Our integrity was as important to all of us as our inventiveness.

Developing these systems took us a year of frustrating trial and error.

You don’t need Harvard to teach you that it’s more important to listen than to talk. You can get straight A’s from all your Harvard profs, but you’ll never make the grade unless you are decisive: even a timely wrong decision is better than no decision.

he appreciated the fact that I always provided him with alternatives when presenting him with a problem: I’d say, “Solution one will cost you so much money. Solution two will cost you so much time. You’re the boss. Which do you choose?”

When Kelly rolled up his sleeves, he became unstoppable, and the nay-sayers and doubters were simply ignored or bowled over. He declared his intention, then pushed through while his subordinates followed in his wake. He was so powerful that simply by going along on his plans and schemes, the rest of us helped to produce miracles too.

Extremely difficult but specific objectives (e.g., a spy plane flying at 85,000 feet with a range of 6,000 miles) and the freedom to take risks—and fail—define the heart of a Skunk Works operation. That means hiring generalists who are more open to nonconventional approaches than narrow specialists.

Leaders are natural born; managers must be trained.

these complex, self-organizing systems are adaptive, in that they don’t just passively respond to events the way a rock might roll around in an earthquake. They actively try to turn whatever happens to their advantage

The crucial skill was insight, the ability to see connections.

An engineer named Christopher Scholes designed the QWERTY layout in 1873 specifically to slow typists down; the typewriting machines of the day tended to jam if the typist went too fast.

An engineer named Christopher Scholes designed the QWERTY layout in 1873 specifically to slow typists down; the typewriting machines of the day tended to jam if the typist went too fast. But then the Remington Sewing Machine Company mass-produced a typewriter using the QWERTY keyboard, which meant that lots of typists began to learn the system, which meant that other typewriter companies began to offer the QWERTY keyboard, which meant that still more typists began to learn it, et cetera, et cetera. To them that hath shall be given, thought Arthur—increasing returns. And now that QWERTY is a standard used by millions of people, it’s essentially locked in forever.

Increasing returns, lock-in, unpredictability, tiny events that have immense historical consequences

“In the real world, outcomes don’t just happen,” he says. “They build up gradually as small chance events become magnified by positive feedbacks.”

a lot of nature is not linear—including most of what’s really interesting in the world.

this process is an excellent example of what he meant by increasing returns: once a new technology starts opening up new niches for other goods and services, the people who fill those niches have every incentive to help that technology grow and prosper. Moreover, this process is a major driving force behind the phenomenon of lock-in: the more niches that spring up dependent on a given technology, the harder it is to change that technology—until something very much better comes along.

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In nonlinear systems—and the economy is most certainly nonlinear—chaos theory tells you that the slightest uncertainty in your knowledge of the initial conditions will often grow inexorably.

“complex adaptive systems.” In the natural world such systems included brains, immune systems, ecologies, cells, developing embryos, and ant colonies. In the human world they included cultural and social systems such as political parties or scientific communities. Once you learned how to recognize them, in fact, these systems were everywhere. But wherever you found them, said Holland, they all seemed to share certain crucial properties.

An adaptive agent is constantly playing a game with its environment. What exactly does that mean? Distilled to the essence, what actually has to happen for game-playing agents to survive and prosper? Two things, Holland decided: prediction and feedback.

“Nonscientists tend to think that science works by deduction,” he says. “But actually science works mainly by metaphor. And what’s happening is that the kinds of metaphor people have in mind are changing.”

complex, lifelike behavior is the result of simple rules unfolding from the bottom up.

means that you try to see reality for what it is, and realize that the game you are in keeps changing, so that it’s up to you to figure out the current rules of the game as it’s being played.

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As we begin to understand complex systems, we begin to understand that we’re part of an ever-changing, interlocking, nonlinear, kaleidoscopic world. “So the question is how you maneuver in a world like that. And the answer is that you want to keep as many options open as possible.

Smart people are a dime a dozen and often don’t amount to much. What counts is being creative and imaginative. That’s what makes someone a true innovator.

“I have no special talent,” Einstein once said. “I am only passionately curious.”

Einstein, likewise, realized how important it is to interweave the arts and the sciences. When he felt stymied in his quest for the theory of general relativity, he would pull out his violin and play Mozart, saying that the music helped connect him to the harmony of the spheres.

Another characteristic of truly innovative

Another characteristic of truly innovative and creative people is that they have a reality-distortion field,

Bezos came to admire Disney more because of the audacity of his vision. “It seemed to me that he had this incredible capability to create a vision that he could get a large number of people to share,” he says. “Things that Disney invented, like Disneyland, the theme parks, they were such big visions that no single individual could ever pull them off, unlike a lot of the things that Edison worked on. Walt Disney really was able to get a big team of people working in a concerted direction.”

“You know the business plan won’t survive its first encounters with reality,” he says. “But the discipline of writing the plan forces you to think through some of the issues and to get sort of mentally comfortable in the space. Then you start to understand, if you push on this knob, this will move over here and so on. So, that’s the first step.”

Every time a seismic shift takes place in our economy, there are people who feel the vibrations long before the rest of us do, vibrations so strong they demand action—action that can seem rash, even stupid.

Every time a seismic shift takes place in our economy, there are people who feel the vibrations long before the rest of us do, vibrations so strong they demand action—action that can seem rash, even stupid. Ferry owner Cornelius Vanderbilt jumped ship when he saw the railroads coming. Thomas Watson Jr., overwhelmed by his sense that computers would be everywhere even when they were nowhere, bet his father’s office-machine company on it: IBM.

know for sure that long-term orientation is essential for invention because you’re going to have a lot of failures along the way.”

I know for sure that long-term orientation is essential for invention because you’re going to have a lot of failures along the way.”

There are three criteria he instructs managers to consider when they are hiring: Will you admire this person? Will this person raise the average level of effectiveness of the group he or she is entering? Along what dimension might this person be a superstar?

“We are working to build something important, something that matters to our customers, something that we can all tell our grandchildren about,” he says. “Such things aren’t meant to be easy.

We must be committed to constant improvement, experimentation, and innovation in every initiative.

Work Hard, Have Fun, Make History

Working to create a little bit of history isn’t supposed to be easy, and, well,

Working to create a little bit of history isn’t supposed to be easy, and, well, we’re finding that things are as they’re supposed to be! During

Working to create a little bit of history isn’t supposed to be easy, and, well, we’re finding that things are as they’re supposed to be!

LONG-TERM THINKING IS both a requirement and an outcome of true ownership.

We humans coevolve with our tools. We change our tools, and then our tools change us. Writing, invented thousands of years ago, is a grand whopper of a tool, and I have no doubt that it changed us dramatically.

focusing our energy on the controllable inputs to our business is the most effective way to maximize financial outputs over time.

Invention comes in many forms and at many scales. The most radical and transformative of inventions are often those that empower others to unleash their creativity—to pursue their dreams.

They share a distinctive organizational culture that cares deeply about and acts with conviction on a small number of principles. I’m talking about customer obsession rather than competitor obsession, eagerness to invent and pioneer, willingness to fail, the patience to think long-term, and the taking of professional pride in operational excellence.

One area where I think we are especially distinctive is failure. I believe we are the best place in the world to fail (we have plenty of practice!), and failure and invention are inseparable twins. To invent you have to experiment, and if you know in advance that it’s going to work, it’s not an experiment.

There are many advantages to a customer-centric approach, but here’s the big one: customers are always beautifully, wonderfully dissatisfied, even when they report being happy and business is great. Even when they don’t yet know it, customers want something better, and your desire to delight customers will drive you to invent on their behalf.

Good inventors and designers deeply understand their customer. They spend tremendous energy developing that intuition. They study and understand many anecdotes rather than only the averages you’ll find on surveys. They live with the design.

you, the product or service owner, must understand the customer, have a vision, and love the offering. Then, beta testing and research can help you find your blind spots. A remarkable customer experience starts with heart, intuition, curiosity, play, guts, taste. You won’t find any of it in a survey.

Speed matters in business—plus a high-velocity decision-making environment is more fun too.

One thing I love about customers is that they are divinely discontent. Their expectations are never static—they go up. It’s human nature. We didn’t ascend from our hunter-gatherer days by being satisfied. People have a voracious appetite for a better way, and yesterday’s “wow”

One thing I love about customers is that they are divinely discontent. Their expectations are never static—they go up. It’s human nature. We didn’t ascend from our hunter-gatherer days by being satisfied. People have a voracious appetite for a better way, and yesterday’s “wow” quickly becomes today’s “ordinary.”

High standards are contagious. Bring a new person onto a high standards team, and they’ll quickly adapt. The opposite is also true. If low standards prevail, those too will quickly spread.

The football coach doesn’t need to be able to throw, and a film director doesn’t need to be able to act. But they both do need to recognize high standards for those things and teach realistic expectations on scope.

A builder’s mentality helps us approach big, hard-to-solve opportunities with a humble conviction that success can come through iteration: invent, launch, reinvent, relaunch, start over, rinse, repeat, again and again. They know the path to success is anything but straight.

In the end, we are our choices. Build yourself a great story.

If we had a me-too product offering, I knew it wasn’t going to work. Our culture is much better at pioneering and inventing, and so we have to have something that’s different.

THE WAY YOU earn trust, the way you develop a reputation is by doing hard things well over and over and over. The reason, for example, that the US military, in all polls, has such high credibility and reputation is because, over and over again, decade after decade, it has done hard things well.

How do you hire great people and keep them from leaving? By giving them, first of all, a great mission—something that has real purpose, that has meaning. People want meaning in their lives.

You know the old saying “I hope I go to heaven when I die.” He said, “I realized at that moment, you go to heaven when you’re born.” Earth is heaven.

Yiming had once famously said that in launching a business, he is creating two types of products: first, the consumer-facing platforms, and second, the actual company itself. There is arguably a third product the entrepreneur has been carving out over the years: himself.

“Endurance, the ability to be alone, making judgments based on long-term considerations without being blinded by short-term factors, as well as having the patience for your plans and efforts to materialize—these are all very important in building your own startup,”

Quickly push new ideas out, test multiple features, and let the market verify which has value - this became an enduring strategy of ByteDance.

“The efficient flow of information is the main theme of my entrepreneurship. I think that information transmission has a great impact on the benefits, cooperation, and cognition of human society… I care about information. Whether it’s a search engine’s keywords, or a social networking site that uses people as nodes or an interest engine that uses interests as a granularity, they are all information-based.”

“We can’t do recommendation now, but we can learn. After this meeting, I’ll be the first to take action” was Yiming’s promise to lead by example. Sheer determination and self-study proved somewhat useful, but in the end, the significant breakthroughs for ByteDance came as a direct result of acquiring outside talent. Only by luring in experienced expertise from other organizations could Yiming hope to realize the vision of building a best in class recommendation engine.

The more substantial barrier was one of creativity and inspiration—coming up with a concept. Most users need to be inspired.

“When you want to grow early on, you want to be a brush, meaning you have to be very specific; you have to solve a specific need very well… Later you want to be a canvas; you want all kinds of things to happen on this blank canvas.”164

“With enough learning and perseverance, any skill could be mastered,” was always Yiming’s standard approach to his shortcomings.

Heavy reliance on operations to achieve growth is one of the defining characteristics of the Chinese internet. At Western tech companies, the role of user acquisition typically falls under the marketing, sales, or growth teams, which tend to systematically achieve user growth through highly scalable data and technology-driven methodology. In addition to these established techniques, Chinese companies also favor using manual, labor-intensive methods to promote and grow their platforms. Examples include paying for celebrity endorsements and media exposure, operating promotional accounts on other platforms, or running regular competitions and festival holiday promotions. Operations teams are typically active all day, maintaining relationships with outside stakeholders, including users, creators, and promotional partners.

“To abandon a project, mainly we look at the data,” described ByteDance executive Chen Lin, “but the leader also has to use their judgment.”181 A leader needs to judge why the data is bad.

Yiming revealed in a later interview that the company had made it compulsory for everyone on the management team to make their own Douyin videos with goals to gain a certain number of likes or suffer forfeits such as doing push-ups. It wasn’t good enough to just look at charts and data; management needed to understand short videos from a creator’s perspective also.

Yiming had a simple strategy for evolving ByteDance to the next level – hire or acquire the absolute best people and infuse their knowledge into the organization. To improve the company’s nascent recommendation engine, Yiming relentlessly poached top-level experts from Baidu. To start monetization, he headhunted one of the rising stars in traditional media advertising, Zhang Lidong.

One lesson learned from Douyin had been that user-generated content apps first need to cultivate a committed group of local, high-quality seed creators that define the tone of the community and can generate memes for others to mimic. That took time. Rushing in and spending heavily on ads without any kind of community would be counterproductive.

Popular video memes straddled the “goldilocks zone” of difficulty. Too easy for others to replicate meant they quickly became tedious, too complicated for others to copy, and they could not spread. Prior exposure to a meme facilitated the mental processing of new variants as it provided a familiar structure into which the new information could be integrated. Music was the most potent trigger for making these mental connections.

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Arguably the most potent defense was the rich ecosystem of skilled video creators. These people invested time and creativity into making unique content for the platform that was timely and meaningful to their niche audiences. TikTok had the most diverse and vibrant ecosystem of short video content creators. Building that community took time and could not be easily recreated at scale.

“building a company as a product,”

Ernest Hemingway, James Mitchener, Neil Simon, Frank Lloyd Wright, and Pablo Picasso could not get it right the first time, what makes you think that you will?

If Ernest Hemingway, James Mitchener, Neil Simon, Frank Lloyd Wright, and Pablo Picasso could not get it right the first time, what makes you think that you will?

Technology isn’t destiny, no matter how inexorable its evolution may seem; the way its capabilities are used is as much a matter of cultural choice and historical accident as politics is, or fashion.

No Risk is the Highest Risk As much as people, technologies

No Risk is the Highest Risk

we ideally need to be able to experience our designs in the wild during the early stages of the process. Failing that, we have to do the next best thing, whatever that might be.

The only true voyage of discovery is not to go to new places, but to have other eyes.

The best way to a good idea is to have lots of ideas.

The best way to a good idea is to have lots of ideas. …for they had gone out on a limb—but isn’t that where the fruit is? it is ultimately experiences that we are designing, not things. Yes, physical objects are often the most tangible and visible outcomes of design, but their primary function is to engage us in an experience–an experience that is largely shaped by the affordances (Gibson 1979) and character embedded into the product itself (Norman 1988; Gaver 1991). Obviously, aesthetics and functionality play an important role in all of this. Practice

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People on a design team must be as happy to be wrong as right. If their ideas hold up under strong (but fair) criticism, then great, they can proceed with confidence. If their ideas are rejected with good rationale, then they have learned something. A healthy team is made up of people who have the attitude that it is better to learn something new than to be right.

Innovation is not primarily about alchemy. Rather than trying to make gold, it has far more to do with learning how to find it, mine it, refine it, and then work it into something of value. If Gibson is right, then the innovator is likely best to trade in his or her alchemist’s chemistry set for some prospecting tools, and learn about geology, mining, smelting, design, goldsmithing, sales, and marketing, so to speak.

It takes almost as much creativity to understand a good idea, as to have it in the first place. It takes even more creativity to productize a good idea than it does to have the idea in the first place.

Generally the last thing that you should do when beginning to design an interactive system is write code.

I had seen the parallels between film-making and interaction design in terms of the need for preproduction and the use of video to capture demonstrations,

Good stories are retold. Hence, they not only help you explain your ideas and make converts. Through their memorability and retelling, they provide a means whereby your audience itself becomes an effective conduit for spreading the debate and understanding reflected in your tale. In short, they are a form of “viral marketing” for design ideas. Both are pretty extreme cases of “putting yourself in someone else’s shoes.” But then, as my climbing partners are prone to say, there is nothing like a little extremity to help bring on a healthy dose of clarity. Our interest is mainly around using scenarios and theatrical techniques as an alternative approach to identifying or working through problems, or to communicate or validate ideas from one stake-holder to another. The limiting factor is your imagination, not technology or technique. There is always a way to express an idea appropriately within your means. The limiting factor is your imagination, not technology or technique. There is always a way to express an idea appropriately within your means. That being said, if traditional sketching were sufficient to handle the types of things that we want to design, one needs to have spent a lot of time exploring the social, personal, and physical context in which the system is to be used. Almost by definition, this requires representing not only people, but also their emotional state, and where they are physically. How can you get the details right if you haven’t looked at the big picture first? cinematic techniques had been developed precisely to deal with temporal phenomena, such as timing, movement, dynamics, and the like. It made sense to use them in interaction design as well. amplification through simplification. The only way to discover the limits of the possible is to go beyond them into the impossible. Design is a funny word. Some people think design means how it looks. But, of course, if you dig deeper, it’s really how it works. To design something really well, you have to ‘get it.’ You have to really grok [understand] what it’s all about. One of the greatest pains to human nature is the pain of a new idea. — Walter Bagehot A number of simple complementary techniques is usually more effective and economical than one comprehensive approach. The later in the process that a mistake is detected, the more expensive it is to fix. Play is the highest form of research. —Albert Einstein … success every time implies that one’s objectives are not challenging enough. A prototype is a prototype, regardless of the technology that is used to implement it, and regardless of its fidelity relative to the actual product. Prototypes are not sketches and the term low-fidelity prototype is definitely not a synonym for my use of the term sketch.

Never doubt that a small group of thoughtful, committed people can change the world. Indeed, it is the only thing that ever has.

Innovation in process trumps innovation in product. In order to create successful products, it is as important (if not more) to invest in the design of the design process, as in the design of the product itself.

men dream: but not equally. Those who dream by night in the dusty recesses of their minds wake in the day to find

All men dream: but not equally. Those who dream by night in the dusty recesses of their minds wake in the day to find that it was vanity: but the dreamers of the day are dangerous men, for they may act their dreams with open eyes, to make it possible.

Positioning is the act of deliberately defining how you are the best at something that a defined market cares a lot about.

positioning as “context setting” for products. When we encounter something new, we will attempt to make sense of it by gathering together all of the little clues we can quickly find to determine how we should think about this new thing.

positioning is a deliberate business choice that requires time, attention and, importantly, a systematic process.

“Sit, walk or run, but don’t wobble.” Zen proverb

where you have a distinct advantage. The subsegment needs to be easily identifiable—meaning if I had to create

The subsegment needs to be easily identifiable—meaning if I had to create a list of prospective buyers, I could figure out a way to do that.

the agreed-upon starting point. Great positioning

the agreed-upon starting point. Great positioning rarely comes by default. If you want to succeed, you have to determine the

Great positioning rarely comes by default. If you want to succeed, you have to determine the best way to position your product. Deliberate, try, fail, test and try again.

Great positioning rarely comes by default. If you want to succeed, you have to determine the best way

Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less.

You will always have limitations to your frame of reference that you need to account for in an effort to better understand reality. You must recognize what these limits are and, in situations where the risks are high or the outcomes important, take steps to augment your perception.

When you see someone doing something that doesn’t make sense to you, ask yourself what the world would have to look like to you for those actions to make sense.

Reciprocity can be summed up like this: when you act on things, they act on you.

Life is an iterative and compounding game. In the words of Peter Kaufman, it pays to “go positive and go first.” Also, remember that people make mistakes. Assuming there is no maliciousness, it pays to forgive.

People tend to receive what they offer to the world. Thus, to change our world, we must change what we offer to others.

the way we tell stories is indicative of our desire to find order in the world. Stories are an attempt to tame the terrifying randomness that surrounds us. As we go through life, we are constantly absorbing chaotic information that we make sense of through narratives.

shaping our environment to reduce the challenges of opposing forces is a key to improving productivity.

reducing resistance is often easier than using more force.

he seemed to instinctively understand that in order for a strategy to work, it must be communicated in a way that could be understood and executed. The more time people spend decoding complex instructions, the slower they will move in the direction you need them to go.

keep other people wanting what you have. For leverage to exist, all parties must perceive its value.

We have to deal with the environment we are in, not the one we wish we were in.

You can’t stop adapting, because no one around you is stopping. If you do, your competitive position declines, bringing your survival into question. Every living thing is constantly on the lookout for opportunity, the place to accrue advantage, and thus adaptation is also driven as a response to changes in those with whom we share our environment. Staying the same as we are often means falling behind.

The Law of the Minimum states that the yield of a crop will always be dictated by the essential nutrient that is available at the lowest level. No matter how abundant the other essential nutrients are, being deficient in one will always limit the crop’s growth.

uniquely among species on the planet, humans are able to imagine things that have no physical counterpart, and furthermore that this imagining allows us to function in the large, complex societies that we have. These shared beliefs are requirements for our lifestyles—“large numbers of strangers can cooperate successfully by believing in common myths.”

“the alpha male usually wins his position not because he is physically stronger, but because he leads a large and stable coalition.

The history of fashion can be read, in part, as a chronicle of humans trying to establish and negotiate social hierarchies. How we dress communicates information to people about our status.

Humans don’t like cognitive dissonance—“the state of tension that occurs whenever a person holds two cognitions (ideas, attitudes, beliefs, opinions) that are psychologically inconsistent This is why understanding the power of incentives is both critical and tricky. The acceptance of an initial incentive creates a psychological state whereby we become invested in maintaining whatever story brought about that incentive, so we can justify our acceptance of it.

Heuristics exist because they are way more efficient—efficient in terms of energy use, not necessarily efficient in getting the most useful answer.

While most people assume that experience is the key to learning, the key is actually reflection.

Journaling works because it prompts reflection. Keeping a journal, where you chronicle your use of the models and your expected results, allows you to build a repertoire that you can begin to rely on time and again.

“First get it written, then get it right.” I can’t remember who said them, but these are words of wisdom. Don’t spend too much time worrying and fretting and tinkering with your first draft.

“Living, vibrating human beings are still the secret and magic formula of great and enduring writing. Read, or better, study the immortals and you will be forced to conclude that their unusual penetration into human character is what has kept their work fresh and alive through the centuries.

it’s critical to develop the sort of imagination that considers several possibilities before deciding which scene to write. You can do this just by pausing, writing a quick list of possibilities, and waiting for something to click.

we are born, we live, and we die. It feels like three acts. Childhood is relatively short and introduces us to life. That long section in the middle is where we spend most of our time. Then we have a last act that wraps everything up. Daily life is like that, too. We get up in the morning and get ready to go to work. We work or do whatever we do. Eventually we wrap up the day’s business and hit the sack. We live each day in three acts.

To find the best plots, you need to come up with hundreds of ideas, then choose the best ones to develop.

Does the story you’re considering hit a nerve inside you? If not, why write it?

Stay healthy, happy, and above all produce.

We start to make up our minds about other people within seven seconds of first meeting them.

if you truly know yourself, deeply and intimately, you will be able to create great, complex, and interesting characters. That’s because we have all experienced, to a greater or lesser degree, every human emotion. By tapping into our emotional memories, we can create an infinite variety of characters.

there are deaths that are not physical. We can die on the inside.

But why does he pull the gun? You’ll have to figure that out for yourself. And that’s what novelists do. They write actions and justify them.

What makes a plot truly memorable is not all of the action, but what the action does to the character. We respond to the character who changes, who endures the crucible of the story only to emerge a different person at the end.

Set a good-sized word quota for each day, and then write on through to the end.

Set a good-sized word quota for each day, and then write on through to the end. Rewriting is what separates the real pros from the wannabes.

When you steal from one author it's plagiarism; if you steal from many, it's research.

You create characters out of everything that you are: your perceptions, emotions, beliefs, history, lifelong reading, desires, dreams. It's not a mappable process, or a simple one, or a straight-line one. You need patience, and insight, and trial and error.

Fiction is not sociology. But fiction, like sociology, is about human behavior. If you answer some of the same questions as sociologists, you will get a fuller picture of your setting.

70 percent of communication is nonverbal. If Harry says to Sue, “Can I see you tonight?” almost three-quarters of his meaning will be conveyed by the tone of his voice, his inflections, his facial expression, his hand gestures, his body language, the degree of his attention.

In art, the completely natural seldom works. Instead nature is refined, trained, pruned, heightened, unspontaneously considered and rehearsed. The perfect building, the liquid aria, the gorgeous football play — these are carefully composed. Choices are made, adjustments are constant, training counts. The results may look natural, but they are in fact artificial, which is itself a term derived from art.

Attitudes are only personal thoughts, feelings and opinions — the stuff that goes on in our brains when we're not talking aloud to someone else.

“I think, therefore I am,” Descartes said. He might also have said, “What I think, I am.”

“We see the world not as it is, but as we are.” To discover what a person is really like, decipher his map of reality. We all carry one around inside, and it dictates which parts of reality we focus on and how we react to that focus.

Scenes in fiction, especially short fiction, should do two things: deepen character and advance the plot.

go to the source: the wellsprings of human behavior. Concentrate on those universal drives that power all of our actions, in all times and all cultures.

fear and love. Psychologists tell us that these drives directly or indirectly motivate much behavior.

Brief action — but layers and layers of motivation.

add enough pressure to force your character to change. Why the pressure? Because change is threatening to most people, and they won't do it unless something drives them to it, usually pain or conflict.

Tension is the other great transformer of life into art.

We have cultural stories embedded in the very fabric of our thinking, goes this argument, and those stories influence what we notice in a given situation, how we interpret it and how we choose to react. Moreover, some stories seem to transcend individual cultures. They are universal archetypes. The form may look different in different tellings, but the underlying plot is the same.

Ayn Rand, to take an extreme example, become so involved with the characters of Atlas Shrugged that when the very long book was finally finished, she spent the next several months just reading it over and over, unwilling to be separated from the world she had created.

How can we establish significant facts about the world through observation if we do not have some guidance as to what kind of knowledge we are seeking or what problems we are trying to solve?

Science poses the questions, and ideally observation can provide answers.

Falsificationists freely admit that observation is guided by and presupposes

Once proposed, speculative theories are to be rigorously and ruthlessly tested by observation and experiment. Theories that fail to stand up to observational and experimental tests must be eliminated and replaced by further speculative conjectures.

Science progresses by trial and error, by conjectures and refutations. Only the fittest theories survive. Although it can never be legitimately said of a theory that it is true, it can hopefully be said that it is the best available; that it is better than anything that has come before.

If it is to form part of science, a hypothesis must be falsifiable A hypothesis is falsifiable if there exists a logically possible observation statement or set of observation statements that are inconsistent with it, that is, which, if established as true, would falsify the hypothesis.

I can therefore gladly admit that falsificationists like myself much prefer an attempt to solve an interesting problem by a bold conjecture, even (and especially) if it soon turns out to be false, to any recital of a sequence of irrelevant truisms. We prefer this because we believe that this is the way in which we can learn from our mistakes, and that in finding that our conjecture was false we shall have

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The demand that theories should be highly falsifiable has the attractive consequence that theories should be clearly stated and precise. If a theory is so vaguely stated that it is not clear exactly what it is claiming, then when tested by observation or experiment it can always be interpreted so as to be consistent with the results of those tests. Politicians and fortune-tellers

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science should progress by the proposal of bold, highly falsifiable conjectures as attempts to solve problems, followed by ruthless attempts to falsify the new proposals.

If we give in to criticism too easily, we shall never find out where the real power of our theories

If we give in to criticism too easily, we shall never find out where the real power of our theories lies.

It is all very well painting a heroic picture of Einstein as making a major advance by having the originality and courage to challenge some of the fundamental principles of physics, but we should not lose sight of the fact that it took two hundred years of detailed work within the Newtonian paradigm and one hundred years of work within theories of electricity and magnetism to reveal the problems that Einstein was to recognise and solve with his theories of relativity. It is philosophy, rather than science, that comes closest to being adequately characterised in terms of constant criticism of fundamentals.

Business success contains the seeds of its own destruction. The more successful you are, the more people want a chunk of your business and then another chunk and then another until there is nothing left.

You need to plan the way a fire department plans: It cannot anticipate where the next fire will be, so it has to shape an energetic and efficient team that is capable of responding to the unanticipated as well as to any ordinary event.

we all need to expose ourselves to the winds of change. We need to expose ourselves to our customers, both the ones who are staying with us as well as those that we may lose by sticking to the past. We need to expose ourselves to lower-level employees, who, when encouraged, will tell us a lot that we need to know. We must invite comments even from people whose job it is to constantly evaluate and critique us, such as journalists and members of the financial community.

Henry Ford’s slogan for the Model T—”It takes you there and brings you back”—epitomized the original attraction of the car as a mode of basic transportation. to

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building up the determination necessary to undertake the hard, unpleasant and treacherous task of leading a group of people through an excruciatingly tough set of changes—the moment when a leader decides to go forward, no matter what.

It takes objectivity, the willingness

It takes objectivity, the willingness to act on your convictions and the passion to mobilize people into supporting those convictions. This sounds like a tall order, and it is.

We became good at solving problems. We became highly focused on tangible results (our word for it is “output”). And from all the early bickering, we developed a style of ferociously arguing with one another while

We became good at solving problems. We became highly focused on tangible results (our word for it is “output”). And from all the early bickering, we developed a style of ferociously arguing with one another while remaining friends (we call this “constructive confrontation”).

we got kicked out and the board brought in a new CEO, what do you think he would do?” Gordon answered without hesitation, “He would get us out of memories.” I stared at him, numb, then said, “Why shouldn’t you and I walk out the door, come back and do it ourselves?”

Peter Drucker quotes a definition of an entrepreneur as someone who moves resources from areas of lower productivity

Peter Drucker quotes a definition of an entrepreneur as someone who moves resources from areas of lower productivity and yield to areas of higher productivity and yield.

If the prospect of a vigorous debate scares you, it’s understandable. Lots of aspects of managing an organization through a strategic inflection point petrify the participants, senior management included. But inaction might lead to a bad result for your business and that should frighten you more than anything else.

How a company handles the process of getting through a strategic inflection point depends predominantly on a very “soft,” almost touchy-feely issue: how management reacts emotionally to the crisis.

Looking back over my own career, I have never made a tough change, whether it involved resource shifts or personnel

Looking back over my own career, I have never made a tough change, whether it involved resource shifts or personnel moves, that I haven’t wished I had made a year or so earlier.

Getting this far took a lot of energy from you; you must now reach into whatever reservoir of energy you have left to motivate yourself and, most importantly, the people who depend on you so you can become healthy again.

To make it through the valley of death successfully, your first task is to form a mental image of what the company should look like when you get to the other side. This image not only needs to be clear enough for you to visualize but it also has to be crisp enough so you can communicate it simply to your tired, demoralized and confused staff.

I can’t help but wonder why leaders are so often hesitant to lead. I guess it takes a lot of conviction and trusting your gut to get ahead of your peers, your staff and your employees while they are still squabbling about which path to take, and set an unhesitating, unequivocal course whose rightness or wrongness will not be known for years. Such a decision really tests the mettle of the leader.

if you’re in a leadership position, how you spend your time has enormous symbolic value. It will communicate what’s important or what isn’t far more powerfully than all the speeches you can give.

Strategic change doesn’t just start at the top. It starts with your calendar.

If you’re wrong, you will die. But most companies don’t die because they are wrong; most die because they don’t commit themselves. They fritter away their momentum and their valuable resources while attempting to make a decision. The greatest danger is in standing still.

focusing instead on building a thoughtfully crafted product, where what’s popular is shaped by Instagram’s own storytelling about its biggest users.

He loved the science behind art, and how a simple innovation—like architect Filippo Brunelleschi’s rediscovery of linear perspective during the Renaissance—could completely change the way people communicated

Systrom knew their product was fun, but was it useful? Did it solve a problem most people had in their lives? The question was a tipping point, sending Systrom and Krieger back to the drawing board.

to ask first what problem they were solving, and then to try and solve it in the simplest way possible.

On the whiteboard, Systrom and Krieger brainstormed three of the top problems to solve. One, images always took forever to load on 3G cellular networks. Two, people were often embarrassed to share their low-quality phone snaps, since phones weren’t nearly as good as digital cameras. Three, it was annoying to have to post photos in many different places. What if they made a social network that came with an option to deliver your photos to Foursquare, Facebook, Twitter, and Tumblr all at once?

Nothing about it was new, exactly. They were not the first to think of photo filters or interest-based social networks. But the founders valued feel and simplicity over technological innovation. By keeping the product minimalist—just for posting and liking photos—they would spend less time developing it, and would be able to test it on the public before spending any more money. They set a deadline to launch whatever Codename would be in eight weeks, less time than it had taken Krieger to get his visa.

The founders picked their first users carefully, courting people who would be good photographers—especially designers who had high Twitter follower counts. Those first users would help set the right artistic tone, creating good content for everyone else to look at, in what was essentially the first-ever Instagram influencer campaign, years before that would become a concept.

Instead of trying to get everyone to use their app, they invited only people they thought would be likely to spread the word to their followers elsewhere, especially designers and creatives. They sold exclusivity to investors, even when so many of them were skeptical. In that sense, they were like a luxury brand, manufacturing coolness and tastefulness around what they’d built.

pretending things were going more smoothly than they actually were was part of the job of being a startup CEO. Everyone needed to think you were on the right track.

“Anybody can build Instagram the app,” he said, “but not everybody can build Instagram the community.” Those artists, designers, and photographers were turning into evangelists for the product, and Instagram needed to keep them as excited as possible for as long as possible.

Instagram had an opinion about what model content on the site looked like—the kind that gave a window into an interesting life.

Zuckerberg understood that the hardest part of creating a business would be creating a new habit for users and a group they all wanted to spend time with.

Instagram was teaching and rewarding storytelling.

Instagram was teaching and rewarding storytelling. The app was “more valuable the better the stories are,”

“We’re looking to have a level of impact on the world that is unmatched by any other company, and in order to do that we can’t sit around and act like we’ve made it. We need to constantly remind ourselves that we haven’t won and that we need to keep making bold moves and keep fighting or we risk peaking and fading away.” —MARK ZUCKERBERG,

Vine’s constraint would inspire new types of activity, just like Instagram’s square requirement or Twitter’s 140-character limit.

Besides having a tendency for profanity, Spiegel was apt to pick fights and hold grudges. He banned employees from using words like “share” and “post” that reminded him of Facebook, since Snapchat was about being more personal, and preferred using a term like “send” instead.

Systrom and Krieger always urged people to do the simplest thing first, the way they had when they first built the app.

Systrom personally approved every ad.

Systrom was the ultimate self-improver. In the last few years, besides building a social network with 400 million users, he’d gotten better at searing steaks, at running miles, at understanding interior design, at raising a puppy. He was working with an executive coach.

Instagram had always made things work with a smaller team than competitors.

Data was religion at Facebook, but never provided a perfect picture in terms of user behavior. It could tell you what people were doing, but not necessarily why.

Systrom understood the limitations of just numbers, which was Systrom understood the limitations of just numbers, which was one reason he’d invested so heavily in direct outreach and research.

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Building new things requires that we step back, understand what inspires us and match that with what the world needs; that’s what we plan to do.

The ability to be alone with your thoughts is, in fact, one of the key advantages of working remotely.

the human connection is even more important when hiring remote workers because it has to be stronger to survive the distance. When the bulk of your communication happens via email and the like, it doesn’t take much for bad blood to develop unless everyone is making their best effort to the contrary. Small misunderstandings that could have been nipped in the bud with a wink of an eye or a certain tone of voice can quickly snowball into drama. That’s one of the key challenges of remote work: keeping everyone’s outlook healthy and happy.

The old adage still applies: No assholes allowed. But for remote work, you need to extend it to no asshole-y behavior allowed, no drama allowed, no bad vibes allowed.

Motivation is the fuel of intellectual work. You can get several days’ worth of work completed in one motivation-turboed afternoon. Or, when you’re motivation starved, you can waste a week getting a day’s worth of work done.

If a worker’s motivation is slumping, it’s probably because the work is weakly defined or appears pointless,

In life and business, the person with the fewest blind spots wins. Removing blind spots means we see, interact with, and move closer to understanding reality. We think better.

In order to see a problem for what it is, we must first break it down into its substantive parts so the interconnections can reveal themselves.

While pontificating with friends over a bottle of wine at dinner is fun, it won’t help you improve.

The only way you’ll know the extent to which you understand reality is to put your ideas and understanding into action. If you don’t test your ideas against the real world—keep contact with the earth—how can you be sure you understand?

The further we are from the feedback of the decisions, the easier it is to convince ourselves that we are right and avoid the challenge, the pain, of updating our views.

As Confucius said, “A man who has committed a mistake and doesn’t correct it, is committing another mistake.”

Most geniuses—especially those who lead others—prosper not by deconstructing intricate complexities but by exploiting unrecognized simplicities.

Without reflection we cannot learn.

The world does not act on us as much as it reveals itself to us and we respond.

Wrapping ego up in outcomes

Wrapping ego up in outcomes instead of in ourselves makes it easier to update our views.

«I think it is undeniably true that the human brain must work in models. The trick is to have your brain work better than the other person’s brain because it understands the most fundamental models: ones that will do most work per unit. If you get into the mental habit of relating what you’re reading to the basic structure of the underlying ideas being demonstrated, you gradually accumulate some wisdom.»

What successful people do is file away a massive, but finite, amount of fundamental, established, essentially unchanging knowledge that can be used in evaluating the infinite number of unique scenarios which show up in the real world.

But frequently, we don’t remember that our maps and models are abstractions and thus we fail to understand their limits. We forget there is a territory that exists separately from the map. This territory contains details the map doesn’t describe. We run into problems when our knowledge becomes of the map, rather than the actual underlying territory it describes.

Maps are not purely objective creations. They reflect the values, standards, and limitations of their creators.

if you don’t have at least a few years and a few failures under your belt, you cannot consider yourself competent in a circle.

Keeping a journal of your own performance is the easiest and most private way to give self-feedback. Journals allow you to step out of your automatic thinking and ask yourself: What went wrong? How could I do better? Monitoring your own performance allows you to see patterns that you simply couldn’t see before. This type of analysis is painful for the ego, which is also why it helps build a circle of competence. You can’t improve if you don’t know what you’re doing wrong.

if you can’t prove something wrong, you can’t really prove it right either.

If you know the first principles of something, you can build the rest of your knowledge around them to produce something new.

first principles thinking identifies the elements that are, in the context of any given situation, non-reducible.

If we never learn to take something apart, test our assumptions about it, and reconstruct it, we end up bound by what other people tell us—trapped in the way things have always been done.

When it comes down to it, everything that is not a law of nature is just a shared belief. Money is a shared belief.

When it comes down to it, everything that is not a law of nature is just a shared belief. Money is a shared belief. So is a border. So are bitcoin. So is love. The list goes on.

If we want to identify the principles in a situation to cut through the dogma and the shared belief, there are two techniques we can use: Socratic questioning and the Five Whys.

Socratic questioning generally follows this process: Clarifying your thinking and explaining the origins of your ideas. (Why do I think this? What exactly do I think?) Challenging assumptions.

Socratic questioning generally follows this process: Clarifying your thinking and explaining the origins of your ideas. (Why do I think this? What exactly do I think?) Challenging assumptions. (How do I know this is true? What if I thought the opposite?) Looking for evidence. (How can I back this up? What are the sources?) Considering alternative perspectives. (What might others think? How do I know I am correct?) Examining consequences and implications. (What if I am wrong? What are the consequences if I am?) Questioning the original questions. (Why did I think that? Was I correct? What conclusions can I draw from the reasoning process?)

If your “whys” result in a statement of falsifiable fact, you have hit a first principle. If they end up with a “because I said so” or ”it just is”, you know you have landed on an assumption that may be based on popular opinion, cultural myth, or dogma. These are not first principles.

The real power of first principles thinking is moving away from random change and into choices that have a real possibility of success.

Creativity is intelligence having fun.

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“You can never merely do one thing.”3 We operate in a world of multiple, overlapping connections, like a web, with

“You can never merely do one thing.”3 We operate in a world of multiple, overlapping connections, like a web, with many significant, yet obscure and unpredictable, relationships.

Life is filled with the need to be persuasive. Arguments are more effective when we demonstrate that we have considered the second-order effects and put effort into verifying that these are desirable as well.

When making uncertain decisions, it’s nearly always a mistake not to ask: What are the relevant priors? What might I already know that I can use to better understand the reality of the situation?

“upside optionality”, that is, seeking out situations that we expect have good odds of offering us opportunities. Take the example of attending a cocktail party where a lot of people you might like to know are in attendance. While nothing is guaranteed to happen—you may not meet those people, and if you do, it may not go well— you give yourself the benefit of serendipity and randomness. The worst thing that can happen is...nothing. One thing you know for sure is that you’ll never meet them sitting at home. By going to the party, you improve your odds of encountering opportunity.

Failing properly has two major components. First, never take a risk that will do you in completely. (Never get taken out of the game completely.) Second, develop the personal resilience to learn from your failures and start again. With these two rules, you can only fail temporarily.

There are two approaches to applying inversion in your life. Start by assuming that what you’re trying to prove is either true or false, then show what else would have to be true. Instead of aiming directly for your goal, think deeply about what you want to avoid and then see what options are left over.

«Hence to fight and conquer in all your battles is not supreme excellence; supreme excellence consists in breaking the enemy’s resistance without fighting.»

Simply invert, always invert, when you are stuck.

Anybody can make the simple complicated. Creativity is making the complicated simple.

you can make decisions more confidently by basing

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you can make decisions more confidently by basing them on the explanation that has the fewest moving parts.

we should not attribute to malice that which is more easily explained by stupidity.

energy to execute (such as ignorance or laziness) It

of all possible motives behind an action, the ones that require the least amount of energy to execute (such as ignorance or laziness) are more likely to occur than one that requires active malice.

You need to know both what to do and how to do it.

“back-of-the-envelope calculations.” I have frequently observed great scientists and engineers do this much more often than the “run-of-the-mill” people, The reason back-of-the-envelope calculations are widely used by great scientists is clearly revealed—you get a good feeling for the truth or falsity of what was claimed, as well as realize which factors you were inclined not to think about,

In science, if you know what you are doing, you should not be doing it. In engineering, if you do not know what you are doing, you should not be doing it.

All of engineering involves some creativity to cover the parts not known, and almost all of science includes some practical engineering to translate the abstractions into practice.

the main difference between those who go far and those who do not is some people have a vision and the others do not and therefore can only react to the current events as they happen.

I have seen the accuracy of the vision matters less than you might suppose, getting anywhere is better than drifting, there are potentially many paths to greatness for you, and just which path you go on, so long as it takes you to greatness, is none of my business. You must, as in the case of forging your personal style, find your vision of your future career, and then follow it as best you can.

In forming your plan for your future you need to distinguish three different questions: What is possible? What is likely to happen? What is desirable to have happen? In a sense the first is science—what is possible. The second is engineering—what are the human factors which choose the one future that does happen from the ensemble of all possible futures. The third is ethics, morals, or whatever other word you wish to apply to value judgments. It is important to examine all three questions, and insofar as the second differs from the third, you will probably have an idea of how to alter things to make the more desirable future occur, rather than let the inevitable happen and suffer the consequences. Again, you can see why having a vision is what tends to separate the leaders from the followers.

I am preaching the message that, with apparently only one life to live on this earth, you ought to try to make significant contributions to humanity rather than just get along through life comfortably—that the life of trying to achieve excellence in some area is in itself a worthy goal for your life.

I am preaching the message that, with apparently only one life to live on this earth, you ought to try to make significant contributions to humanity rather than just get along through life comfortably—that the life of trying to achieve excellence in some area is in itself a worthy goal for your life. It has often been

“Is programming closer to novel writing than it is to classical engineering?” I suggest yes! Given the problem of getting a man into outer space, both the Russians and the Americans did it pretty much the same way, all things considered, and allowing for some espionage. They were both limited by the same firm laws of physics. But give two novelists the problem of writing on “the greatness and misery of man,” and you will probably get two very different novels (without saying just how to measure this). Give the same complex problem to two modern programmers and you will, I claim, get two rather different programs. Hence my belief that current programming practice is closer to novel writing than it is to engineering.

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think before you write the program, it might be called. Before you start, think carefully about the whole thing, including what will be your acceptance test that it is right, as well as how later field maintenance will be done. Getting it right the first time is much better than fixing it up later!

It was not all just luck—I made a lot of it by trying to understand, below the surface level, what was going on.

It was not all just luck—I made a lot of it by trying to understand, below the surface level, what was going on. I began, at any lecture I attended anywhere, to pay attention

you the reader should take your own opinions and try first to express them clearly, and then examine them with counterarguments, back and forth, until you are fairly clear as to what you believe and why you believe it.

I knew enough not to think about the process when doing research, just as athletes do not think about style when they engage in sports, but they practice the style until it is more or less automatic. I had thus established the habit, after something of great or small importance was discovered, of going back and trying to trace the steps by which it apparently happened. But do not be deceived; at best I can give the conscious part, and a bit of the upper subconscious part, but we simply do not know how the unconscious works its magic.

Notice first this essential step happened only because there was a great deal of emotional stress on me at the moment, and this is characteristic of most great discoveries. Working calmly will let you elaborate and extend things, but the breakthroughs generally come only after great frustration and emotional involvement.

It must be your friends, in some sense, who make you famous by quoting and citing you, and it pays, so I claim, to be helpful to others as they try to do their work. They may in time give you credit for the work, which is better than trying to claim it yourself.

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the fun of working with good people on important problems is more pleasure than the resulting fame.

Committee decisions, which tend to diffuse responsibility, are seldom the best in practice—most of the time they represent a compromise which has none of the virtues of any path and tends to end in mediocrity. Experience has taught me that generally a decisive boss is better than a waffling one—you know where you stand and can get on with the work which needs to be done!

Speed in learning new things is not everything, to be sure, but it seems to me it is an important element.

You also realize any dictionary must be circular; the first word you look up must be defined in terms of other words—there can be no first definition which does not use words.

There are smells you cannot smell, wavelengths of light you cannot see, sounds you cannot hear, all based on the limits of your sense organs, so why do you object to the observation that given the wiring of the brain you have, there can be thoughts you cannot think?

Man is not a rational animal, he is a rationalizing animal.

Creativity seems, among other things, to be “usefully” putting together things which were not perceived to be related before, and it may be the initial psychological distance between the things which counts most.

There is first the recognition of the problem in some dim sense. This is followed by a longer or shorter period of refinement of the problem. Do not be too hasty at this stage, as you are likely to put the problem in the conventional form and find only the conventional solution. This stage, moreover, requires your emotional involvement, your commitment to finding a solution, since without a deep emotional involvement you are not likely to find a really fundamental, novel solution.

A long gestation period of intense thinking about the problem may result in a solution, or else the temporary abandonment of the problem. This temporary abandonment is a common feature of many great creative acts. The monomaniacal pursuit often does not work; the temporary dropping of the idea sometimes seems to be essential to let the subconscious find a new approach.

The false starts and false solutions often sharpen the next approach you try. You now know how not to do it! You have a smaller number of approaches left to explore. You have a better idea of what will not work and possibly why it will not work.

When stuck I often ask myself, “If I had a solution, what would it look like?” This tends to sharpen up the approach, and may reveal new ways of looking at the problem you had subconsciously ignored but you now see should not be excluded.

“Luck favors the prepared mind.” You prepare your mind for success “by thinking on it constantly” (Newton), and occasionally you are lucky.

get down to the fundamentals of a field, since it implies you must examine things many ways before you can decide what is fundamental and what is frills.

We reason mainly by analogy. But it is curious that a valuable analogy need not be close—it need only be suggestive of what to do next. A dream by Kekule about snakes biting their own tails suggested to him, when he awoke, the ring structure of carbon compounds! Many a poor analogy has proved useful in the hands of experts.

In the past I have deliberately managed myself in this matter by promising a result by a given date, and then, like a cornered rat, having at the last minute to find something! I have been surprised at how often this simple trick of managing myself has worked for me. Of course it depends on having a great deal of pride and self-confidence.

We are, in a very real sense, the sum total of our habits, and nothing more; hence by changing our habits, once we understand which ones we should change and in what directions, and understand our limitations in changing ourselves, then we are on the path along which we want to go.

Institutions, like people, tend to move only when forced to.

Systems engineering is the attempt to keep at all times the larger goals in mind and to translate local actions into global results. But there is no single larger picture.

The first rule of systems engineering is: If you optimize the components, you will probably ruin the system performance.

you get what you measure. This is seldom thought about by people setting up a rating, measuring, or other schemes of recording things, and yet in the long run it has enormous effects on the entire system—usually in directions which they never thought about at all!

as far as I know each of you has but one life to lead, and it seems to me it is better to do significant things than to just get along through life to its end. Certainly near the end it is nice to look back at a life of accomplishments rather than a life where you have merely survived and amused yourself. Thus in a real sense I am preaching the messages that (1) it is worth trying to accomplish the goals you set yourself and (2) it is worth setting yourself high goals.

Newton observed that if others would think as hard as he did, then they would be able to do the same things. Edison said genius was 99% perspiration and 1% inspiration. It is hard work, applied for long years, which leads to the creative act, and it is rarely just handed to you without any serious effort on your part. Yes, sometimes it just happens, and then it is pure luck. It seems to me to be folly for you to depend solely on luck for the outcome of this one life you have to lead.

Among the important properties to have is the belief you can do important things. If you do not work on important problems, how can you expect to do important work? Yet direct observation and direct questioning of people show most scientists spend most of their time working on things they believe are not important and are not likely to lead to important things.

“Why are you not working on and thinking about the important problems in your area?” If you do not work on important problems, then it is obvious you have little chance of doing important things.

Confidence in yourself, then, is an essential property. Or, if you want to, you can call it “courage.” Shannon had courage.

Look at your successes, and pay less attention to failures than you are usually advised to do in the expression, “Learn from your mistakes.” While playing chess Shannon would often advance his queen boldly into the fray and say, “I ain’t scared of nothing.” I learned to repeat it to myself when stuck, and at times it has enabled me to go on to a success. I deliberately copied a part of the style of a great scientist. The courage to continue is essential, since great research often has long periods with no success and many discouragements.

The desire for excellence is an essential feature for doing great work. Without such a goal you will tend to wander like a drunken sailor. The sailor takes one step in one direction and the next in some independent direction. As a result the steps tend to cancel each other out, and the expected distance from the starting point is proportional to the square root of the number of steps taken. With a vision of excellence, and with the goal of doing significant work, there is a tendency for the steps to go in the same direction and thus go a distance proportional to the number of steps taken, which in a lifetime is a large number indeed.

intellectual investment is like compound interest: the more you do, the more you learn how to do, so the more you can do, etc. I do not know what compound interest rate to assign, but it must be well over 6%—one extra hour per day over a lifetime will much more than double the total output. The steady application of a bit more effort has a great total accumulation.

the race is not to the one who works hardest! You need to work on the right problem at the right time and in the right way—what I have been calling “style.”

for some years I set aside Friday afternoons for “great thoughts.” Of course, I would answer the telephone, sign a letter, and such trivia, but essentially, once lunch started, I would only think great thoughts—what was the nature of computing, how would it affect the development of science, what was the natural role of computers in Bell Telephone Laboratories, what effect will computers have on at&t, on science generally? I found it was well worth the 10% of my time to do this careful examination of where computing was heading so I would know where we were going and hence could go in the right direction.

Most great people also have 10 to 20 problems they regard as basic and of great importance, and which they currently do not know how to solve. They keep them in their mind, hoping to get a clue as to how to solve them. When a clue does appear they generally drop other things and get to work immediately on the important problem.

Doing the job with “style” is important. As the old song says, “It ain’t what you do, it’s the way that you do it.”

It is a poor workman who blames his tools. I have always tried to adopt the philosophy that I will do the best I can in the given circumstances, and after it is all over maybe I will try to see to it that things are better next time.

I must address the topic of whether the effort required for excellence worth it. I believe it is—the chief gain is in the effort to change yourself, in the struggle with yourself, and it is less in the winning than you might expect. Yes, it is nice to end up where you wanted to be, but the person you are when you get there is far more important. I believe a life in which you do not try to extend yourself regularly is not worth living—but it is up to you to pick the goals you believe are worth striving for.

Getting rich is about knowing what to do, who to do it with, and when to do it. It is much more about understanding than purely hard work. Yes, hard work matters, and you can’t skimp on it. But it has to be directed in the right way.

You should not grind at a lot of hard work until you figure out what you should be working on.

You will get rich by giving society what it wants but does not yet know how to get. At scale.

Play iterated games. All the returns in life, whether in wealth, relationships, or knowledge, come from compound interest.

Become the best in the world at what you do. Keep redefining what you do until this is true.

Society will pay you for creating things it wants. But society doesn’t yet know how to create those things, because if it did, they wouldn’t need you. They would already be stamped out.

Society, business, & money are downstream of technology, which is itself downstream of science. Science applied is the engine of humanity.

If you’re not 100 percent into it, somebody else who is 100 percent into it will outperform you. And they won’t just outperform you by a little bit—they’ll outperform you by a lot because now we’re operating the domain of ideas, compound interest really applies and leverage really applies.

If you are fundamentally building and marketing something that is an extension of who you are, no one can compete with you on that.

The most important skill for getting rich is becoming a perpetual learner.

Compounding in business relationships is very important. Look at some of the top roles in society, like why someone is a CEO of a public company or managing billions of dollars. It’s because people trust them. They are trusted because the relationships they’ve built and the work they’ve done has compounded. They’ve stuck with the business and shown themselves (in a visible and accountable way) to be high-integrity people.

Forty hour work weeks are a relic of the Industrial Age. Knowledge workers function like athletes—train and sprint, then rest and reassess.

Being at the extreme in your art is very important in the age of leverage.

An old boss once warned: “You’ll never be rich since you’re obviously smart, and someone will always offer you a job that’s just good enough.”

Whether in commerce, science, or politics—history remembers the artists.

I’m always “working.” It looks like work to others, but it feels like play to me. And that’s how I know no one can compete with me on it. Because I’m just playing, for sixteen hours a day. If others want to compete with me, they’re going to work, and they’re going to lose because they’re not going to do it for sixteen hours a day, seven days a week.

Your real résumé is just a catalog of all your suffering. If I ask you to describe your real life to yourself, and you look back from your deathbed at the interesting things you’ve done, it’s all going to be around the sacrifices you made, the hard things you did.

“Clear thinker” is a better compliment than “smart.”

Very smart people tend to be weird since they insist on thinking everything through for themselves.

Julius Caesar famously said, “If you want it done, then go. And if not, then send.” What he meant was, if you want it done right, then you have to go yourself and do it. When you are the principal, then you are the owner—you care, and you will do a great job. When you are the agent and you are doing it on somebody else’s behalf, you can do a bad job. You just don’t care. You optimize for yourself rather than for the principal’s assets.

Reading science, math, and philosophy one hour per day will likely put you at the upper echelon of human success within seven years.

The three big ones in life are wealth, health, and happiness. We pursue them in that order, but their importance is reverse.

Don’t take yourself so seriously. You’re just a monkey with a plan.

Happiness is there when you remove the sense of something missing in your life. Every positive thought

Happiness is there when you remove the sense of something missing in your life.

happiness is not about positive thoughts. It’s not about negative thoughts. It’s about the absence of desire, especially the absence of desire for external things.

You’re born, you have a whole set of sensory experiences and stimulations (lights, colors, and sounds), and then you die. How you choose to interpret them is up to you—you have that choice.

you have to go through your life replacing your thoughtless bad habits with good ones, making a commitment to be a happier person. At the end of the day, you are a combination of your habits and the people who you spend the most time with.

Whenever I get caught up in my ego battles, I just think of entire civilizations that have come and gone. For example, take the Sumerians. I’m sure they were important people and did great things, but go ahead and name me a single Sumerian. Tell me anything interesting or important Sumerians did that lasted. Nothing.

To make an original contribution, you have to be irrationally obsessed with something.

We evolved for scarcity but live in abundance. There’s a constant struggle to say no when your genes always want to say yes.

An emotion is our evolved biology predicting the future impact of a current event. In modern settings, it’s usually exaggerated or wrong.

The greatest superpower is the ability to change yourself.

Impatience with actions, patience with results.

the smartest and the most successful people I know started out as losers. If you view yourself as a loser, as someone who was cast out by society and has no role in normal society, then you will do your own thing and you’re much more likely to find a winning path.

Honesty is a core, core, core value. By honesty, I mean I want to be able to just be me. I never want to be in an environment or around people where I have to watch what I say. If I disconnect what I’m thinking from what I’m saying, it creates multiple threads in my mind. I’m no longer in the moment—now I have to be future-planning or past-regretting every time I talk to somebody.

I only believe in peer relationships. I don’t believe in hierarchical relationships. I don’t want to be above anybody, and I don’t want to be below anybody. If I can’t treat someone like a peer and if they can’t treat me like peer, I just don’t want to interact with them.

There is actually nothing but this moment. No one has ever gone back in time, and no one has ever been able to successfully predict the future in any way that matters. Literally, the only thing that exists is this exact point where you are in space at the exact time you happen to be here.

The truth isn't the truth until people believe you, and they can't believe you if they don't know what you're saying, and they can't know what you're saying if they don't listen to you, and they won't listen to you if you're not interesting, and you won't be interesting unless you say things imaginatively, originally, freshly.

“The more intellectual you grow, the more you lose the great intuitive skills that really touch and move people.”

You are faced with a blank slate, and in a fixed amount of time, you must fill it with something interesting enough to be remembered by a customer who, in the course of a day, will see thousands of other ad messages.

“If you systematically dismantled the entire operation of the Coca-Cola Company and left them with only their brand name, management could rebuild the company within five years. Remove the brand name and the enterprise would die within five years.”

You gather as much information on the problem as you can. You read, you underline stuff, you ask questions, you visit the factory. You sit down and actively attack the problem. You drop the whole thing and go do something else while your subconscious mind works on the problem. “Eureka!” You figure out how to implement your idea.

Dramatizes is the key word. You must dramatize it in a unique, provocative, compelling, and memorable way.

Somewhere between these two places, however, is where you want to be—a balance between a healthy skepticism of your reason for living and a solar confidence in your ability to come up with a fantastic idea every time you sit down to work. Living at either end of the spectrum will debilitate you. In fact, it's probably best to err on the side of fear.

Brands are verbs. “Nike exhorts, IBM solves, and Sony dreams.” Even Mr. Whipple, as bad as he was, helped Charmin equal

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Draconian simplicity involves stripping your brand's value proposition down to the bone and then again to the marrow, carving away until you get down to brand = adjective. Make your brand stand for one thing. Pair it with one adjective.

But what they're going to remember a brand for, the way they're going to label it in their mental filing system, is with a word. Find that word.

“A brand is the most valuable piece of real estate in the world: a corner of someone's mind.”

Find the emotion, and you'll be miles ahead of someone who's just thinking about the brand.

spend as much time researching the problem as you do on solving it. Spend time finding that insight.

write down the truest thing you can say about your product or brand. You need to find the central truth about your brand and about the whole category—the central human truth.

he also talked about a deeper bond with the product: nostalgia. It's delicate but potent. Teddy told me that in Greek, nostalgia literally means “the pain from an old wound.” It's a twinge in your heart far more powerful than memory alone. This device [gesturing to the Kodak Carousel] isn't a spaceship; it's a time machine. It goes backwards, forwards…takes us to a place where we ache to go again. It's not called the wheel. It's called the Carousel. But he also talked about a deeper bond with the product: nostalgia.

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Study your product, brand, or category, and find the emotional center. Once you've discovered it, the words and the ideas and the truth will start to flow.

Whatever you do, just start writing. Don't let the empty page (what Hemingway called “the white bull”) intimidate you. Go for art later. Start with clarity.

Work. Just work. The time will come to unveil. For now, just work.

I don't think most people read ads, either—at least not the body copy. There's a reason they say a picture is worth a thousand words.

Remember, styles change; typefaces and design and art direction, they all change. Fads come and go. But people are always people. They want to look better, make more money, feel better, be healthy. They want security, attention, and achievement. These things about people aren't likely to change. So focus your efforts on speaking to these basic needs, rather than tinkering with the current visual affectations. Focus first on the substance of what you want to say. Then worry about how to say it.

Part of what makes metaphors in ads so effective is how they involve the reader. They use images already in the reader's mind, twist them to the message's purpose, and ask the reader to close the loop for us.

“People read what interests them, and sometimes it's an ad.”

the point here isn't, hey, how many headlines can we write, but rather how many different doors can we go through? How many different ways can we look at the same problem?

Why write to the masses? It's one person reading the Web page you're working on, right? So write to one person.

Simple is big. The artist Cezanne said, “With an apple, I will astonish Paris.”

Get it down to one thing. Sometimes it's just a headline. Sometimes a picture. Either way, he said, the math always works out the same. Every element you add to a layout reduces the importance of all the other elements. And conversely, every item you subtract raises the visibility and importance of what's left.

“If you're about to spend advertising dollars on a campaign and you can't imagine anybody's going to write about it or talk about it, you might want to rethink it.”

“You cannot logic your way to an audience's heart.”

we don't get people talking about our brands by reading them product benefits off the sales guys' spec sheets. People talk in stories, and so must we.

the human brain is wired to hunger for story—that a structure of three acts, taking us from problem to unexpected solution, is something our brains crave.

Our job is to discover the stories behind our brands and tell them in a way that will get people's attention.

To get your story engine started, try seeing your brand as an archetype. By dint of the character traits in each one, archetypes suggest story. The Hero saves the day. The Outlaw fought the law and the law won. So what archetype feels right for your brand?

Being creative is hard. Being creative on demand is harder. Being creative full time, that takes discipline.

Being creative is hard. Being creative on demand is harder. Being creative full time, that takes discipline. We're talking about baking quality so far into

“You cannot pursue greatness and comfort at the same time.”

“And for me engineering comes down to two real principles: The first is that you think of every problem as a system. And every system can be better. No matter how good or bad it is, you can make anything better—and that goes for you whether you’re writing code or you’re building hardware, or your system is a company.”

Mark, he said, was “strong-willed and relentless,” a description that many coworkers and rivals would certainly endorse.

That was his general approach—how can you use technology to let people collaborate and remove constraints of time and space?”

existed.” It was the time of year when students were shopping for courses for the new

It was the time of year when students were shopping for courses for the new semester, and Thefacebook provided an instant utility.

“My goal is to not have a job,” Zuckerberg said. “Making cool things is just something I love doing, and not having someone tell me what to do or a timeframe in which to do it is the luxury I am looking for in my life.”

Friends told him to put his financial house in order and take a job, but he was holding out for something bigger. “They were like, you’re getting deeper in debt, you’ve got to focus on paying your bills,” he says. “I had a bank account shut down on me, I couldn’t get credit, but my belief was, I’m just going to hold out for the large payday. I’m just going to keep doing what I’m doing and as long as I create something of massive value, the money will follow.”

“Mark was basically framing it for people—this is your page, this represents you, this is how other people see you. It needed that explicit frame for people to learn how to use it.”

“Mark would always be the final arbiter of what went in the product and how it worked,”

ZUCKERBERG CARRIED A notebook. In 2006, the year that put Facebook on a course for greatness and infamy, you would have seen him in the Palo Alto office, head down, scrawling on an unruled journal in his crabbed, compact script, sketching out product ideas, diagramming coding approaches, and slipping in bits of his philosophy. Those who visited his one-bedroom apartment, with its mattress on the floor and a kitchen that never saw an egg boiled, might spot a stack of completed notebooks.

Zuckerberg was no longer doing much coding, but he’d use those notebooks to convey a detailed version of his product vision.

Zuckerberg wrestled with all of this in the Book of Change. A day after he started the notebook, he began a page called “Open Registration,” and asked, “So what do we need to hash out before we build this?”

Zuckerberg wrestled with all of this in the Book of Change. A day after he started the notebook, he began a page called “Open Registration,” and asked, “So what do we need to hash out before we build this?” He diagrammed the information flow on the sign-in process, asking people to declare whether they were in college, in high school, or “in the world.” He decided that people should use their zip codes to identify their geographical network. He even mused on how privacy should work.

Zuckerberg was thinking hard about what would appear on the News Feed, diving deep into the criteria that would determine which stories should appear on one’s News Feed, and how they might be ranked. He wanted to make it easier for people to see what was important in the world of the friends they had consciously connected to. He had one word in mind as a yardstick for inclusion: “interesting-ness.”

Using Facebook needs to feel like you’re using a futuristic government-style interface to access a database full of information linked to every person. The user needs to be able to look at information at any depth . . . The user experience needs to feel “full.” That is, when you click on a person in a governmental database, there is always information about them. This makes it worth going to their page or searching for them. We must make it so every search is worth doing and every link is worth clicking on. Then the experience will be beautiful.

Zuckerberg had built the original Facebook in not much more than a week.

Palihapitiya proposed to be utterly obsessive about MAUs—to look at every part of Facebook’s business in light of this metric, to learn what can drive MAUs, to fix things that don’t increase it, and to build new parts of the company to boost MAUs even higher.

“We don’t view your experience with the product as a single-player game,” he says. Yes, in the short run, some users might benefit more than others from PYMK friending. But, he contends, all users will benefit if everyone they know winds up on Facebook. We should think of PYMK as kind of a “community tax policy,” he says. Or a redistribution of wealth. “If you’re ramped up and having a good life, then you’re going to pay a little bit more in order to make sure that everyone else in the community can get ramped up. I actually think that that approach to building a community is part of why [we have] succeeded and is modeled in a lot of aspects of our society.”

He is a learn-by-doing person, and that is the DNA of the company. Facebook doesn’t believe in perfection.”

From Zuckerberg on down, everyone believed that Facebook’s edge came from its speed and risk-taking. Going slow would mean death.

Facebook later noted that 80 to 85 percent of its users did not change the defaults.)

“Nobody was using WhatsApp as intended,” says Fishman. “People were trying to use this as a messenger.” This was a revelation. Instead of leaving WhatsApp to start a direct conversation with someone, Koum realized that you could do that inside the app.

“Nobody was using WhatsApp as intended,” says Fishman. “People were trying to use this as a messenger.” This was a revelation. Instead of leaving WhatsApp to start a direct conversation with someone, Koum realized that you could do that inside the app. Koum spent the next few weeks revamping WhatsApp to focus on messaging.

She thinks in the lens of How is this story going to be written, what are the headlines?

Spiegel did not panic. When Snapchat itself first launched, it had been a flop. “That’s always the challenge with new ideas,” he says. “It takes time for people to change their behavior.” That is what happened with Stories. After a few months, the graph that showed the rate of pickup roused itself from the basement and began to take the satisfying trajectory of an S-curve.

I am more afraid of not doing the best thing we can than I am of breaking the thing that we currently have. I just think I take more chances and that means I get more things wrong. So in retrospect, we have certainly made a bunch of mistakes in strategy, in execution. If you’re not making mistakes, you’re probably not living up to your potential, right? That’s how you grow.”

The key to being a successful author is consistency. You need to write every day, preferably at the same time, so your body and mind become trained. You need a writing habit, one that you will practice for the rest of your life.