Chapter

6

THE MAGIC OF IMAGINATION

"When we don't understand what's happening,
let's just pretend we're the organizer."

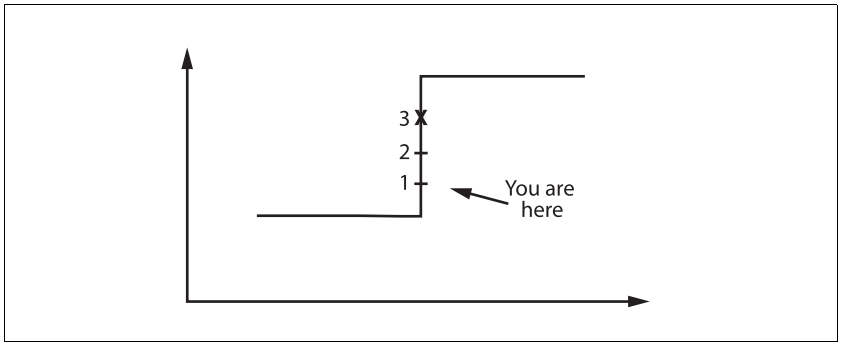
Jean Cocteau

How do you create a wonderful fountain of ideas? What's the magic behind imagination?

In the 19th century, many people wondered whether a horse, at full gallop, had all four hooves suspended at any one point, or whether one hoof was always in contact with the ground. The question was not answered until 1872, when railroad baron Leland Stanford, to settle a bet, hired photographer Edward Muybridge to freeze the motion of a horse at full gallop. When the sequence of photographs was developed, the world had its answer: The hooves did indeed leave the ground.

It's a bit the same when it comes to thought. We may talk about those little ideas trotting around inside our head but, more often than not, our imagination is galloping along, throwing up ideas and giving an impression of instantaneity. It's as if all our mental hooves are off the ground. But this, in fact, is not at all the case. The various breakthroughs made in the so-called cognitive sciences enable us to analyze to a small degree the birth of a new idea, the process we call *thought*. Between *no idea* and *an idea* there is no bridge, no simply constructed arch. There are, rather, a number of stages that we can distinguish and identify precisely.

FIGURE 6.1 *Astonishment*



Let's take three of them. They form an equation:

Astonishment + Questioning = New Ideas

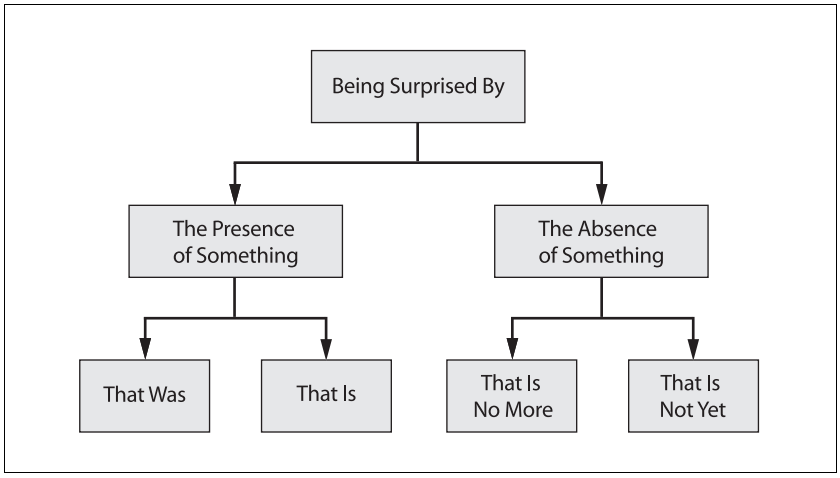
Warning: Imagination can be fostered by adding a fourth stage to the process; it's called *creativity techniques* or *methods.* But that's a discussion for another time.

Astonishment is not only the origin of almost every idea, it's an ability we all have within us. By this we mean the potential for experiencing surprise, blurting out "Jeez!" or "Hey!"

Perhaps you know people who don't seem to get surprised often. If you ask, "Anything special?" they will most often answer, "No, not really." "What's new?" will usually provoke the answer, "Oh, nothing much." If you ask, "How are you?" the answer will be "It's Monday . . ." or, if you work in a multinational, "Business as usual." This type of reaction is not exactly stimulating for the neurons, but it is through these instances of numbed thought and dormant reflections that we see where the real start line for imagination is situated, and we can find our way to the starting blocks of creativity.

Schopenhauer once said, "To be a philosopher involves being capable of being surprised at routine events, at day-to-day things, and setting for oneself as a subject for study everything that is most general and ordinary." At the start of thought there needs to be a state of openness to things, chronic and voluntary doubt, and a gentle, nagging worry. Peace of mind needs to give way to confident worry, to pleasure in ideas and to attention without tension. It is impossible for two Mondays to be identical, or for there to be absolutely nothing new. There is always something to report.

FIGURE 6.2 *Identifying Four Types of Astonishment*



Astonishment is a gift we can give ourselves or other people. The characteristic "Hey!" of a mental leap bears witness to this. It really is a present we are asked to hold. Present in both senses of the word: a gift, and something now!

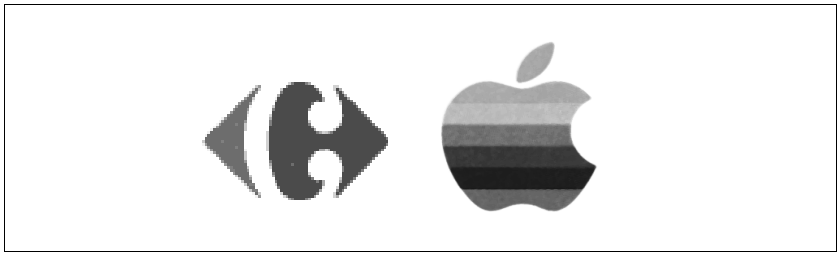
Ideas only grow in soil with high astonishment content, fertilized by curiosity. But soil can be varied and of many types, so the creative person has to be constantly on the watch for anything that moves and surprised by anything that doesn't. There are four types of astonishment, and they are all positive and can all be told apart by their use of the verb *to be* (see Figure 6.2).

1. You can easily be astonished by the presence of something that *is:* it's perhaps the easiest of the four types of "all of a sudden." A bad cup of coffee, a client who looks different, a strange noise. Something happens that is picked up by the senses, a difference is flagged up, and you feel surprise. It is, for example, the surprise of a Belgian tourist who, every time he goes to stay in France, is astonished to find that they still use checks.
2. More problematic is astonishment over something that *was* for a long time, but which you had not remarked until now. For years, you've been taking the same route to work. Every day, morning and evening, you find yourself going along the same roads, passing the same shops. One day, someone says to you, "Listen, as you're going that way, could you stop off at the jeweler's and pick

up the watch I ordered?" Astonishment. A jeweler's? I never noticed. But sure enough, on the route that you think you know by heart, at the number you've been given, there really is a jeweler. So you're astonished, although nothing has changed from yesterday to today! Nothing? Not really, because your perception has changed. Another example is the logo used by the Carrefour supermarket chain (see Figure 6.3). You always see it, rather vaguely, as an ace of spades on its side, until the day someone tells you it's a capital *C.* Astonishment once again, though in this case too nothing has changed. Nothing? Something has changed: the view that you yourself now have, the way of seeing something that hasn't changed. There is a small variant on this phenomenon: While surprise can sometimes come from another view of something that hasn't moved or changed, it can also sometimes come from observing a change that is real but minute, and which bears no proportional relation to the amount of astonishment it causes. Suddenly one day you notice that a child seems to have grown, a man you know seems to have gone bald—although neither the growth nor the hair loss are instant phenomena. The change in reality is slow; it is the change in perception that is sudden.

3. Do you remember when the Apple logo had rainbow stripes? Did you notice one day that the colored stripes had disappeared? (See Figure 6.3)
4. Perhaps the real challenge is astonishment of the fourth type—the kind which one can experience when confronted with something that *is not,* vis-à-vis some unexploited potential. Procter & Gamble launched a Pampers box, which, once empty, could be used as a doll's house. That was because someone, one day, was surprised to see that the inside of the carton wasn't being used. This last type of astonishment should be a privileged sort, for the new rules of the economy are opening up enormous opportunities for ideas. Twenty years ago, being creative was all about finding an original "how." Now, more and more, being creative involves finding a new "what." There's a divide. The challenge used to be the answer, but now it's becoming the question. Creativity, which for a long time was defined as the art of "getting out of the box," has to be reinvented, simply because there are fewer and fewer boxes. Astonishing, isn't it?

FIGURE 6.3 *Logos*



This division into four groups provides us with an interesting perspective on the creativity of great scientists. Four examples:

1. When he arrived on one of the Galapagos Islands, Darwin was surprised to see tortoises that were very different from those on other islands only a few kilometers away.
2. Copernicus, by comparison, was surprised one day to see the sun "set"—when people had been seeing the same thing for thousands of years.
3. Freud drew the attention of his patients to things they had forgotten or subconsciously rejected.
4. Carnot, watching a steam engine, suddenly said there must be a thermodynamic theory that helped explain the disappointing output.

All four were inspired by astonishment—Darwin in a new situation, Copernicus in a traditional situation, Freud and Carnot in a situation where something was missing. Aristotle must be pleased. In his *Metaphysics,* he said, long before any of the others, "The starting point of all sciences is the astonishment at the fact that things are what they are."

Creativity was one day defined as a revolution in the way we look at things. But this conspiracy should not be limited to future Nobel Prize winners; the insurrection has to appeal to everyone, because every individual's senses can contribute to the imagination of us all. You have to be the scientist of your own life and be astonished four times: at what is, at what always has been, at what has disappeared, and at what could be!

A supermarket can be a good laboratory. Consider your attitude toward the products you have no intention of buying. This illustrates the four instances quite clearly. It is easier to be astonished when a new product appears in the shop than when an old product is revamped. It is even

more difficult to note that a product has disappeared from the shelves, or that it has never been put on sale. "Nothing surprises me any more," we hear people say when they are getting desperate. Quite the contrary: they should let themselves be surprised by everything, and then hope would return. "Nothing to be surprised at," people sometimes say, believing that things are logical. On the contrary, there's always something to astonish us—and, in the process, these things become magical.

Take away surprise and we have no ideas. There's nothing, threefold nothing: nothing to report, nothing to think, nothing to do. You may think everything's chugging along nicely but, in reality, you're going round in circles. "Nothing new?" is not the right question. You should be asking "What's new?"—and the ideas will follow.

So be astonished, and astonish the others. From time to time, read a newspaper that you normally never read, go to a meeting of a political party that isn't yours, take a different route to a destination that is not where you normally go, read the job offers even if you're not looking for a job, watch football in another language. The things in life are so important, but it doesn't say anywhere that they always have to be the same. Be astonished and you will be surprised how much good it does you! Even if it doesn't get you anywhere.

Five last remarks about astonishment:

1. One astonishment may hide another—as the signs on French railway crossings used to say: "*un train peut en cacher un autre*" ("one train can hide another"). Believe me, that could be one great big surprise. That's exactly what happened to Galileo. Watching a church chandelier swaying in an air current, he rightly concluded that the time taken for one swing was dependent on the length of the supporting cable and not on the width of the swing. Had he not been so taken up with his discovery, he might also have noticed something even more significant: that the direction of swing changed as the day progressed, with the earth rotating under the chandelier!
2. Even Galileo couldn't make the entire thinking trip on his own—and we are not even Galileos. So don't hesitate to express your astonishment—that's also a gift, because your astonishment can sometimes help someone else have the idea.

3. Be careful—astonishment is much more like a shooting star than a comet. It is unpredictable and doesn't necessarily come back periodically. Keep your senses trimmed.
4. A group will never be astonished; surprise is an individual faculty. Confronted with someone else's astonishment, people say "Well, *I* never," or sometimes "Well, *you* never," but never "Well, *we* never."
5. While astonishment is essential, it is not of course enough, for it doesn't automatically induce questioning. A feeling of a missed opportunity or a wasted chance comes up after the event: "I'd said that, but . . ." or "It's true they'd told me that, but . . . ." This is the "but" of the idea that didn't come along, despite the invitation being there.

When an astonishment occurs there are two possibilities: either you don't have any doubt in your own mind and you lose the opportunity to have the idea, or you do have some doubt in your mind and profit from the astonishment. There will be a next step, most probably a question.

For example, if a customer comes into your office and you see he's angry. You may react by thinking that he has a problem at home. In this case the astonishment won't lead to anything.

Remember: convictions = addictions!

A QUESTION IS MORE THAN A QUESTION

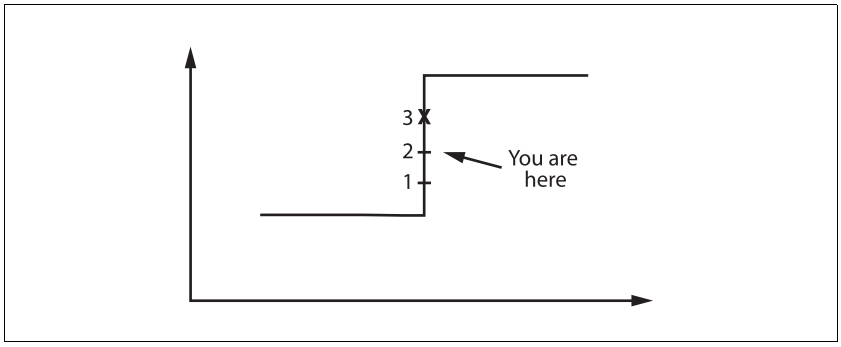
When I'm running a seminar, I often notice that people rush to a conclusion by taking a question for what it is. That's not a good idea, since the question that comes to mind may not be the best way to start the brainstorm.

The purpose of thought—and often the purpose of a work contract—is to provide an answer to the questions asked. That's even more reason to pause for a few moments to consider whether a question might be a loaded one, predetermining your thoughts on the item under consideration. The only mental exercise some people take is jumping to conclusions!

We should remember that a question is much more than a question.

When people realized there was room for cheaper airlines, their brainstorming could have started with the question "how do we estab-

FIGURE 6.4 *Questioning*



lish a low-cost airline?" Instead, they asked "how are we going to get people to fly that usually take Greyhound?" You immediately sense that the second question is the better one. It's more specific, it's accessible to the senses. You see and feel the Greyhound!

Sometimes the most effective way of dealing with a question is to reformulate it. One efficient reformulation consists of making the question visible, staging it, creating a situation in which the senses can grasp it. A service society took it upon itself to deal with the difficult problem of sales to the public sector by organizing a creativity session. Very few ideas came out of this until the moderator painted a verbal picture of a breakdown in an elevator containing the elevator company's sales delegate and the client's director-general, and the ensuing (and unexpected) dialogue. Ideas poured out because, suddenly, it was possible to see the problem.

This type of approach is anything but new. King Hiero II of Syracuse one day asked Archimedes, a mathematician by training, if his crown really was made of pure gold. Archimedes reformulated the question from a problem of quality to one of quantity: to weigh the crown and compare its weight to an equivalent volume of gold. But with the instruments he had, it was impossible for him to measure volume.

The famous "eureka" involved him using his bathwater as a unit of measurement. He got the solution because he put the question differently. Legend has made Archimedes the first man to realize that it's often the problem that is the problem.

Another example of reformulation was given by Karl Dunker one day in 1945 (this has to be put into the technological context of the

time): "How can we destroy a stomach tumor using rays without damaging the healthy tissue?"

A problem posed this way often stays unanswered. But the same question reformulated in the following way: "How can we reduce the intensity of the rays in those parts of the body not affected by the tumor" set the researchers on a different path—the path of a lens located outside the body, focusing the rays on the center of the tumor.

Another idea that was also taken on board was to use three orthogonal rays (like the three edges forming the corner of a box). Each ray would have a third of the intensity required to destroy the tumor, which would therefore have to be positioned at the exact point where the rays came together, the only point where the intensity would reach 100 percent.

Reformulating the question can usefully be spiced up with a few constraints. It can, for example, be asked in another language, with children's talk, or by choosing to do without one letter of the alphabet.

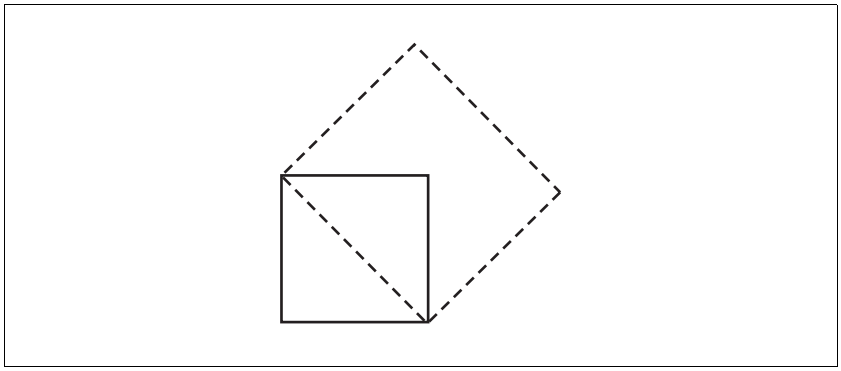
So, ultimately, the father of reformulation is not Archimedes, but Socrates. In one of his many dialogues, the philosopher asks someone to take a given square and build another square out of it with double the surface area. As we would probably do over two thousand years later, the slave reasons "a little more of the same thing" and tells himself the problem is to extend two sides by a distance that needs to be determined.

Since the time of Pythagoras, the Greeks have known that this method is irrational (the side of a double square is $\sqrt{2}$ larger than the first one) and Socrates suggests thinking differently. He gives the slave some hints—more precisely, he poses the questions in a way that prompts the slave to take a step back and think creatively, to change his point of view in order to see the problem better. Instead of doubling the original surface area, divide it into two equal parts and quadruple the result. This gives the right answer!

So the easy method consists of looking at things differently, of changing perspective—in short, of being creative. (The next time you have to build a square of exactly 24.5 cm^2, you will remember me and solve it in a second.)

A couple of years ago, NASA gave us another example to illustrate the principle. How should we decelerate a spacecraft to land on planet Mars? How do we make it strong enough not to disintegrate? The question apparently focuses on how we keep the spacecraft from crashing, but the real question is how do we land it? If we focus on that question, dis-

FIGURE 6.5 *Creatively Doubling the Surface Area*



integration is not the prime concern. In fact the answer was remarkably creative and counterintuitive. Girded with airbags, it simply bounced—as happened with Pathfinder.

So, instead of asking his students for the right answer, Socrates suggested they ask the right question. He distinguished five types of questions and encouraged his students to choose the right one.

1. *A question to help you understand the point of view presented.* What do you understand by that? Can you give an example of . . . ? How do you explain that?
2. *A question aimed at testing the solidity of the argument.* Why do you think that . . . ? Is there proof that . . . ? How can we justify that?
3. *A question to lead to other clarifications on what was said.* What would someone who disagreed say? Can you reformulate . . . ? And if someone suggested . . . ?
4. *A question to draw attention to the implications and consequences.* Is there a general principle that . . . ? What would be the consequence of . . . ? Is it consistent with what was previously said?
5. *A question about the discussion itself.* How does it help us? How could we sum things up at this stage? Are there other questions?

Do companies that want to make themselves "intelligent" always give themselves the resources necessary? It's a worthwhile question. A fair number of discussions seem to be guided in only one direction, and the natural flow of ideas seems to be from top to bottom.

It should be recognized that answers may often be arranged but the questions generally are not, and management is more partial to a re-

searcher who finds than a researcher who seeks. It's forgetting that the collective thought in a company should be nourished by an unceasing and balanced dialog between those asking and those asked, just as the usefulness of a question-and-answer session at the end of a conference or seminar depends only partly on the skills of the speakers or experts. Whatever the subject of a meeting, the "question" should always be on the agenda. It should be dissected, analyzed, X-rayed.

Sometimes a question is called devious. But could it be anything else? The person asking it, the relationship with that person, the tone used, all contribute to giving a question an orientation, momentum. A question asked already has its own idea of the answer, but is it yours?

Do this test. Ask someone to make a quick sketch of a little dog. Most of the time it will be a profile with the head on the left, although this was not stipulated. This appears to be linked to our Western upbringing which teaches us that time's arrow goes from left to right (as we have been doing since the beginning of this book) and which attaches more importance to the head than to other parts of the body.

The difficulty is sometimes to be found in the form and not the content. The way the question is asked sometimes has more impact on our thoughts than the question itself does.

There are closed questions, which lead to yes or no (Do you want to go to Belgium?) and open questions, which lead to open ideas (What do you want to do when you are in Brussels?). In brainstorming sessions, you should never start with closed questions, because all you will get is yes or no. So you have to ask questions about the question itself, to see whether you're not leading in an unwanted direction. If you don't want to reformulate it, lighten it, open it up, invert it, to avoid having the question answer for us! The nature of the question is grounds for suspicion.

I was so happy—one of my clients said that because of me, everyone at his Monday morning meetings who wants to put a point on the agenda has to do it with a question. Imagine the issue is budget, but it must be put as a question. So the person has to consider: what is the problem with the budget? The person has to think about it a bit, even before the meeting begins.

To help you realize how devious a question can be, below are nine different characteristics a question can have, and some little exercises accompany them. Take them as metaphors; identify the traps in your daily

life with its problems that you do not want to fall into. Remember, questions are not neutral—they are loaded.

If, by the way, you start to think this chapter is about mathematics, it's not; it's also about ideas and how your brain functions!

1. Wrong-Way-Round Questions

A question is by definition directed, meaning it has direction.

It can be presented in forward or reverse. So the same question can provoke different reactions. Because abundance in ideas is the objective here, why don't we try both?

Take two similar people. Ask the first to give a rough estimate of the product without providing the time to work it out:

$$2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8$$

Ask the second person, in a separate room, but with the same very short time limit, to estimate the value of the product of:

$$8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2$$

The results given by the first person are generally lower—by a large margin—than those of the second. I'm sure you have the same intuition. Don't, therefore, try to say that these questions have no direction! As you can see, they do!

Convention suggests that we tackle the problem from the left, but sometimes climbing the left face of a problem proves particularly laborious. This is then the occasion to try the creative (i.e., opposite) face—all the more so since the risk is safe!

It is sometimes useful to turn a question round, to tackle the problem from the other side. It's easier to multiply by two than to divide by half. Also, a project called "new computers" will boost its chances of success *de facto* if it is renamed "getting rid of the old computers."

When we have envisioned what would be the results of a policy to *reduce* working time, it can be useful to look at the consequences of another policy, namely to *increase* leisure time. It is, in effect, exactly the same question.

As early as 1654, Pascal was recommending this type of approach to Fermat. "Rather than calculating the probability of an event taking

place," he wrote, "it is sometimes easier to calculate the probability of its *not* taking place." Then subtract it from one.

So the next time your car is stuck behind a flock of sheep, don't ask yourself "How can I get round them?" but instead "How can I put those sheep behind my car?"

2. Overloaded Questions

This kind of question is one that is burdened with useless figures. It not only makes reflection difficult, but it sometimes steers us to the wrong answer or completely down the garden path. Sometimes we are given too much information. We should not make the mistake of using all the information we have (even if our education told us to).

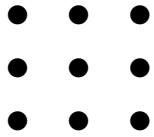
Let's take three examples.

1. A farmer has 17 horses. All but 9 are dead. How many are left? This kind of puzzle, which we loved in childhood, is still a lesson for adults. Do we not feel a sort of temptation within us, a force even, pushing us towards subtracting 9 from 17—even though a smile breaks through a second later?
2. A drawer contains red and blue socks in a 60 to 40 percent proportion. If you close your eyes, how many socks do you have to take out the drawer to be sure of having two of the same color? Three, of course. The "60 to 40 percent" means something, but it's irrelevant! In this case it's easier if you remove the information.
3. A driver buys a second-hand car for $3,000. Shortly afterwards, she sells it for $3,500. For a reason that is not important for the story, she is forced to buy back the car, for which she pays $4,000 this time round. But a few months later she manages to part with it for the sum of $4,500. What is the profit the driver makes on the entire operation? (If you want to use euros, no problem for me, the impact is the same.) See the solution at the end of this chapter.

How many times have you fallen into the trap of believing that overabundant information is useful, and, in fact, must be used? Sometimes the situation is exactly the opposite, as we shall see in the next exercise.

3. Underloaded Questions

Consider the diagram below, the most popular exercise in creativity (if you don't know the answer, buy the book of one of my competitors). How can you connect these nine dots with four lines, without taking your pencil off the paper?



The answer is that you have to move your pencil *outside* the virtual square.

Who said you *couldn't* move your pencil outside the square? Nobody. Indeed, we often fail to find the answer to problems simply because we put arbitrary borders around them that we think we cannot cross. When buying a birthday present, for instance, how often do we have trouble finding the right gift when we are searching within the "boundaries" of the top ten CDs, or books that are literary prize-winners? There are, after all, infinite numbers of other presents to buy.

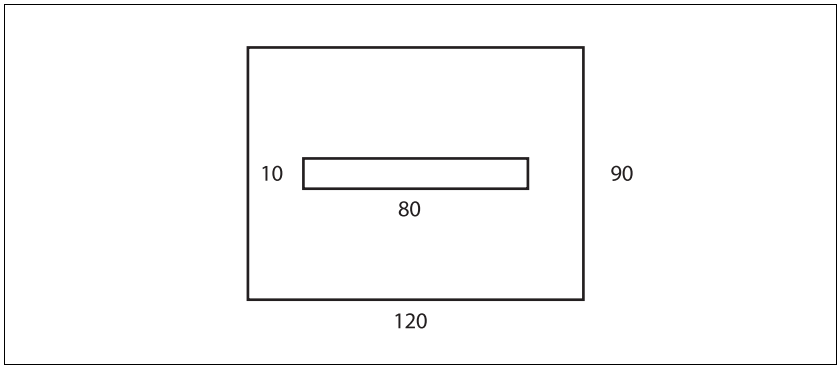
Let me illustrate this by another exercise. In a desert area somewhere on Earth, an explorer covers a distance of 1,000 miles southwards. He then moves 1,000 miles east. Finally, after a third journey of 1,000 miles, this time to the north, he realizes he is back at his starting-point. What is his starting-point? (If you want to use kilometers, no problem for me, the impact is the same.)

This little problem evokes vague memories in the form of spherical triangles, and quickly suggests the answer should be the North Pole or possibly the South Pole. But the danger is to remain there. See the solutions at the end of this chapter.

4. Impossible Questions

Certain problems are qualified as unsolvable, and certain questions quickly give the impression there is no answer. Yet hundreds of books full of exercises like this are there to remind you that accounting puzzles, IT brain-teasers, even commercial riddles may also have their solutions.

FIGURE 6.6 *A Damaged Rug*



A superb little rectangular Oriental carpet has been badly damaged by a chemical product. The part left intact looks like the diagram in Figure 6.6.

There is a slit down the middle. The owner, something of an optimist, realizes right away that what's left, if properly handled, can be restored. He takes a pair of scissors, cuts the damaged carpet into two parts, and puts them together to form a perfect square with one-meter sides. Theoretically, it's possible since $90 \times 120 - 800 = 10{,}000 = 100 \times 100$. How does he do it? See the solutions to the exercises at the end of this chapter.

The point is that a question that seems impossible to answer is sometimes *not* impossible. People too often throw their hands up at the first pass. You must persevere!

5. Zoomed-In Questions

Life in most companies doesn't leave much time to step back and reflect. This, unfortunately, is because it's true that a specific case or a precise example is easier to deal with than a more general problem or even a generic one. However, sometimes the opposite situation arises. In such cases theory can be more efficient than practice, the *macroscope* more suitable than the microscope, and long sight less of a problem than short sight.

Let us suppose, for example, that you are asked to prove that 313,313 is divisible by 13. If you get too close to the figures, so to speak, you will very quickly recognize the similarity between the numbers and realize that they only feature the figures 1 and 3. You will probably also take a

much more difficult route to solving the problem, even if you do come up with the right answer. (See the solution at the end of this chapter.)

6. Similar Questions

With the first five kinds of questions, we have limited ourselves to detecting the "instant load" of a question and have learned to be wary of its momentum. But some questions also have a past, a memory. They may look like another question, or may prompt the use of a conventional method.

Ask someone, for example, what the following figure means:

T

He or she will probably refer to the letter *T,* rather surprised that the question has even been asked. Then ask what this represents:

TT

Two *T*s, probably again. But if you had done things differently, showing the so-called double *T* first, what would have been the response? Telegraph poles, antennae, the letter π, a Greek temple, a table with a space down the middle? Difficult to say *a priori.* You will agree that the probability of getting the answer "double *T*" is much greater if you have already shown the *T* on its own. Because memory, being what it is, steers thought in familiar directions.

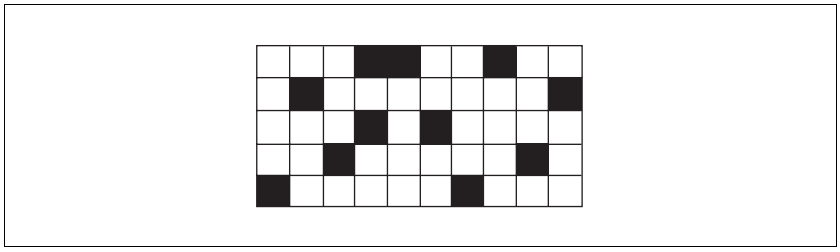
In a company, if the boss holds a meeting and tells his team, "Let's put together next year's budget," the chances are high that they will work from last year's budget. If he phrases his request differently, "Let's create a budget that makes us more competitive," he is asking an open question that will elicit a far more creative reply.

7. Identical Questions

Questions that come after each other—and look like each other—rub off on each other.

Sometimes you even need to find a different way of answering the same question. The answer can be totally different, simply because the environment has changed.

FIGURE 6.7 *Same Question . . .*



You are asked, for example, to count the number of black squares in Figure 6.7. You find this easy enough, and the question comes up so frequently that you have developed an extremely efficient method that makes you the regional black-square-counting champion! Then all of a sudden, the one in Figure 6.8 appears. Equally all of a sudden, the method you have long found best doesn't work any more! Though the problem is exactly the same, the world (reality) has changed.

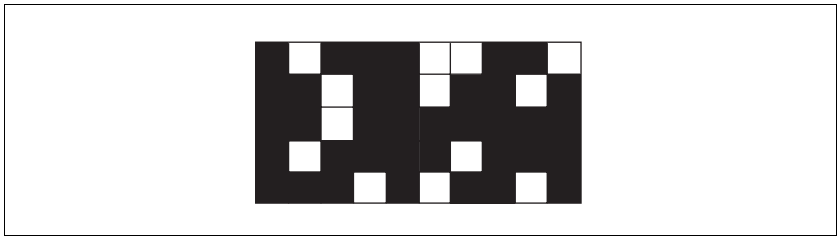
Another example comes from accountancy. The idea of "writing off" means taking into account the depreciation of an asset. As a building gets older, it's logical to reduce its value on the balance sheet. For software, however, aging can only be measured in relation to external events; for example, the arrival of a competitor's product that is better or cheaper. But look how software is depreciated on a balance sheet!

Some companies sometimes fall into this trap from time to time because of their gigantic size. They become supertankers that are so big that the crew can't even see the sea—and, by definition, the other ships.

8. "Stupid" Questions

A place also needs to be set aside for all those questions that once perplexed you so much that you felt like jettisoning them from the back of your brain. Even if they fit well here, they come from a very different region of the noosphere.

FIGURE 6.8 . . . *At Different Times*

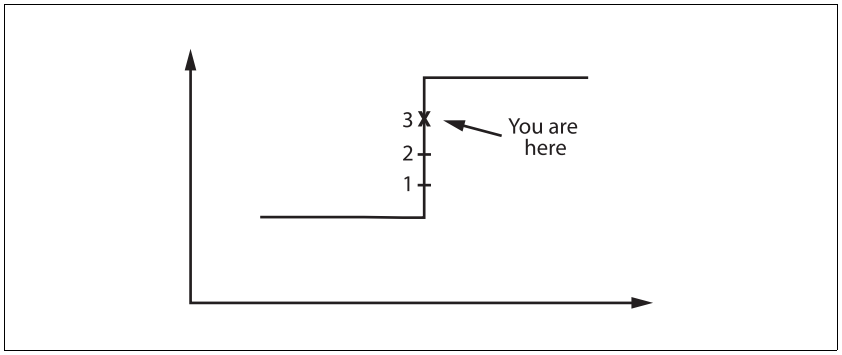


These kinds of questions are often answered with a smile, just to help us cope with the dizziness they provoke. They are destabilizing and worrying, and are divergent to such an extent that convergence can't even start. But, quite simply, they are beautiful. Perhaps, as in other disciplines, there is room for a level of *applied* creativity—the art of the unexpected answer—and a level of *pure* creativity: the art of the new question!

Children are here to prove that this art is innate to all of us. Here are some examples of their "whats" and "whys."

- What does the wind do when it's not blowing?
- Why is the sky blue?
- Why are there so many species of dogs?
- Why do I have identical shoes?
- If five-sixths of the planet is covered in water, why do we call it *Earth* and not *Sea?*
- 3/10 + 4/10 = 7/10. So, if we get 3/10 and 4/10 in different school tests, why doesn't that make 7/10?
- If there's no one there to hear it, does a falling tree make any noise?
- Why does glass break?
- Why do we have eyebrows?
- Why is the word *short* short, whereas the word *incomprehensible* isn't incomprehensible?
- Athens and Rome have such a similar history, so why was there no Greek Empire?
- Why were European towns more harmonious before there were town planning laws?

FIGURE 6.9 *New Idea*



9. "What If?" Questions

Some questions do not have to have obvious answers—or answers at all—to mobilize our creativity. In fact they are ideal as warm-up questions in group discussions. For example, I once asked the executives of a petroleum company, "What if oil had been discovered before coal," The world today could be totally different—there would have been no steam locomotives, for example, as availability of oil would have made smaller engines immediately feasible. But the real point is that it made these managers think.

- What if the Romans had invented the steam engine (they were almost there!)?
- What if we never died?
- What if there was suddenly no gravity?
- What if the solar system became unstable?
- What if we never forgot anything anymore?
- What if Pontius Pilate had had more guts?
- What if a pack of cards had four colors—blue diamonds and green spades?
- What if light traveled at the same speed as sound?
- What if NASA started making cars?
- What if all the R&D people in IBM transferred to marketing?
- What if copyright didn't exist?
- What if we had six fingers?
- What if they were only one currency unit on earth?
- What if Immanuel Kant had died at the age of 40?
- What if we only could say 50 words a day?
- What if nobody agreed to be a teacher any longer?
- What if Columbus had arrived on the west coast of America?

Sometimes I adapt this approach a bit and run a "scenario" exercise: Your company disappeared in 2010. Why?

BIRTH OF A NEW IDEA

The French have a nice word for it: *trouvaille*. It means "something found with happiness." We would talk about a "finding" or a "stroke of

inspiration." It's a word that is inextricably linked with the exhilaration that goes with the moment that we see the light, that the penny drops. It is the mental click that accompanies sudden intuition, the first few seconds when we realize that something new is possible. The *trouvaille* is the idea of an idea, a new concept's birth certificate, discontinuity, a break. It's no coincidence that the icon for an idea is a lightbulb, as a lightbulb can only have two states, lit or unlit.

Sometimes we have been waiting years for that moment—a moment that can also mark the start of a process of reflection that can also go on for years—but once it's there, it changes everything. There is a "before" and an "after." The Eureka moment—the flash—corresponds to a change in perception. The world around us stays the same, but not the way we see it. It's the same mechanism at any point on the scale, from the great idea that can change the world to a small one that improves something in our daily routine.

Lawrence of Arabia shouted "Aqaba" and told himself that the town (today it's in Jordan, then it was held by the Turks) could be taken by coming from inland through the desert. Cantor, the mathematician, was forced by his convictions into understanding that certain infinities are bigger than others. Handel was "taken over" by his *Messiah* project. There are many other examples.

All of them went through the experience of finding something with a sense of relief and joy. It's just like the delight you experience when you manage to put the last piece in a Chinese puzzle, or when you finally understand the intricacies of a complicated form from the Internal Revenue Service.

It's not just the size, scale, or impact that characterizes a new idea. There are also a number of other differences.

- Certain findings are more necessary than others. You get the feeling that the steam engine was always going to be invented, whereas Scrooge McDuck was only one possibility in Disney's imagination.
- Einstein was capable of explaining his theory of relativity, while Paul McCartney was never able to describe how he came to compose *"Yesterday."*
- The R&D departments of the big pharmaceutical companies are in competition, while writers and painters are more like rivals.

With these three statements we can already identify one type of finding: creation. We can define it as the "possible new idea." Extraordinary as it may seem, such finds are fortuitous—no offence to admirers of Beethoven, but the world would still be possible without his Fifth Symphony.

If we turn to findings that are imperative, then we can make a distinction between finding something that is going to be, and finding something that already is. This defines and makes the difference between *invention* and *discovery*. Galileo used an invention, the telescope, to make a discovery, the phases of Venus. In the same way, Christopher Columbus had a compass with him when he discovered the Americas.

Discovery is more the domain of scientists, while invention is for company bosses who need to find what is going to be, and find it before their competitors do.

There are some other interesting questions. Who's the owner of the new idea? A discovery should not belong to anyone—here is the crux of the debate about the human genome. Invention is protected by patent, and creation by copyright (see Chapter 2). As financial conditions can vary greatly, we can understand the motive of big IT developers in having their product placed in the more lucrative of the two categories, if not in both!

Other distinctions are possible. Sometimes the finding is a unique concept—it can be a discovery (infinite calculus), an invention (the wheel) or a creation (Harry Potter). Sometimes, the finding is a bissociation, and this can also be a discovery (electromagnetism), an invention (the surf board) or a creation (theater improvisation combining theater with ice hockey).

As with any model, there are a number of criticisms that can be made of the breakout in Figure 6.10.

- Is a mathematical theorem discovered, invented, or created?
- There are discoveries in sociology (this is the aim of large-scale surveys where correlations emerge).
- There are some creations in corporations (e.g., Acela, Nutella).
- There are creations that artists *have* to create. Picasso said he could not have *not* painted *Guernica*.
- The borderline between invention and creation is a vague one (e.g., the Post-It note).

FIGURE 6.10 *Discovery, Invention, or Creation?*

	Discovery	Invention	Creation
Existed	yes	no	no
The "other one"	competitor	competitor	rival
Necessary	yes	yes	no
Explainable	yes	yes	no
Intellectual protection	—	patent	copyright/ author's rights
Field	science	technology management	art
Examples where there was no problem	radioactivity	Post-It notes	"Hey Jude"
Examples of answers to a problem	hieroglyphics	iPod	the Louvre pyramid

This book is all about innovation, *new* ideas. If that's obvious in the case of invention or creation, it's not the same for the other category: we can indeed also discover objects that are already there, like Tutankhamen's mummy, the dark side of the moon, oil, more oil, the wreck of the Titanic, hidden cave paintings, or buried treasure.

We can classify these things, because the coincidence of the discovery, the novelty of the object discovered, or even the identity of the discoverer can vary from case to case. The questions have been asked. Who owns something that is updated? Is it a discovery or a rediscovery?

But the focus of this book is invention—and now, at least, we understand better what is the first step in the process.

At the beginning of invention there is a new relationship, an original link between different things that have often been said before. Plato remarked on this, a long time ago. "A new idea," he said, "is a new form." The affirmation remains valid, but it needs to be nuanced. The inventor of the steam engine neither discovered steam nor the system of cranks and connecting rods. He invented a new combination and put together, for the first time, things that had been kept separate until then. Such new *matter-to-matter* links remain, of course, the domain of research. Remember Philips (Chapter 4)?

But a massive new field of possibilities is opening up: the *matter-to-information* links. The automobile sector has started to mine this rich vein: GPS, the keyless car, and so on. Information about the car is becoming the differentiating factor, more than the car itself. For example

the OnStar GPS/cellphone in-car system, in addition to navigational and other services, signals emergencies at the trigger of an airbag. Everywhere, information can enrich matter. For so many years, being creative consisted of playing with molecules to invent new products. Today, it involves assembling molecules and bytes to invent new services.

As Koestler said about bissociations, "The more common the part, the more striking the whole!"

KEY IDEAS IN THIS CHAPTER

- The eureka moment comprises several steps.
- Rediscover the power of astonishment.
- Raise questions about the question.
- Look at your problems with the eyes of an artist.
- Dare to bissociate.

***S**olutions to the **E**xercises*

1. When this question is asked in a group, it generally produces two answers. However, the majority tends to estimate the total profit at 500 dollars, which is the profit made on the second sale, because the three first operations would appear to cancel each other out. It's then time to start the story again in a slightly different way, and tell the adventure of the garage owner who buys a Renault for 3,000 dollars, sells it for 3,500, and then buys a Peugeot for 4,000 to sell it for 4,500 dollars. The group will be unanimous in calculating his profit at 1,000 dollars. Now is the moment to ask yourself what the difference is between the two exercises. Clearly, there isn't any, apart from the fact that the first question was loaded with irrelevant information—the fact that it is the same car is of no importance.
2. Surprise, there is an infinite number of possibilities! Let's take a parallel exactly 1,000 miles long. It exists somewhere in the south hemisphere. Then let's take another parallel exactly 1,000 miles to the north. All points of this second parallel meet the criteria and are a possible solution to the exercise.

***S**olutions to the **E**xercises (continued)*

3. All you need to do is to cut the damaged carpet in the form of a staircase, cutting steps 20 cm long by 10 cm high, to form two parts A and B, as in Figure 6.11. These two cut pieces can then be assembled as shown to make a perfect square with one meter sides.
4. Calmer consideration, or even a more detached one, will perhaps note that the number 313,313 is curious, as it has the form *abc,abc* and therefore is worth a thousand times *abc* plus another *abc* (i.e., a total of 1,001 times *abc*). This means that it is divisible by 13, whatever *a, b,* or *c* are (since 1,001 is divisible by 13).

FIGURE 6.11 *Cutting the Rug*