



META SKILLS

FIVE TALENTS FOR
THE ROBOTIC AGE

MARTY NEUMEIER

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PREFACE

What happens when a paradigm shifts? Do we simply wake up one day and realize that the past seems irreversibly quaint? Or do financial institutions fail, governments topple, industries break down, and cultures crack in two, with one half pushing to go forward and the other half pulling back?

This is a book about personal mastery in a time of radical change. As we address our increasing problems with increasing collaboration, we're finding that we still need something more—the bracing catalyst of individual genius.

Unfortunately, our educational system has all but ruled out genius. Instead of teaching us to create, it's taught us to copy, memorize, obey, and keep score. Pretty much the same qualities we look for in machines. And now the machines are taking our jobs.

I wrote this book to cut cubes out of clouds, put our swirl of societal problems into some semblance of perspective, and suggest a new set of skills to address them. While the problems we face today can be a source of hand-wringing, they can also be a source of energy. They can either lead to societal gridlock or the most spectacular explosion of creativity in human history.

One thing's for sure: There's no going back, no secret exit, no chance of stopping the clock. The only way out is forward. Our best hope is that once we see the shape of our situation, we can turn our united attention to *reshaping* it. It won't require a top-down strategy or an international fiat to get the transformation going. Just a relative handful of people—maybe people like you—with talent, vision, and a few modest tools.

I've divided the book into seven parts. The first is about the mandate for change. The next five are the metaskills you'll need to make a difference in the postindustrial workplace, including *feeling*, *seeing*, *dreaming*, *making*, and *learning*. The last is a set of suggestions for educational reform, written from the perspective of a hopeful observer.

As you read about the metaskills, take comfort in the knowledge that no one needs to be strong in all five. It only takes one or two talents to create a genius.

—Marty Neumeier

DREAMING

3

BRILLIANT BEYOND REASON. Imagination is one of the more mysterious capabilities of the human mind. How is it possible to conjure up images, feelings, or concepts that we can't perceive through our senses? How can we arrive at perfectly workable solutions without the benefit of logical thought? Is imagination learnable, or is it only the preserve of eccentric artists and mad scientists?

The metaskill of imagination is conspicuously absent from the educational system. There are no classes called "Dreaming 101." Alexander Graham Bell, arguably one of our more prolific inventors, seemed to be unaware of the role of imagination in his own work. He laid down three rules for innovation: 1) Observe as many worthwhile facts as possible; 2) Remember what has been observed; 3) Compare the facts so as to come to conclusions.

Observe, remember, compare—then *presto!*—idea. Hello? Alex? Could there be anything missing between comparing and concluding? Like maybe an insight? No disrespect to the telephone, but since when does the comparison of facts produce innovation?

Let's say I compared a number of worthwhile facts about social media. I observed the ways people use Facebook, noted the increase in worldwide tweets, mapped the behavior of Pinterest users, and measured the market for advertising potential and investor interest. Then I compared these facts. While I might find them interesting, I would still need some insight, spark, or leap of imagination to out-innovate competitors who have access to the same facts. Bell's formula reminds me of the Monty Python skit in which a man is interviewed about how to make a million pounds. "First," he says, "get a million pounds."

When people talk about "dreaming up" an idea, they're not far from the truth. Imagination is closely linked to dream states. Neuroscientists Charles Limb and Allen Braun studied the brains of jazz musicians, revealing a "disassociated pattern of activity in the prefrontal cortex" when they played improvisational music. They found it was absent when they played memorized sequences. These disassociated patterns, they say, are similar to what happens in REM sleep. Dreaming is marked by a sense of unfocused attention, unplanned or irrational associations, and an apparent loss of con-

trol. When students exhibit this behavior in the classroom, teachers call it attention-deficit/hyperactivity disorder. When musicians exhibit it, we call it genius.

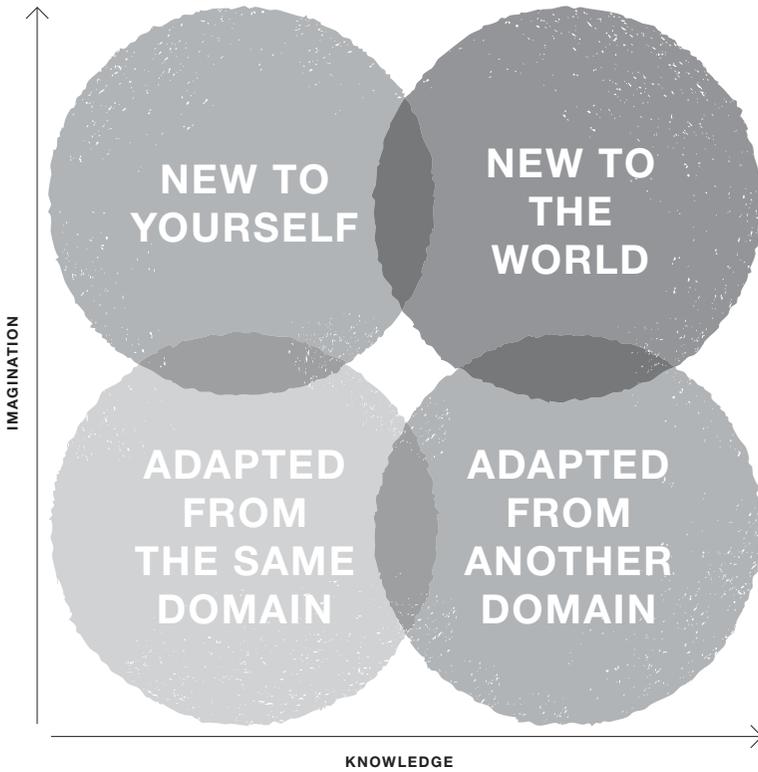
Dreams don't simply visit us. We actively *create* them while we're unconscious, not unlike the way we create our perceptions while we're awake. What makes dreams so fascinating is the absence of logical narrative. The word for dreaming in French is *rêver*—to rave, to slip into madness. Even though the scenes we create in our dreams may seem random or fantastical, their emotional trajectory often makes complete sense. Our emotions are fully engaged while our reasoning is disconnected.

What if we could harness this capability at will? Wouldn't this provide the mental leap needed to connect the facts to a new conclusion? As it happens, there's no other way to do it. Innovation needs a little controlled madness, like the controlled explosions of an internal combustion engine, to move it forward. Applied imagination is the ability to harness dreaming to a purpose. Innovators, then, are just practical dreamers.

The encouraging news from science is that people who have this talent are no smarter on average than other people. They've simply learned the "trick" of divergent thinking. Biographer Walter Isaacson described this quality in Steve Jobs: "Was he smart? No, not exceptionally. Instead, he was a genius. His imaginative leaps were instinctive, unexpected, and at times magical." Jobs had the ability to make connections that other people couldn't see, simply because they couldn't let go of what they already knew.

In order to innovate, you need to move from the known to the unknown. You need to hold your beliefs lightly, so that what you believe doesn't block your view of what you might find out. This is hard for most people. When asked to imagine a new tool for slicing bread, or a new format for a website, or a new melody for a song, they'll stare blankly as if to say, "How could there be such a thing?" They may recall many of the knives, or the home pages, or popular songs they've known, but nothing new will come to mind. At most they might try to combine the features of two or more existing examples to come up with a hybrid.

Originality is
the product of
imagination and
knowledge.



Why is this? What's stopping us from using our imagination? We can only guess that our world of ready-made everything has turned us into a population of idea shoppers. We expect to choose our solutions off the rack instead of building them from scratch. We mix them and mash them, never believing that real originality is within our power. And the companies that make our products are not much different. They shop for *best practices* to make their jobs easier, instead of imagining *new practices* that could set them apart or push them forward. Somewhere along the line we've lost our tolerance for trial and error, settling instead for the derivative, the dull, and the *dis*-integrated. We need to reverse this trend. If we don't, we'll end up low on the Robot Curve.

Originality doesn't come from factual knowledge, nor does it come from the suppression of factual knowledge. Instead, it comes from the exposure of factual knowledge to the animating force of imagination. Depending on the quality of knowledge and the level of imagination applied to it, an idea can fall into four categories: 1) an idea adapted from the same domain; 2) an idea adapted from a different domain; 3) an idea that is new to the innovator; 4) an idea that is new to the world. These are listed in ascending order, with "new to the world" being the rarest and most valuable. The path of learning starts with the more modest forms of originality and leads to larger ones over time.

Imagination is a renewable resource. It doesn't get depleted by

Originality comes from exposing factual knowledge to the animating force of imagination.

use, but instead grows stronger with practice. When you learn the trick of dreaming, of disassociating your thoughts from the linear and the logical, you can become a wellspring of originality and brilliance.

A client once asked architect Mark Kirkhart how he was able to produce so many fresh concepts for a single building. He said: "I have ideas I haven't even had yet."

Like all types of magic, dreaming is the result of practice. There are no shortcuts, only diversions and mental traps. In the following chapters I'll let you in on the hidden discipline that allows innovators to produce their acrobatic leaps of imagination.

THE ANSWER-SHAPED HOLE. The number-one hazard for innovators is getting stuck in the tar pits of knowledge. Knowledge has a powerful influence over creativity. While it can free us to imagine new-to-the-world ideas, it can also trap us into believing opportunities are smaller than they are. When we're stumped by a problem, or when we feel hurried to solve it, our brains can easily default to off-the-shelf solutions based on "what everyone knows." The problem-solving mind is a sucker for a pretty fact. But what we know today may not be what we need to know tomorrow, since every challenge brings with it new requirements for understanding.

Arthur Conan Doyle, in the voice of Sherlock Holmes, expressed something similar when he said, "It is a capital mistake to theorize before one has data. Insensibly, one begins to twist facts to suit theories, instead of theories to suit facts." To avoid jumping to conclusions, we need to hold off solving a problem until we can perceive the general shape of its solution. There are three steps in generating the answer to a problem: 1) discover *what is*; 2) imagine *what could be*; and 3) describe the attributes of success. Let's take them one by one.

What is. This is the body of known facts about a problem. Why is it a problem? What is its history? What is the conventional thinking about it? How have similar problems been solved in the past? In other domains? Other cultures? And what are the practical constraints of the problem?

Constraints are the limitations imposed by the subject matter, or by the context, of a problem. They might have to do with budgets, time, manpower, physics, habits, conventions, or human fears. They squeeze the problem down to a size you can focus on. They force you to writhe uncomfortably in its grip while you struggle to break free. Without constraints, solutions tend towards the ungainly, the unfocused, and the unimaginative. Unbounded challenges are anathema to innovators, draining their energy without delivering insight. Bounded challenges provide not only a starting place but a booster shot of adrenaline.

Louis Pasteur, in a famous 1854 lecture at the University of Lille, said: "*Dans les champs de l'observation, le hasard ne favorise que*

les esprit préparés.” In the field of observation, chance favors only the prepared mind. Pasteur’s statement is often used to support the idea that hard work trumps talent, but it also suggests that the better you understand the facts and constraints, the better your

Without constraints, solutions tend toward the ungainly, the unfocused, and the unimaginative.

chances of solving the problem.

What could be. Facts and constraints are necessary but insufficient. To envision what’s possible, you also need imagination. If innovation is determined

by what’s “useful, novel, and nonobvious,” as the US patent system puts it, then you need ways to get beyond the obvious. One such way is by asking deeper questions.

For example, let’s say you run a marketing department in a large company. The director of marketing, or perhaps the CEO, asks you to address declining revenues by improving the company’s advertising. You could figure out how the existing campaign might be improved with stronger headlines, better product photography, or more precise targeting. Or you could go a little deeper and think about the strategy of the campaign, questioning the underlying concept. You could go deeper still and ask whether advertising is the best place to address the revenue decline. Maybe the real problem lies in product positioning, requiring a shift in brand strategy to outmaneuver the competition. Then again, you might wonder if positioning can save a product line that’s become commoditized over time. Or maybe the problem is the company itself, increasingly hampered by an outdated business model or an uninspired workforce. As the questions go deeper, the answers get bigger.

When Thomas Edison imagined the light bulb, he didn’t frame the question as, How can we create an alternative source of light? Instead he framed it as, How can we make electricity so cheap that “only the rich will burn candles”? While you can easily overreach the possibilities by thinking too big, it’s much easier to tame a wild idea than reanimate a dead one. The best problem solvers are “high yearners,” people who reach for the stars and land on the moon.

The attributes of success. The shape of the missing answer is formed at the intersection of *affordances* and *desiderata*. Affordances are the counterpoint to constraints. They consist of creative pos-

sibilities that are native to the subject, the method, the tools, or the challenge. For example, a movie about the early days of movies contains the possibility of being a silent film (*The Artist*). A car designed for the poor population of India contains the possibility of being extremely minimal (Tata Motors). A company with a breadth of experience but a commoditized product line has the possibility becoming a consulting firm (IBM).

Desiderata are secondary objectives that support a goal or a solution. I once hired a pair of young architects to help me build out a new office space. My company was a startup, so the budget for design and construction was modest. Yet I needed to leave my clients with a memorable experience, and also create a convivial and productive environment for my employees. The desiderata included the budget (small), the hoped-for look (stunning), the number of workspaces (15), the type of workstation privacy (semi-open), and the need for electrical outlets where there were none.

The architects came back with a plan to spend my entire budget on a single element: a large, curving wall of translucent, corrugated plastic that contained interior uplighting and electrical outlets to feed the entire workspace. Inside the wall was a huge logo looming softly over the reception area. In a single move, this simple but inspired solution established the identity for the new firm, separated the client spaces from the working spaces, supplied electricity to the workstations, and created a buzzworthy experience for visitors. When I asked the two how they were able to conceive such a surprising solution, they grinned at each other and replied in unison: “Talent.”

The principle of desiderata can be applied to any number of problems. It’s really as simple as compiling a wish list. Ask yourself this question and fill in the blank: Wouldn’t it be great if _____? When you finish your list, call out the wishes that would create the most compelling outcome. These will form a sort of matrix, a convergence of vectors that define the shape of the answer. When the answer appears, it’ll pop into place like the final piece of a jigsaw puzzle.

THERE BE DRAGONS! The frame of a problem is not a comfortable place. It's filled with tension, confusion, danger, and doubt. It's a veritable dragon pit of unresolved conflict. On one side you've got the reality of *what is*, or *what is common*, and on the other side you've got a vision for *what could be*, or *what could be different*. In between lies a battle. For this reason most people are eager to get in, make a decision, and get out. But creative people know they have to stay in the dragon pit because that's where the ideas are.

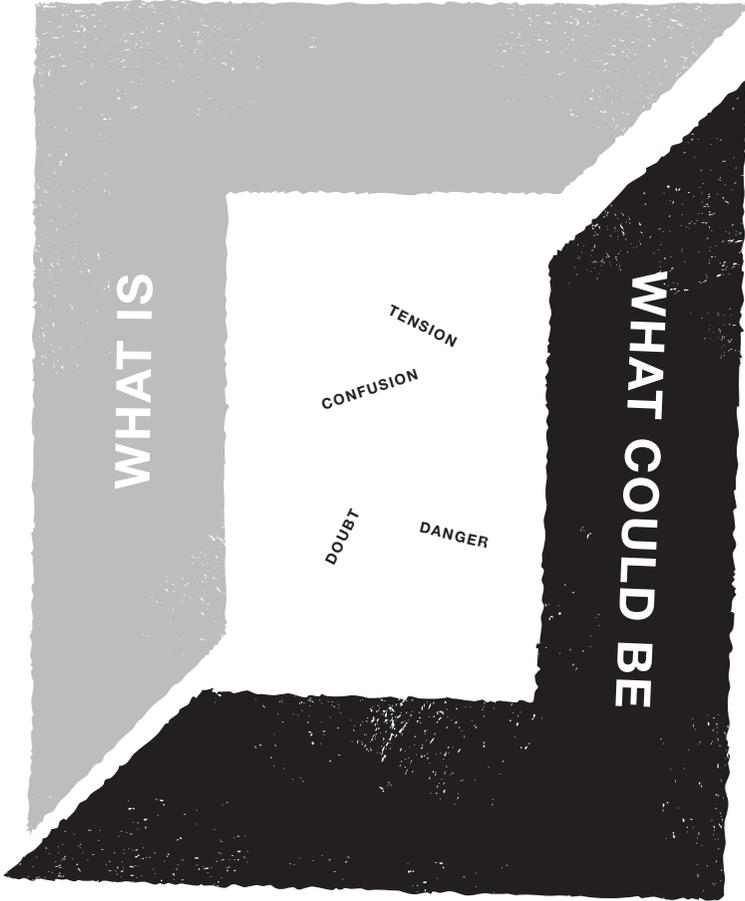
The uncomfortable tension between *what is* and *what could be* creates a mental spark gap—a space between two poles that can only be bridged by a leap of imagination. If you close the gap too quickly by making the easy decision, there's no spark. If you keep it open longer, ideas and insights will start to appear in rapid succession.

Pretend you're a commercial farmer growing tomatoes for a living. On one side you feel competitive pressure to use more pesticides and chemical fertilizers to increase yields and control costs. On the other side you face mounting criticism from environmental groups and customers who are calling for organic farming methods. The quickest fix is to decide one way or the other—either go large and commercial or small and organic. However, neither is a very good solution. The demand for low prices will continue, and the desire for organic produce will keep growing. By staying in the pit it's possible to imagine a third alternative that exists outside this simple dichotomy.

How, you ask? By learning to embrace paradox. A *paradox* is a proposition that contains two contradictory thoughts while expressing a truth. For example, Thoreau's statement that "the swiftest traveler is he that goes afoot" would seem to be a contradiction. Everyone knows that walking is not the fastest mode of travel, but the paradox contains an idea: You might make more progress by keeping things simple. Or you might learn faster by doing things the hard way. By expressing a problem as a paradox, you force your mind to look for new answers.

Physicist Niels Bohr found that by holding two opposing thoughts in his mind at the same time he was able to move his

The frame
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dragon pit.



The uncomfortable tension between what is and what could be creates a mental spark gap.

imagination to a higher level. In some cases, like the problem of understanding electrons, the paradox he met with was actually the answer. *Complementarity*, now a basic principle of quantum theory, proves that an electron can be both a wave and a particle at the

same time, even though it can't be viewed both ways at once. While it confounds our sense of reality, it's true nevertheless.

One of the qualities of a genius is a strong tolerance for ambiguity. This is often difficult, because the human brain seeks closure. We're uncomfortable with the feeling of cognitive dissonance, of not knowing the right answer. And a brain that doesn't like paradox is one that jumps to any conclusion, right or wrong, that can end the debate. The secret to getting the most out of your imagination is to keep the problem in a liquid state as long as possible.

The scientific tool of *hypothesis*, defined as a testable supposition, is less science than art. It's more akin to the maquette of the sculptor or the preliminary sketch of the painter than the provable truths we associate with the scientist. The painter has to be willing to draw badly or paint uncertainly while working through a new composition. "Art needs to incubate, to sprawl a little, to be ungainly and misshapen before it finally emerges as itself," says Julia Cameron, author of *The Artist's Way*. "The ego hates this fact. It wants instant gratification and the addictive hit of an acknowledged win." Creative thinking, whether in the service of art or science, requires that we postpone gratification while we try out different approaches.

New ideas can't be proved in advance. This comes close to being a tautology, as if saying, "New ideas are new." Yet the ways we're taught to use logic don't account for this simple fact. We're taught to reason using only deduction and induction, two methods handed down from the Greeks that make little use of imagination. *Deduction* is the logic of argument, drawing specific conclusions from general rules. *Induction* is the logic of educated guesses, drawing general conclusions from specific observations. While both of these are helpful in judging a hypothesis, neither is suitable for cre-

ating a hypothesis. For this we need a third kind of thinking called *abduction*, the nonlogic of *what could be*.

If architect Frank Gehry had used logical reasoning as a starting place for his projects, he never could have invented the swooping, shimmering forms of Bilbao's Guggenheim Museum. He would have designed a very nice building that the city could be proud of, but that few tourists would consider a destination. To escape the trap of logic, he started by drawing shapes that made use of his imagination, emotion, and gestural instincts. Undoubtedly, many of these were "ungainly and misshapen," but something mysterious and satisfying began to emerge, a highly sculptural edifice with the curving forms of a sailing ship. He called this stage "capturing the dream." It's not the result of logic but of nonlinear thinking, a conscious choice to avoid the deeply rutted road.

The search for innovation is progressive, starting with the most obvious ideas and moving further out with each attempt. First ideas are rarely the best ideas, and real innovators recognize this. They force themselves to climb onward and upward until they arrive in virgin territory. In some creative circles, this is known as "third-pasture thinking." When horses are let into a pasture, most will be content to eat the grass they find there, even though it's been trampled by previous herds. Some horses, however, will move up into a higher pasture where the grass is slightly fresher. One or two others will climb all the way to the third pasture, where the grass is pristine and new.

The New Yorker hosts a popular contest in which readers are invited to fill in the caption for a new cartoon. Tellingly, the editors found that about 20 percent of contestants would come up with the same funny line for the cartoon. Very few would make the leap to a surprising and concisely written caption that rose beyond the simply logical. Those 20 percent got stuck in the second pasture. They probably never realized there were fresher ideas further up the hill.

The proper approach to invention is not logic but wonderment. Creative thinking begins with phrases like "I wonder," "I wish," and "what if." It sets out from a position of not knowing, then winds

By expressing the problem as a paradox, you force your mind to look for new answers.

slowly and circuitously through the problem until it finds something unexpected and untried. It then takes that something—the so-called “germ of an idea”—and begins to poke and pull and twist it until it resembles something new. It only attains the status of knowledge when it’s been tested in the real world. How does it get to the real world? Through the dogged persistence of a dragon slayer.

A MOST UNPLEASANT YOUNG MAN. Steve Jobs, a cofounder of Apple Computer, was only 30 when I interviewed him in 1985. Back then I was the part-time editor of a design journal, and the interview was to be the highlight of a two-issue cover story. I could hardly wait to meet the man behind the Macintosh.

Right from the start it didn’t go well. We argued. I don’t know how this happened, because my only task was to pose questions and record the answers on a pocket tape recorder. Maybe it was similar to what occurs when you place the negative poles of two magnets together: they repel each other. I still wince when I remember the interview.

ME: What’s this device here on the table?

STEVE: It’s new. It’s called a LaserWriter. You can print whatever you see on the screen.

ME: You’re kidding—that’s fantastic!

STEVE: No big deal. We just buy these from another company.

ME: I see it has an Apple trademark on it. And the trademark looks a little different. Is that new, too?

STEVE: Yeah, we’ve updated our logo.

ME: You mean the typographical part?

STEVE: No, I mean the symbol part. *Logo* is Latin for *symbol*.

ME: Actually, it’s Greek for *word*. I thought maybe you changed the letterforms, too.

STEVE: You’re wrong. *Logo* means *symbol*.

ME: Okay.

STEVE: It’s Latin, not Greek.

ME: Okay.

STEVE: What I like about our logo is that it's completely unique.

ME: Hmm, I thought it might have been a witty homage to Apple Records.

STEVE: That's absurd.

ME: Well, it's not completely unique, because I designed a similar trademark about eight years ago—an apple with a bite taken out of it—for an educational company. (I happened to have a copy of the awards annual in which it appeared. I shared. There was a pause.)

STEVE: Ours is better.

ME: Can you tell me who designed it?

STEVE: I have no idea.

ME: Well, I guess we don't have to credit the designer.

STEVE: Any other questions?

ME: I guess not.

STEVE: Then I think we're done.

I drove home feeling sick. I had the man of the year all to myself, and the best I could do was spar with him.

My wife kindly offered to transcribe the tapes, which also contained interviews with several other Apple executives. When she got to the last interview, she threw her headphones to the floor. "Who is this guy?"

"I think you mean Steve Jobs."

"Well, he's extremely unpleasant."

Apple's board of directors agreed. Three weeks later they forced him to leave the company he founded. When he returned after nearly 12 years in exile, the company's value had shriveled to about \$4 billion, a fraction of Hewlett-Packard's \$62 billion valuation. Yet over the next 12 years under his strong-willed leadership, Apple's value rocketed to \$184 billion, surpassing the worth of both Hewlett-Packard and Dell put together. By the time of his death in 2011, Apple had become the world's most valuable company.

What was it about Jobs that enabled this level of success? Was it his immaculate design sense? His visionary stewardship? His Buddhist leanings? His vegan food preferences? His Sixties idealism?

The adoration of his adoptive parents? His belief that he was chosen to “put a dent in the universe”?

Probably all that. But there’s one more thing, and it’s readily apparent in the conversation above: He was a prime contrarian. If you said the sky was blue, he said it was wide. If you said a trademark couldn’t be printed in three colors, he would stamp his feet until he got six. As a designer, he was slow to recognize the potential of another person’s idea. But after knocking it around in his head for a while he would often take ownership of it.

A key characteristic of an inventive mind is a strong *disbelief* system. Einstein and Picasso were dyed-in-the-wool skeptics. Einstein’s physics professor once told him, “You are quite smart, but you have one big failing. You never listen to anybody.” Similarly, Picasso’s lithographer Fernand Mourlot once said, “Picasso looked, listened, and then did exactly the opposite of what was shown him.” In science and art, as well as in other fields, innovation is an act of rebellion. You have to reject conformity if you’re looking for brilliance.

The challenge, then, is how to put contrarian thinking to work without alienating the people you depend on. I have a few suggestions:

Learn to recognize judgments. Develop an ear for authoritative pronouncements about second-order reality—the world of meaning, not fact—and subject them to questioning. “Who says?” is a good place to start. Another is “So what? A third is “Why not?” You don’t have to be rude, just curious.

Dare to be wrong. What would the answer be if you reversed one or more of the assumptions? What would happen if you did the

A key characteristic of an inventive mind is a strong disbelief system.

opposite of what other people would do? As the saying goes, “If you only think what you’ve already thought, you’ll only get what you’ve already got.”

Some groups and organizations place such a high premium on being right that there’s no room for being wrong—even for a moment. These are the groups with the most severe cases of “infectious repetitis.”

Stay in the dragon pit. Entertain competing ideas for as long as possible, instead of scrambling to the safety of the known. It’s com-

mon for managers and business leaders to think they have to have all the answers. This not only sets you up to fail, but undermines your credibility. Real innovators revel in the unknown. They love a mystery. As business advisor David Baker says, “An entrepreneur is someone who dives into an empty swimming pool and invents water on the way down.”

Be disobedient. Don’t play by the rules. If your goal is innovation, aligning with current practices is anathema. Alignment works well when the world isn’t changing. But of course the world *is* changing. Rules can be helpful, but some rules are nothing more than scars from a previous bad experience.

Don’t wait for research. Working without knowledge can feel like driving without headlights, but there’s no law that says all the research has to come first. Sometimes it’s better to grope your way toward an answer, then check it against reality when you have a specific hypothesis in hand.

Cannibalize yourself. Do what *The Atlantic* did when it found itself stuck in the dying world of print magazines: Pretend you’re a venture-capital-backed startup in Silicon Valley whose mission it is to attack *The Atlantic* by disrupting the industry. Steve Jobs put it bluntly: “If you don’t cannibalize yourself, someone else will.”

Stand up for quality. The 20th century has been a triumph of quantity over quality, but in the 21st century we need to reverse the trend. “Be a quality detector,” says systems thinker Donella Meadows. “Be a walking, noisy Geiger counter that registers the presence or absence of quality. If something is ugly, say so. If it is tacky, inappropriate, out of proportion, unsustainable, morally degrading, ecologically impoverishing, or humanly demeaning, don’t let it pass.”

There you have it. Seven tips for being a contrarian without becoming a bully, a tyrant, or a curmudgeon. Ego-driven unpleasantness will always be a temptation for innovators. But how many inventions, masterpieces, and market disruptions would have happened without the researcher’s hubristic ambitions, the artist’s grand designs, or the entrepreneur’s blithe disregard of risk?

“Here’s to the crazy ones,” intoned the announcer for Apple’s

What would happen if you did the opposite of what other people would do?

comeback commercial. “They’re not fond of rules. And they have no respect for the status quo. You can quote them, disagree with them, glorify or vilify them. About the only thing you can’t do is ignore them...Because the people who are crazy enough to think they can change the world are the ones who do.”

THE PLAY INSTINCT. How do you picture something that isn’t there? What’s the process for uncovering insights? Why do some people seem more inventive than others?

Hint: It’s not because they work diligently. Instead, it’s because they work *differently*. Imagination is the child of obstinacy and playfulness. It comes from a refusal to settle for the comfortable answer while having fun doing it.

During the Industrial Age, fun was discouraged. It took time to have fun, and time was the nonrenewable resource that needed to be managed, maximized, and measured. Employees were paid by the hour, the day, or the year. They were paid by number of pieces they could complete. Or they were paid by the predetermined function they performed. They were not paid by the number of new ideas they brought to the table or by the passion they brought to their work. Time was money and money was time.

After the clock came to Europe in 1307, it took less than a century for mechanical time to sweep the continent. With clocks you could agree on the delivery of a shipment, regularize the baking of bread, and estimate the completion of a brick wall. Clocks paved the way for sophisticated banking, transportation, mass production, and eventually computers. They brought precision to business. But they also brought an undue emphasis on quantity over quality.

The ancient Greeks understood that time came in two flavors: objective time, called *chronos*; and subjective time, called *kairos*. Chronos could be measured by the sun, the moon, or the seasons. Kairos could not be measured, only judged by the quality of one’s experience. My kairos is different from your kairos, but our chronos is the same. Today we use the phrase *quality time* to describe the experience of living in unmeasured time. We find that as soon as

we measure or limit quality time, it quickly turns into *quantity time*.

Think back to a day in your childhood when you were so busy playing that you lost track of the clock. The minutes and hours blended seamlessly, one into the next, while your mind focused on some absorbing project or engaging activity. As you grew older, your *play instinct* began to fade. The requirements of society demanded more attention to objective time—an adherence to deadlines, agreements, and social courtesies—until play became more and more associated with nonproductivity, a kind of time that had no commercial value.

Yet *quality time* is the state in which imagination flourishes best. You can't decide to produce an insight in 30 minutes or have an idea by 3:15. But you can decide to forget about the clock and focus on the challenge, in which case you may well have an idea by 3:15—or even five ideas. Imagination takes as long as it takes, and rushing it usually slows it down. This is the central conflict between the world of business and the world of creativity. They need each other, but can't seem to understand each other. They're working in two different kinds of time.

The solution to this dilemma, in my experience, is for business “doers” and creative “dreamers” to focus on goals instead of deadlines. Goals form the common ground that unites both workstyles. Focus on goals, take away the clocks, and start playing as soon as possible. What you'll find is that generating ideas “out of time” can produce results much faster than holding yourself to a deadline. If you wait until the last minute, however, leaving little opportunity for play, you'll find yourself clutching the first idea that floats by. Quantity time will enter the picture and force a mediocre result.

Goals are the common ground that unites business “doers” and creative “dreamers.”

If you could pry the roof off of all the mediocre companies in the world, you'd see an army of adrenaline addicts working on perpetual deadline, madly checking boxes instead of thinking ahead. You can get an immediate buzz from getting things done, but innovation requires something more—it requires unmeasured time in the dragon pit.

But what should you be doing there? What are the rules of cre-

ative play? How do you know when you're winning? Here's where quantity plays a crucial role. The best creative thinkers are usually the most prolific thinkers, because innovation, like evolution, depends on variety. In fact, you could say that innovation is really just evolution by design. The more ideas you have, the better your odds that two will combine to make a useful third idea. In the par-

The best creative thinkers are usually the most prolific thinkers, since innovation, like evolution, depends on variety.

lance of creative theory, you're *fluent*. When ideas flow, the music of chance plays faster.

In London's Highgate Cemetery, where ancient crypts lean out over twisted trails in silent competition for post-life prestige, one headstone stands in contrast. It's a small gray rectangle lying flat against the edge of the road to mark the grave of historian Jacob Bronowski. Bronowski was the narrator of an early PBS series called *The Ascent of Man*. On screen he spoke slowly and with a little trouble pronouncing the letter R, his stage-glasses flashing into the camera whenever he delivered his most fascinating insights. "A genius," he said, "is a person who has two great ideas." What he meant was that innovation often comes from connecting two thoughts that previously had been unconnected. These might be two ideas that had never been considered together, or two ideas previously thought to be in conflict, or one old idea plus one new idea. Einstein's term for this process was *combinatory play*.

While there may be nothing new under the sun, there's no restriction on combining old things in new ways. For an exhibition called "Making Connections," about midcentury designers Charles and Ray Eames, Ralph Caplan described their firm belief in combinatory play—the excitement of connecting disparate materials such as wood and steel, of connecting alien disciplines such as physics and painting, of connecting people like architects and mathematicians or poets and corporate executives. The connection point "is the crack in the wall, the point at which a designer can sneak past the limitations while no one is looking."

The importance of connections is also echoed by recent discoveries in neuroscience. The brain forms new ideas when two old ideas suddenly overlap. Cortical cells then make new connections,

rewiring themselves into fresh networks. Once the insight has been formed, the prefrontal cortex can name it and claim it. But the real genius lies not in making interesting combinations, but in separating the great ideas from the merely crazy ones by applying the principles of aesthetics. Some connections offer a better fit than others.

Of course, it's easy to talk about fluency and variety and prolific imagination, but how do you start? What's the selection criteria? Where do combinable ideas come from?

Happily, they come from learnable techniques. While some people may be naturals in the realm of imagination, we can all improve our skills with deliberate practice. Here are ten strategies that can trigger new ideas.

Think in metaphors. A metaphor is a way of making a comparison between two unrelated things. "All the world is a stage" is an example. The world is not a stage, but it's *like* a stage in some ways. Shakespeare could have used a simile instead of a metaphor—"The world is like a stage"—and it would have had the same meaning, just not the same impact. By saying the world is a stage, a fresh idea is forced to emerge—that every person is merely playing a part.

Thinking about problems metaphorically moves your thinking from the literal to the abstract, so you can move freely on a different plane. To a literal thinker, a rose is a rose. To a metaphorical thinker, a rose could be a young woman's cheek, a seductive trap, or the morning sky before a storm. If your challenge is to invent a new name for a store that sells footwear to active girls, you could call it Active Footwear. Or you could think in metaphors and move beyond the first pasture. For example, maybe active footwear for girls is like the ballet slippers in *The Red Shoes*, or like a bouncy pop song from the sixties, or like—wait a minute. What if we call it Shubop?

**When ideas flow,
the music of chance
plays faster.**

Think in pictures. Many people assume Einstein was a logical, left-brain thinker, but he was actually the opposite. Rather than using mathematics or language to crack a tough problem, he preferred to think in pictures and spatial relationships. This is because visual thinking can strip a problem down to its essence, leading to profoundly simple conclusions that ordinary language might not

be able to reach.

Visual thinking isn't just for graphic designers, artists, and illustrators. It's for anyone who can draw a stick figure, an arrow, and a talk balloon. Pick up a copy of *The Back of the Napkin* by Dan Roam to learn a few of the most useful tricks. You'll wonder why more people don't think like Einstein.

Start from a different place. Your brain builds up patterns of experience that act as attractor states, making it hard to think in new ways. Your best shot at clearing this hurdle is not to try and jump it but to go around it. Start from a different place. Start from a place that doesn't make any sense. Better yet, think of the worst place you could possibly start, and start there.

Let's say, for example, your task is to negotiate a peace treaty between warring states. (What? You don't have that on your calendar?) So far no amount of reasoning has been able to bring the two sides together. You could try more reasoning, or better reasoning, or perhaps the threat of draconian intervention, but these are likely to cause further entrenchment.

So you start from a different place. What would be the worst way to structure the talks? How about suggesting that the two leaders declare immediate, mutual, all-out war? Obviously, that's crazy. But at least it's different. Okay, what if you suggest it anyway, just to make a point about the absurdity of war? Then, when the two parties reject the idea, you can propose a less dramatic solution: Arm wrestling to the death, winner take all. No? How about this? Arm wrestling, and whoever loses buys the other a beer. Now we're getting somewhere. At least they'd have to be human, which would count as progress and make a great photo op as well.

The arm-wrestling photo op solution may not be the final idea, but you can see how difficult it would be to get there using the standard negotiating handbook. Next you might imagine other photo ops that could serve as clever backdrops for negotiation, and so on and so forth. By following the trail from the worst idea to a workable idea, you can avoid being imprisoned by old patterns.

Poach from other domains. Voltaire said, "originality is nothing but judicious imitation." What could be more judicious than steal-

In combinatory
play, new ideas are
created when two old
ideas collide.

BOOTS

TWEEZERS

WEAPONS

BUTTONS

← VELCRO

BURRS

WEEDKILLER

GLOVES

ing ideas from other fields? While stealing is not the same as pure imagination, it still takes a mental leap to see how an idea from one industry or discipline might be used in another industry or discipline.

Gutenberg got the idea for the printing press from watching the mechanics of a wine press. This mental connection launched the book industry, and did no harm to winemakers.

One fine summer day in 1948, amateur inventor George de Mestral took his dog for a walk in the woods. Upon returning, he found his dog and his pant legs covered in pesky burrs. When he put them under a microscope he saw tiny hooks, perfectly suited for attaching themselves to fur and fabric. The result? Velcro.

In 1921, a 14-year-old Philo Farnsworth got the idea for the electronic television while tilling the family's potato farm. The back-and-forth plowing pattern suggested the back-and-forth scanning pattern for cathode ray tubes. Talk about stealing ideas from another field!

Arrange blind dates. The cases above show how a prepared mind can make novel connections under the right circumstances. But it's also possible to force connections by introducing two unrelated ideas. What do you get when you cross a bank with an Internet café? A shoe store with a charity? A Broadway show with a circus performance? Adhesive tape with a bookmark? You get successful business models like ING Direct, Tom's Shoes, Cirque du Soleil, and Post-it Notes.

Of course, you can also get the business equivalent of kitsch, as Clairol did when it crossed yogurt with hair care and got Touch of Yogurt Shampoo. Or as Omni did when it crossed a television hit with a carbonated drink and got Tru Blood soda. Don't fall in love with your first idea. Novelty and innovation are two different things.

Reverse the polarity. While it doesn't usually work with electronics, reversing the polarity in an assumption can release conceptual energy. Here's how you do it:

Let's say your challenge is to get your employees to wash their dishes instead of leaving them in the sink for someone else to do.

You can start by listing some assumptions about the problem.

1. Employees don't like doing dishes.
2. It's hard to tell whose dishes are in the sink.
3. The dishes are company property.
4. Dishes are easier to clean after they soak.
5. Dishes tend to pile up.

Now, reverse the assumptions to see what happens.

1. Employees love doing dishes.
2. It's easy to tell whose dishes are in the sink.
3. The dishes are employee property.
4. Dishes are easier to clean before they soak.
5. Dishes never pile up.

What would it take to make these true? Well, employees might love doing their dishes if they had a great music system at the sink. It would be easy to tell whose dishes were in there if each item were personalized with the employees' names or initials. Maybe employees could be allowed full kitchen privileges, but only if they agreed to use their own kitchenware. Or maybe you could install a large-capacity dishwasher that makes it just as easy to put dishes there as in the sink. Or maybe you could make your sink and sideboard so small that the dishwasher was the only logical place to put them. Of course, you could just lay down the law, then enforce it with a surveillance camera. But that seems a bit draconian.

Find the paradox. If you can describe the central contradiction within a given problem, you're well on the way to solving it. When designer Mitchell Mauk noticed a problem with the storm drains in San Francisco, he took it the initiative to propose a solution. The city had been concerned about people dumping motor oils and chemicals into the sewers, where they would flow into the bay and pollute the fish habitats. The usual warnings posted near the drains weren't working.

The central contradiction might have been stated like this:

People won't stop dumping toxins through the sewer grates unless they can read the signs, and they won't read the signs if they're too busy dumping toxins through the sewer grates. So Mauk asked the question another way. Can the sewer grates and the signs be one and the same? His elegant Gratefish sends an unambiguous message: Whatever you put down the drain goes right into the fish.

Give it the third degree. What else is like this, from which you could get an idea? Is there something similar that you could partially copy? What if this were somewhat changed? What can you eliminate? What can you substitute? Is this the cause or the effect? What if you changed the timing? In whose shoes should you put yourself? The questions are endless, but they don't take much time to ask.

Be alert for accidents. The great thing about creative play is that mistakes don't have consequences. You're free to follow any rabbit down any hole. While most of the time you won't find what you're looking for, sometimes you'll find what you *weren't* looking for, and that can be even better.

When mechanic John Hyatt was looking for a substitute for billiard-ball ivory, he accidentally invented celluloid, the plastic used in making movie film and hundreds of other products.

When Percy Spencer was working on radar for the military, he found a melted candy bar in his pocket, thus discovering the working principle for microwave ovens.

Steve Jobs, while trying to design a tablet computer, discovered a great set of features for the iPhone instead. The iPhone became the stepping stone back to the iPad.

Physicist Richard Feynman had a simple test for new ideas. "What did you discover that you didn't set out to discover?" If you only found what you expected to find, your idea probably isn't new.

Write things down. When I was a wannabe songwriter in my teens (who wasn't?), I never worried that I might forget a line of melody or snippet of lyric. I told myself if it were that good it would probably come back to me. Conversely, I believed if it didn't come back to me, it probably wasn't that good. There were two flaws in this logic. First, I *did* forget good musical ideas, and, second, the value

of ideas often lies in their ability to trigger better ideas. If you don't capture them, you can't build on them.

"Ideas never stand alone," says Kevin Kelly. "They come woven in a web of auxiliary ideas, consequential notions, supporting concepts, foundational assumptions, side effects, logical consequences, and a cascade of subsequent possibilities. Ideas fly in flocks," he says. "To hold one idea in mind means to hold a cloud of them."

A cloud of ideas is a wonderful image. But my advice? Don't try to hold them all in your mind. Write them down. Record them. Get in the habit of taking notes, keeping a diary, carrying a sketchbook, or thinking out loud on a whiteboard. Just because play is fun doesn't mean your ideas aren't worth saving. This is especially true when the playground is collaborative.

DREAMING TOGETHER. Personal mastery can only have meaning in the context of group. None of us can succeed alone, even those whose work is mostly solitary. We all need society, culture, education, government, and industry to provide a framework in which mastery matters, and in which mastery can be learned. Furthermore, in a growing number of domains, nothing meaningful can be accomplished without the cooperation of a diverse set of players.

Creative collaboration, as a business competency, can't be confined to the R&D department. One reason industry has been less than creative during the last century is that innovation was disconnected from business strategy. It was locked in a small, windowless room in the basement, where it couldn't interfere with the running of the company.

In the Robotic Age, creative collaboration needs to escape the lab, linking people from top to bottom, beginning to end, across disciplines and over regional boundaries. It must become a day-one activity that's promoted and modeled by leaders, instead of a follow-on activity that only kicks in after a strategy has been endorsed.

The concept of brainstorming was introduced by Alex Osborn in *Applied Imagination*, a 1953 book that's still worth reading. He recommended that a brainstorm group consist of five to ten peo-

Creativity needs to escape the lab, linking people from top to bottom, beginning to end, across disciplines and over regional boundaries.

ple, including both “brass and rookies.” At least two people in the group should be self-starters, and they should be “sparking” from the moment the problem is stated. He observed that larger groups

are better at getting buy-in on broad solutions, and smaller groups are better at solving specific problems. So far, so good.

The key to brainstorming, believed Osborn, was to foster an atmosphere in which judgment was temporarily suspended. When participants fret over criticism, they hold back or edit their ideas to remove the threat of embarrassment. Most people take this principle as gospel, knowing from direct experience that a brainstorming session can quickly turn into a sniping session.

“The crazier the idea the better,” he always said. “It is easier to tone down than to think up.” In Osborn’s version of the game: 1) judgment was suspended; 2) wildness was welcomed; 3) quantity was wanted; 4) combination and improvement were sought. The only problem: innovation was absent. Most of the early brainstorming groups that suspended judgment had a lot of fun but little success.

There’s a big gap between good crazy and bad crazy. Good crazy is the kind of idea that seems crazy on the surface, but on closer examination is actually quite smart. Bad crazy is just crazy. Brainstorming groups that followed the rule of suspended judgment could often cover the walls with hundreds of ideas, but then they’d run out of energy before they could sort them and turn them into workable solutions. Crazy thinking can be frustrating when it turns into a tedious, thousand-monkeys exercise. This kind of session, in which all ideas are welcome and political correctness reigns, might be called *softball brainstorming*.

When the mission is critical and the time is short, however, what works best is *hardball brainstorming*, in which participants are experienced, well matched, and focused like a laser on the problem to be solved.

In hardball sessions, ideas are judged as they’re pitched, producing not discouragement but more ideas, as thoughts bounce

up against thoughts, deflecting minds into new areas of consideration. Instead of keeping judgment on a leash, hardballers apply *more* judgment. But it's creative judgment, based on the knowledge of what a great idea looks like as it moves through its various stages.

This is not to say that sessions like these are always pleasant. Stretching the imagination can be draining work, and tempers can flare. Therefore the main rule in hardball is to focus not on *who* is best but *what* is best. When everyone is working toward a shared goal, lightly bruised egos are quickly salved by group success.

In both kinds of brainstorming, hardball and softball, there's a necessary tension between contrariness and cooperation. Cooperation is essential for achieving an outcome, but without a certain amount of contrary input, the outcome is likely to be mushy. Studies by organizational psychologists have shown that individuals, not groups, tend to be better at divergent thinking, while groups are better at convergent thinking. When faced by complexity that tests the biological limits the brain, groups often default to a herd mentality instead of fighting for divergent ideas.

To guard against herd thinking, shared goals should be as bold as possible. They shouldn't be ordinary or safe. As Howard Schultz said about the challenge of engaging stakeholders at Starbucks, "Who wants a dream that's near-fetched?" The simplest way to develop bold goals is to start by wishing. When you get the members of a group to start wishing, their dreams can quickly become roadmaps. There's a reason people tell you to be careful what you wish for. It works.

For large design projects, especially those which benefit from multidisciplinary teams, there's an ongoing search for "T-shaped" people. A T-shaped person is one who has a strong descender (the vertical stroke of the T) and a well-developed crossbar (the horizontal stroke). The descender represents deep experience in a certain discipline, and the crossbar represents the ability to work with people across disciplines. Like rock bands, creative groups need specialists who can contribute something unique to the collaboration. The last thing they need is I-shaped people—specialists who have useful skills but can't work

In hardball sessions, ideas are judged as they're pitched, deflecting minds into new areas of consideration.

with others.

Finally, both rock bands and creative groups need one more member: an X-shaped person. This is the one whose main role—though not the only role—is to bring the group together and facilitate progress toward a goal. X-shaped people are rare, because they usually have to prove their worth by first mastering a discipline. The leadership gene is an extra gene, a skill on top of a skill. John Lasseter has been a great creative leader for Pixar, but he developed his credibility and his deep-domain expertise by working first as an animator.

When X-shaped people attract the right T-shaped people to the mission, magic can happen. A surprising number of players will volunteer to dream together and work together if the goal is bold enough and the leader respected. This is especially true in an age of virtual collaboration. Anyone who has watched the exponential growth of Wikipedia can sense the power of collaboration. And while contributions to Wikipedia are voluntary, nothing would have happened without the passionate facilitation of its founder, Jimmy Wales.

Today there's a new variation of collaboration that takes advantage of widespread connectivity. *Swarming*, as it was originally termed by the military, is a method for attacking a problem or a project from a number of angles at once. Rather than structure a project as a linear exercise, the swarming method unleashes the full power of simultaneous collaboration. It lets you jumpstart the project by bringing a variety of minds together at the start, then tap the talents of a wide range of disciplines throughout the process.

Let's say you manage a design firm or an internal marketing department. As soon as you get an assignment, you might embark on the usual process of gathering executive interviews, doing customer research, brainstorming concepts, putting some initial thoughts on paper, making prototypes, testing them, refining them, and finally producing them. Because the steps are linear, each one depends on the one before, and the whole process takes ten weeks. Swarming, by contrast, lets you interview, research, brainstorm, sketch, and prototype in parallel, with each activity informing the



Great teams
are formed when
when T-shaped people
are joined by
X-shaped people.

others, while the team quickly builds up a rich understanding of the project's possibilities. Not only is it faster, but it skirts the danger of playing "telephone"—the children's game in which one kid whispers something quickly to a neighbor, who whispers it to the next neighbor down the line, who whispers it to the next neighbor, and so on, until "dancing on the lawn" becomes "Mrs. Johnson's dog." With swarming, the project has a better chance to come through in its purest, most focused form.

But let's be clear about collaboration. A team is only as good as the skills of the individuals in it. While you can learn a lot from working with great people, your value to the team comes from the quality of your own effort. Whether a T or an X, you still have to develop your own metaskills, create your own thought processes, and do battle by yourself in the dragon zone. A master's degree won't help you. Only mastery itself.

THE BOLT UPRIGHT MOMENT. The metaskill of dreaming brings with it a built-in reward: the glorious split second when the world suddenly reels, a thousand gears snap into place, and the long-hidden answer appears, shimmering, before your disbelieving eyes.

While not every epiphany packs this kind of punch, many do. It all depends on how difficult the problem was, how important the outcome is, and how long the solution has eluded you. And it also depends on the beauty—the sheer aesthetic elegance—of the final answer. Imagine the breathtaking moment when Einstein realized that the secret of relativity could be expressed in three letters and a number. He once likened the surprise of scientific discovery to a hen laying a golden egg. "*Kieks! auf einmal ist es da!*" Cheep! suddenly it's there!

I can honestly say that I'd rather have an epiphany than win the lottery. Okay, the lottery brings money, but it leaves you with the problem of how to turn your money into the kind of transcendent experience that makes life worth living. It's much easier to turn epiphanies into money than the other way around. Winning the lottery is like finding a golden egg; learning to dream is like raising a golden goose.

There's a good reason why people have reported sitting bolt upright in bed, suddenly awakened from slumber after weeks or months of wrestling with a problem. Their subconscious mind has been busy working behind the scenes to sort through the rational complexities that kept the solution hidden. This "dark time" is known as the *incubation* period, a stage when the problem, as it was originally framed, does not seem to yield to a solution. The solution can only come when the rational mind lets go so the dreaming mind can take over. It can happen during actual dreaming, but it can also show up anytime the rational mind lets down its guard—while taking a shower, driving a car, lying on the beach, or having sex (presumably with one's muse). Once, when Johann Sebastian Bach was asked where he found his melodies, he answered that the problem wasn't *finding* them—it was not *tripping* over them when he got up in the morning.

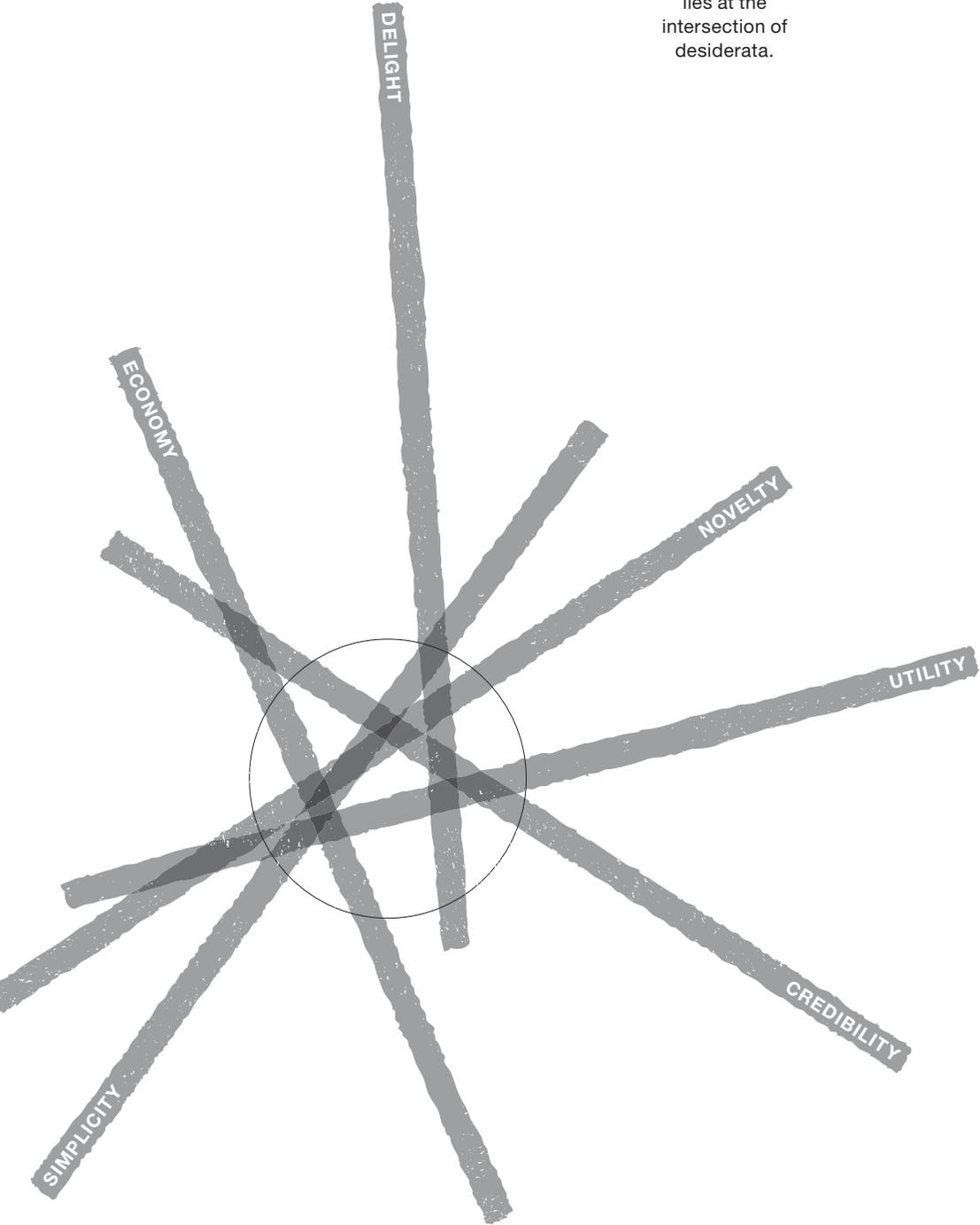
The bolt upright moment is the point at which a new idea clicks into the right criteria, even when the criteria are poorly understood. Sometimes what you think are the right criteria are not, and you find that your subconscious brain has reframed the problem. Other times, the criteria are so complex that your rational brain can't make sense of them, leaving the job to your dreaming mind.

Imagine criteria as a pile of pick-up sticks that happened to fall in a certain pattern. Each stick is a line item on your problem-solver's wish list. All you have to do is find a pattern where most of the pick-up sticks overlap. But there's a catch: Some of the sticks are hard to see, some are more important than others, and some won't stop moving. The shifting, now-you-see-it-now-you-don't landscape of criteria can overwhelm the focusing mechanism of your mind.

The bolt upright moment is the point at which a new idea clicks into the right criteria.

Have you ever pointed an autofocus camera into a moving crowd? The camera will have so much trouble deciding on the focal point that you'll miss your shot entirely. You'll hear the lens zooming in and out, but the shutter won't click. An autofocus camera is a little like your rational mind. It doesn't like ambiguity, so it will either take the first picture that comes into focus, or else become confused and freeze. This is the problem that the new

The sweet spot
of idea creation
lies at the
intersection of
desiderata.



multifocus cameras solve. They capture all the information in the scene, but they leave the final decision on where to focus until later. In human terms, it's like allowing time for incubation.

When a fresh solution to a problem finally does come into focus, the emotional brain sends a signal to the rest of your body—sometimes described as a tingle, a flash, or a jolt—that tells you something remarkable has happened. Developing a sensitivity to these signals is an integral part of being creative.

SIX TESTS OF ORIGINALITY. The goal of dreaming is to produce an original idea. The idea can be new to you, new to your group, or new to the world. But how do you know which it is? And how do you know if it's any good in the first place?

In my experience, creative judgment comes with practice, maturity, and familiarity with the world of ideas. There's no shortcut. But there is a *shorthand* for recognizing the potential of an idea at the point of epiphany. I've distilled it down to a list of six questions:

1. *Is it disorienting?* A great idea should be unsettling—not just to you, but to others in your group. Some people may reject it on the spot. This is not always a bad sign, since the potential of a new idea is often inversely proportional to its comfort factor.

Other people may simply find the idea baffling if it doesn't jibe with their existing beliefs. For example, when talking pictures became possible, H.M. Warner was firmly against it: "Who the hell wants to hear actors talk?" he roared. Some people believed airplanes would have no military value; that broadcast radio could not become popular; that no one would want a computer at home; and that educated people would never contribute to an encyclopedia without being paid. When you hear these kinds of comments, your antennae should tingle.

2. *Does it kill ten birds?* A good idea kills two birds with one stone. A great idea kills ten or twenty. This is the place where the pick-up sticks overlap, the pattern that tells you when a solution is elegant. The opposite of an elegant solution is one with too many trade-offs. In politics, trade-offs are often placed on a pedestal, held up

as examples of “the art of compromise.” But great ideas don’t come from compromise. They come from common ground.

Let’s say you’re trying to imagine a new product for your company. A great product idea would combine a dozen desirable traits in a single move. It might cost less to produce, use the existing sup-

The potential of a new idea is often inversely proportional to its comfort factor.

ply chain, reposition the company’s chief competitor, reenergize the workforce, attract more talent, inspire free publicity, deepen customer loyalty, increase annual revenues, produce higher profit margins,

drive up the stock price, benefit the community, and create a platform for a whole new class of products. Twelve birds right there.

3. *Does it need to be proved?* Original ideas are unproven by definition—and therefore inherently risky. If an idea doesn’t need to be tested, it’s probably because it’s not very original or not very bold. The skepticism that calls for a proof of concept is one of the signals of originality.

When my design firm was tapped by Apple in 1988 to rethink the packaging for the company’s range of software products, one of the ideas we presented was a retail package with nothing on the front but a simple hand-drawn icon, a product name, a trademark, and a splash of color. At the time, no self-respecting software package would go out dressed in less than five colors, one or more photos of people using computers, at least three screen shots, and six or seven bullet points explaining its features—and this was just the front panel.

Bill Campbell, then president of the software business, was curious enough about the “white look” to test it with customers. As it turned out, this became the company’s most successful format, increasing revenues by 40 percent across the product line in the first year, and inspiring the clean white packaging now associated with Apple. When your idea is bold enough to trigger the testing instinct, you might be onto something.

4. *Is it likely to force change?* Great ideas are not polite. They never say they’re sorry. They don’t try to fit in. On the contrary, they force the world around them to make changes in self-defense.

In the 1950s, a small advertising agency named Doyle Dane

Bernbach had a big idea: humor. In the hard-drinking, hard-selling days of Madison Avenue, humor was universally frowned on. The prevailing mantra was “the more you tell, the more you sell.” The current voice of reason, David Ogilvy, maintained that “people do not buy from clowns.” DDB’s creative teams not only believed they did, but delivered their witty headlines and graphics with stark simplicity. Over the next decade any agency that couldn’t create clean, humorous ads began to see its status sink like a stale olive in a cheap martini.

5. *Does it create affordances?* Affordances are the opportunities inherent in a new idea. Good ideas “come woven in a web of auxiliary ideas, consequential notions, supporting concepts, foundational assumptions, side effects, logical consequences, and a cascade of subsequent possibilities.” An affordance of Twitter, for example, is to enable instant communication in places where communication is controlled, such as the Middle East during the Arab Spring rebellions. An affordance of democracy is that citizens can voice their opinions without the threat of reprisals. An affordance of baking soda is that it can soak up fridge odors in addition to making cakes rise.

The measure of a great idea is the number and quality of the affordances it throws off. If innovation is evolution by design, then the best idea is the one that affords the most choices.

6. *Can it be summarized?* Every innovation—whether a government, gadget, service, iPhone app, movie plot, or business model—can be reduced to a one-sentence description. The US government is a democracy of the people, for the people, and by the people. A Nano MP₃ player puts four thousand songs at your fingertips. The Heathrow Express whisks you to London in 15 minutes flat. The Pages tablet application lets you be a writer one second and a designer the next. In *Talk to Her*, two men form an odd friendship while their girlfriends are in comas. Charles Schwab makes investing personal.

The measure of a great idea is the number and quality of the affordances it throws off.

The reason a great idea can be described in a sentence is not because it’s simple but because it has a strong internal order, one

that answers to a clear and compelling purpose. The full idea may be quite complex. Complexity without order is an indescribable mess, while complexity with order appears simpler than it is. If you find it hard to describe your idea, don't fix your description. Fix your idea.

The metaskill of dreaming, the ability to cut ideas out of whole cloth, is not a subject currently taught in business schools—or any other schools. This seems odd in an age when innovation is the dividing line between success and failure. But the gap could grow even wider as aesthetics are asked to play a greater role the way ideas are realized.

The 20th century has made us believe that everything of value can be bought in a store; that the answer to the question lies at the back of the chapter; that design is something only designers do.

But now, in the 21st century, we're being nudged nervously forward—by our customers, by our employers, by our economy, and by the robots nipping at our heels—to be original. To innovate. To make things. Yes, *make* things.