

## Chapter 12

# The Road to Creation

If people bring so much courage to this world the world has to kill them to break them, so of course it kills them. The world breaks everyone and afterward many are strong at the broken places. But those that will not break it kills. It kills the very good and the very gentle and the very brave impartially. If you are none of these you can be sure it will kill you too but there will be no special hurry.

Ernest Hemingway, *A Farewell to Arms*, Chapter XXXIV (1929)

Whereas the previous chapters and the appendices deal with scientific obstacles to revolutionary innovations and discuss some potential methods to overcome them, this chapter focuses on some of the common non-scientific obstacles (financial, political, cultural, personal, etc.) that revolutionary scientific innovators are likely to encounter along the way. In order to prepare future creators for such non-scientific obstacles, this chapter provides:

12.1. My advice

12.2. Advice from previous scientific innovators

12.3. Advice from non-scientific innovators

12.4. Some final thoughts

## 12.1 My Advice

If you are a future creator, you will encounter many obstacles during your career. Some of those will be scientific obstacles. While those can be incredibly challenging, they are the good kind of obstacles. Finding ways to overcome or circumvent them is exactly what revolutionary scientific innovators are highly skilled at doing, and precisely why the world needs revolutionary scientific innovators. All the rest of this book, other than Chapter 12, discusses general methods and specific examples for how to face scientific obstacles.

Other obstacles you encounter will not be scientific in nature. All of those obstacles will be due to people; in a majority of cases those obstacles will *be* people. All of those non-scientific obstacles need not exist at all, yet people make them exist, and thereby make it far more difficult than necessary for someone to be a revolutionary innovator and to successfully produce revolutionary innovations.

Non-scientific obstacles could be created by:

12.3.1. You—for example by things you do, say, or think, or fail to do, say, or think.

12.3.2. Other people—individuals, small groups, organizations, or entire societies.

I offer my suggestions on those issues in this section, but please also read the excellent advice from innovators of the past, as given in Sections 12.2 and 12.3.

### 12.1.1 You

The potential non-scientific obstacles that you could create for yourself are at least fully within your control. If you make wise choices in what you do, say, and think, and equally wise choices in what you avoid doing, saying, and thinking, you can avoid virtually all of these problems.

For simplicity, I have divided my advice into several different yet interrelated areas.

#### **Keep your priorities straight**

In general, it is your duty to help other people, and to make the world as improved as possible when you leave it compared to when you entered it. Throughout your life, your primary objective should be to directly or indirectly help and/or enrich humanity (with cultural and social riches, not necessarily monetary riches). For future creators, that includes pursuing revolutionary innovations to make the world a better place.

Yet if you are trying to help people through your research, you must not harm or neglect people in other aspects of your life. Your co-workers, assistants, students, acquaintances, friends, and family are not resources that should be consumed to help you or your project advance. It is your responsibility to help them advance in pursuing their goals. Sometimes their goals are the same as yours (the same project or the same family), and sometimes they are different. Yet all of those people and all of their goals are at least as valuable as you and your own goals, usually more so, and you should treat them accordingly. Be genuinely concerned about the people around you, make them a priority, and take care very good care of them!

Along these same lines, make sure you do whatever you can throughout your life to inspire, educate, and assist younger generations of innovators, wherever and however possible. Even if you feel you do not have many resources or much knowledge yourself, you almost certainly have more resources and knowledge than they do. Offer them whatever assistance you can, and it will go a long way in their lives.

Choose your battles wisely. No one has the time, energy, political capital, and resources to right all wrongs and do absolutely everything that should be done. Sometimes it is more productive in the long run to forfeit a lesser battle to win a greater one, or to retreat from a losing battle and live to fight more important battles in the future. Nonetheless, if you truly believe that something is the right thing to do, and that it is important to do, then do it, and do it in the best way you can, even if you think (or know) you will lose.

### **Take care of yourself**

In order to do the most good for others and for your research, for as long as possible, it is important to take care of yourself at some basic level.

Taking care of your physical health involves attending to daily exercise, proper diet, regular medical exams and procedures, etc. Goodness knows I have personally fallen short in this respect, yet it is quite important. Do as I say and not as I do.

Taking care of your mental health is a larger and more complex topic, though it is equally important. Choose your family, friends, community, religion, etc. wisely, and draw support from those on a daily basis. (And never forget your obligation to support all of them, as well as others you encounter.)

Stay away from things that waste time and energy, such as anything more than the occasional television show or film, video games, social media and other internet sites, arguments in real life or online, etc.

Keep very far away from drugs, alcohol, tobacco, and similar things that can harm your body and especially your mind.

Develop and maintain a positive (but not deluded or arrogant) self image. Surround yourself with people who think highly of you and make you feel good about yourself (certainly not sycophants though—these should be people who would honestly tell you if you make a mistake or need to improve in some way). See yourself through their eyes; let the positive reflection from them make you stronger and better.

A negative self image is not who you really are. It is nothing more than what you imagine other people imagine about you—a fictitious image of a fictitious image.

Be who you are. It is much better to be a great natural version of you than a poor imitation version of someone else.

Find one or more hobbies or passions not related to your research, and maintain regular time throughout your life to pursue them.

Know the real worth of yourself and your research project, and do everything in your power to succeed. However, you should be at peace:

- If others (incorrectly) do not think highly of you.
- If others (incorrectly) do not think highly of your project.
- If your project fails because of scientific obstacles you could not overcome no matter what you tried and how hard you worked.
- If your project fails because of non-scientific obstacles you could not overcome no matter what you tried and how hard you worked.

If you have correctly judged the worth of yourself and your project, and if you have tried your best, you have absolutely nothing to be ashamed of or to regret if the project fails, or if people incorrectly criticize you or the project. You can be proud of who you are and what you have done, whatever may happen or whatever the world may think. (Do, however, always remain attentive to any feedback or any evidence that there are indeed real things you should do to improve yourself or your project.)

Environments that are truly supportive of revolutionary innovators and innovations appear to be sadly rare. If your environment is not supportive, you may live every day with intense stress and fear of failing in your mission to do what you believe is worthwhile and right, or of losing something you believe is valuable that you are trying to protect. While you should certainly try your best not to lose, if you do ultimately lose, that experience can actually be remarkably freeing (after a transition period of intense grief).

Picture very vividly in your mind how you would feel after losing whatever you are most afraid of losing, and after having had some time to get over losing it. Hold that picture in your mind. That is what awaits if you do lose the thing you have been so afraid of losing. Try not to feel the fear of loss; try to feel the peace that would come afterward. The novelist Jean Rhys referred to reaching a “heaven of indifference” [Rhys 1939], and that is also a central idea in Buddhism. Try to enjoy the thing in the present while you have it, without that constant feeling of fear of losing it.

### **Find a mentor**

If at all possible, find a supportive and wise mentor to whom you can regularly describe your current scientific and non-scientific obstacles, and who can offer useful advice. Such mentors are unfortunately quite rare. (If there is any way you possibly can, be such a mentor to younger scientists, whether or not you have been able to find a mentor for yourself!)

If you cannot find a true mentor, a second choice is at least to find a confidant, in addition to your usual family and friends. A good confidant should be willing to regularly listen to you as you describe your current scientific and non-scientific challenges. It can be highly therapeutic to have someone who listens, understands, and sympathizes, and who remembers what you have told them previously, even if they do not have specific expertise and suggestions for how to overcome those challenges. By having to explain the challenges clearly and concisely to someone else, you may yourself gain new insights into the nature of those challenges, their relative importance or lack of importance, and new ideas for dealing with them. Be sure to help and support your confidant however you can too.

If you cannot find a mentor or even a confidant (beyond your usual family and friends in whom you should already confide), a distinctly third-place yet still helpful choice is to be your own mentor. Find some time every day away from work, people, and other distractions, such as long walks, daily commutes that do not require your attention, or time for meditation or prayer. During those regular times, think about how you would describe your current scientific and non-scientific challenges to a mentor. Then think about what a good mentor might say in response. There are several approaches for finding that response. One is to consider what you would say if you were the mentor, and someone else had just described those challenges to you. Another approach is to conjure up a firm image of a specific mentor—a real person, someone from history, a fictional character, or simply a construct of your own imagination—and imagine what that person would sound like, what they would say, and how they would react. Yet another approach is to think about what you would most want to hear a mentor say, what you most need to hear. There may be other approaches as well. You may find different approaches more fruitful at different times.

### **Be smart**

Study multiple fields, and multiple areas within a field (Sections 1.2.3.1, 1.2.3.2, and 1.2.3.3). Having multidisciplinary expertise can enable you to make contributions in different fields (as opportunities arise), achieve new results by applying knowledge and methods from one field to another, and use your broader view to guide your work away from less productive areas and toward more productive ones. If you cannot find sufficient ideas, opportunities, or resources in one of your fields, you can switch to another one.

Employ systems analysis and brainstorming (Section 1.2.4.4) to identify first the most important problems to work on, and then the range of possible solutions for those problems, and finally out of those possibilities the best solutions for the best problems that one could pursue, all subject to the constraints of your own particular talents, resources, and opportunities.

Choose an important, and hopefully the most important, problem for which you have a realistic chance of making progress (based on your skills, ideas, and resources), and for which there are not already enough talented people working on solutions (Section 1.2.4.5).

Whenever possible and appropriate, borrow proven and effective ideas from nature or from previous scientists (with proper attribution, of course). By all means invent and discover new things, but do not spend your time reinventing or rediscovering previous innovations, or developing new innovations that are inferior to or little better than the previous innovations.

No matter how limited your time, resources, and options may be, practice innovation right now and every single day after that, rather than hoping to start later on down the road. Brainstorm for new ideas for innovative research projects, make a list of the ideas, and add to that list every time you think of a new idea, day or night. Constantly consider various ways in which those ideas could be analyzed theoretically, computationally, or experimentally, or how they could be developed in part or in whole into models or prototypes. Seek outside input to correct or supplement your ideas, but do not simply copy what others say or do. To be as successful as possible at scientific innovation, you must practice it from as early an age as possible, and as much as possible (just like any other skill).

Constantly seek out resources and opportunities to test or develop any of the innovative ideas from your list, and keep your eyes open for opportunities that may arise spontaneously.

Present yourself and your project(s) as well as you possibly can in person, in written documents (p. 80), and in oral presentations (p. 82).

The following advice can be applied to individual people, to projects, to whole scientific fields, and to organizations.

If you feel uncertain of the best way forward, or if you feel that you have lost your way or lost your energy, it can be helpful to pause and take the time to look backward. Replaying in your mind where you have come from, and how, can help you find your momentum and direction for going forward again. By analogy, if you are trying to remember the next line of a song or poem from memory, repeating the previous lines can help you remember. Or if you are trying to figure out what happens next in a story you are writing, going back over the previous events can help you figure out the natural flow of what comes next.

As you look back, learn by emulating the best aspects of the past and avoiding the worst or mediocre aspects of the past.

While it is certainly wise to have a long-term, large-scale plan with many components, do not let yourself feel overwhelmed by the whole project. Focus on one small, achievable piece at a time, feel satisfaction when you have completed that piece, and then move on to the next logical piece.

If you run into an insurmountable wall (either a scientific obstacle or a non-scientific obstacle), reevaluate your options and approach, instead of continuing to bash your head against the same wall. Are you working:

- On the best problem?
- With the best solution and ideas?
- With the best scientific strategy?
- Using the best personal methods?
- In the best place?
- In the best field?
- With the best people above and below?
- With the best sponsors?
- Etc.

Try to keep backup approaches/projects/locations/etc. in mind, in order to expedite a transition if you need it.

Change projects, approaches, locations, etc. however seems best, but always work as hard as possible and never, ever give up on trying to find and accomplish something that will be helpful to others. The film *Galaxy Quest* had a great rallying cry: “Never give up—never surrender!”

As long as you have sufficiently good ideas (and sufficient resources) to move forward on a problem, do not worry that you are not smart enough. There are always smarter people out there somewhere, but unless they are working on that particular problem and that particular solution, you are the only hope for progress on your topic. Make as great a contribution to the field as you can!

### **Be open-minded**

In everything from explaining previous observations to planning future work, always keep multiple possibilities in mind. It is okay if you have a favorite possibility (or explanation, plan, design, etc.), but always remain open to other possibilities. Stay alert to see if one of those other possibilities—or an entirely new idea that comes along from any source—may make a better explanation, better plan, or better design than your initial choice.

In other words, be open-minded. Always bear in mind that your current opinions/beliefs/ideas/projects/solutions/plans/designs/results/etc. may be wrong and someone else's may be right, and always seek and consider more information.

Openly receive any criticism of yourself or your research, whether you believe it is correct or incorrect, small or large, or intended to help or harm. Let the critics and any larger audience that has heard the criticism know that you are truly listening and that you are grateful for the feedback. Then study the criticism from all angles and use it in any way you possibly can to improve yourself or your project, or to improve how you present yourself or your project. If you find that the criticism was valid or even partially valid, admit that honestly, and fix the problem as quickly and as thoroughly as possible. If you examine everything carefully and conclude that the criticism was not valid, find better ways to preempt or to answer similar criticisms in the future.

Do not evaluate ideas or people based on credentials or other biases or prejudices. Evaluate them by really considering them on their own merits. Good ideas or good people may materialize without “proper” credentials. Ideas or people that do possess “proper” credentials may not be correct or worthwhile.

### **Be humble**

Be humble. You are not the center of the universe, no matter how correct or important your work may be.

Do not get a big ego. Do not blow your own horn. Do not seek praise or fish for compliments. Do not fall for flattery that serves someone else's purpose.

Do not regard other people as supporting players in your life and your project—they are equally or more valuable. From the perspective of every other person on the planet, *you* are just a supporting player.

### **Be a good listener**

Listen to what people say, really listen. Only speak what you need to, when you need to. Always listen much more than you talk.

And having listened, remember what someone said, and act on it wherever appropriate and possible. Listening but failing to help can be at least as bad as not listening.

**Play well with others**

Seek out advocates, patrons, and supporters at all levels high and low, and of all ages. Find people at all levels who will be loyal to you (within reason) and be loyal to them.

Be a very good neighbor—helpful to everyone but not nosy; not a burden or nuisance to anyone, but not a sucker to be taken advantage of.

Do not say or do anything out of anger, no matter how egregious the provocation or how time-critical the situation. (Anger is the mind-killer, to modify a phrase from Frank Herbert's novel *Dune*.) Sometimes it is necessary to block an attack by an opponent, or even to attack an opponent. Never do that in anger, but only in a very careful and rational fashion. Only do and say what is truly necessary, at the best possible time, in the best possible way.

**Seize the carp (or something like that)**

You never know how long your life will be. Make it count now.

Even if circumstances force you to be unproductive for most of your day, always do at least some productive work every single day.

As much as possible, avoid things that consume your time and/or energy without accomplishing any good for anyone. That includes useless projects, unproductive meetings, avoidable paperwork, screen time, commuting time, time spent solving problems that other people created unnecessarily, etc. Guard and focus your time and energy on what is important and helpful. And remember that what is important includes not only your project, but also the people around you.

Sooner or later, you may feel a lack of motivation due to any number of possible factors—obstacles, self-doubts, boredom, depression, burnout, age, number of years spent on the same project, losing sight of what matters to you, etc. While a lack of motivation and energy can be harmful if it persists for a long period of time, it can actually be helpful provided that its duration is limited.

- Your body and brain may be telling you that you need to rest and recover, and you should listen to them.
- You might need to temporarily focus on something completely different—a hobby, vacation, or otherwise.
- You may need to be reminded of what—and especially who—matters most in your life.
- You may need to completely rethink whether you are pursuing the best scientific goals and using the best methods to pursue them. Perhaps you would feel much more energy and enthusiasm if you went in a different direction.
- You could set the smallest daily goals for relevant tasks you can complete, and gradually increase those as you feel up to it.
- It may also help to reconnect with the origins of your scientific passion, by remembering your childhood interests that led you to choose this path, or by interacting with younger people who feel the same enthusiasms that you once did.
- Make sure you are surrounded by people who encourage you and support you, rather than the opposite (although you certainly want to receive any valid constructive criticism).



Motivational authors and books can be beneficial if they are not misused or misunderstood. Increasing your motivation is not helpful if the goal you are motivated to achieve is not truly worthwhile, or if it is simply not achievable. Keep yourself highly motivated, but channel that motivation toward accomplishing the most beneficial and achievable objectives, using the most effective approaches.

Another feature of most motivational speakers and books is that virtually all of the examples they give have happy endings—a particular person was motivated enough to keep on going despite difficulties, and ultimately everything turned out well for that person. That is certainly the most desirable outcome, and it has happened in many cases and hopefully will happen in your case. However, you should be aware that sometimes it may not happen in your case. Some battles simply cannot be won, no matter how just they are, or how hard or how cleverly you fight in them. If you know you are facing an unwinnable battle, it may be more productive to withdraw and allow that battle to be lost, and live to apply your motivation and talent to some entirely different, less hopeless battle. On the other hand, some unwinnable battles are worth fighting even though you know that you will lose and that you will pay a great price (e.g., opposing a gross injustice being committed against others, even when you know you are hopelessly outnumbered). Not all stories have happy endings as in the motivational books, and that is okay, as long as you do the right thing (e.g., Sections 12.3.13 and 12.3.20).

### **Adhere to your principal principles**

Regardless of what you pursue for your education and career, you should figure out very early on what fundamental principles are most important to you. You could adopt the best principles that have previously been developed, or develop your own from scratch, or make your own modifications of previously developed principles, or do some combination of those things. Then stick to your fundamental principles throughout your life (unless you find better principles along the way).

Thinking about your fundamental principles may seem like a dull exercise, or too far removed from scientific research, or something so trivial and universal that it can be taken for granted and ignored. Yet it is vitally important to decide upon your principles and always keep them in mind. As you go through life, you will be challenged on a daily basis to compromise or forget those principles when it might seem personally advantageous for you to do so. Don't do it! Moreover, on a larger societal level, you will see people—maybe even most of the people around you—who insist that those principles are outdated, irrelevant, unrealistic, unattainable, ridiculous, incorrect, or even downright evil. Ignore them! (Unless they can make a rational, convincing case for even better principles, of course.)

Throughout your life, gravitate toward other people, and ideally whole organizations, that share the same or similar principles as you. You may also be out in the world of people and organizations that do not share your principles, trying to do some good there, but always have like-minded people you can come back to, and who can keep you from compromising or abandoning your principles.

My own personal principles are drawn from what I feel are some of the most effective and best-proven ones that have been developed and taught in the past, as elaborated in the original sources listed in Sections 12.2 and 12.3. The principles cover an individual's life, governed societies of people, and organizations for revolutionary scientific research and development. If you are interested, please read those sections, and as succinctly as I can I will give some of my favorite excerpts from those documents and explain why I find them meaningful.

### 12.1.2 Other People

Most non-scientific obstacles for revolutionary innovators and innovations are caused by other people, who may act as individuals, small groups, organizations, or whole societies. Sometimes the obstructing person may be as well known to you as your boss or a co-worker; sometimes the obstruction may be as faceless as an irrational anonymous peer reviewer or an entire culture that is completely unsupportive.

Unfortunately the non-scientific problems caused by other people are much easier to diagnose than to prevent or cure. Yet even if I cannot recommend specific solutions, hopefully my descriptions of the problems may at least help future creators to better recognize and understand these problems, and to take comfort that they are far from alone in encountering such obstacles.

Once again, I have divided my advice into different though somewhat overlapping sections. Fresh new eyes reading my words may consider the following descriptions to be cynical, pessimistic, unrealistic, or even preposterous. How desperately I wish that were the case, both for my own sake and for yours! Unfortunately the sorts of problems I describe are ones I have witnessed with my own eyes, at close range, on a daily basis, intensely and repeatedly, for decades. I have also witnessed others encounter these problems, and heard others whom I trust describe their experiences with these same problems.

The only caveat I can offer is that almost all of my experiences and information are based on the United States of the late twentieth and early twenty-first centuries. I would guess that many of these problems are universal, although I hope that they are not. I sincerely wish that they are less severe or even nonexistent in whatever time and place you live.

#### **A philanthropic misanthrope's view of humanity**

A small but significant percentage of people are quite willing to actively harm others to help themselves. In fact, often they harm others simply for their own enjoyment or spite, even if it yields no material benefit for themselves. Positions of power (such as those that decide what people and projects should receive funding, permission to publish, or other support) often tend to attract such actively harmful people. People or projects that are perceived to have something valuable (such as revolutionary innovators and innovations) also often tend to attract the attentions of such actively harmful people. Therefore, future creators will encounter even more of these harmful people than would an average person in the population. Whenever and however possible, avoid them, avoid engaging them, avoid antagonizing them, and avoid arousing their interest, greed, suspicions, or wrath. If you must interact with them, try to placate them without compromising your principles or your project. Whatever they may do or say, do not do or say harmful or hateful things to them. That would not be moral, and it could also be used by them as ammunition against you.

A small percentage of people sincerely and consistently want to help other people, and actively try to help other people. Although that is already a small percentage, sadly even very few of those people will be in positions where they can specifically help you or your project much. Seek out people who want to help others, and help them if it is within your power, even if they cannot really do anything to help you. If nothing else, they might be able to offer advice, listen to your troubles, or at least restore your faith that there are some good people in the world. As Fred Rogers said, "Look for the helpers" (p. 296).

The large majority of people neither actively seek to harm nor actively seek to help others. In fact, the members of this large majority generally will not help others, even if the assistance would cost them absolutely nothing personally, and would benefit someone else greatly. While they do not actively seek to harm others, most of them have absolutely no qualms about selfishly exploiting

an opportunity for their own personal gain at someone else's expense if they happened to be faced with such an opportunity. If someone else accidentally falls down and drops their possessions (metaphorically), the large majority of people will not even give that person a hand, and many will take advantage of the opportunity to pick up the fallen person's possessions for themselves.

Likewise, the large majority of people—and shockingly even a majority of scientists—harbor various stupid ideas and intellectual blindspots, and make correspondingly poor decisions. I have seen scientists who can perform a complex calculation or experiment, yet cannot see that the results of that calculation or experiment are completely irrelevant to the fundamental issue or project being discussed. I have seen other scientists who know how to do something correctly, but foolishly choose not to because it is faster and easier. I have seen people who are experts in certain scientific fields but nonetheless have an unshakable belief (such as the belief that climate change, evolution, or the Covid-19 pandemic is a hoax) that could be easily disproven if they would honestly consider the evidence. I have seen Ph.D. physicists and engineers argue in favor of project proposals that violate well-known fundamental laws such as the conservation of momentum or the second law of thermodynamics. I have seen Ph.D.s argue against proposals or papers despite mountains of high-quality data strongly supporting them. I have seen scholars who refuse to even look at evidence. I have seen scientists advocate without hesitation in favor of things that were incorrect or downright harmful because those scientists were paid to do so. People may seem normal, intelligent, and competent on the surface, yet only a minority of the scientists whom I have gotten to know thoroughly and have seen from various angles have proven to truly and consistently use their brains as they should.

People in positions of power are selected from among the population. In an ideal world, people would be selected for positions of power on the basis of being much less self-centered/evil and much less foolish/incompetent than the average members of the population. In practice, those who attain power tend to be more self-centered/evil (and hence hungrier for the power) and probably more foolish/incompetent (and hence less suited for other work) than the average members of the population from which they are drawn. Thus is it more likely than not that someone in power will be highly self-centered if not downright evil, and more likely than not that they will make incompetent and foolish decisions. The probability that someone in power will be truly good and truly intelligent is remarkably low. And those in power now select who will be in power next.

As long as self-centered/evil or foolish/incompetent people are ordinary, low-level workers, their faults usually only harm themselves, and perhaps their close co-workers too. However, when people like that are in a position of power, their faults can directly harm everyone who is subject to their power or dependent upon their power, from employees to customers.<sup>1</sup> And the vast majority of people in power are self-centered/evil, foolish/incompetent, or both, so there is a tremendous amount of dysfunction, damage, and suffering in organizations and in society in general.

As you witness more and more examples of how many people can be how stupid, selfish, and harmful toward you, toward other people, toward themselves, and toward the world in general, you may be tempted to give up on helping people, or not to help them as much as you could, or even to harm some people or allow them to come to harm. Nonetheless, you should spend your entire life trying to help people however you can, and not trying to harm anyone. At the end of your life, as you leave this world, the real question on your mind should be whether you did everything within your power to try to make the world a better place while you were in it.

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<sup>1</sup>Everyone has faults, to varying degrees. It is a fairly general principle that the effect of those faults is amplified when someone is promoted to a position of power. Any fault, from procrastination to inattentive listening, that previously only plagued that person now has a deleterious impact on everyone working for that person or dependent upon that person.

### Some general strategies

Here are a few general strategies for avoiding or dealing with non-scientific obstacles, in addition to those mentioned elsewhere:

- Search far and wide for people who (a) are most inclined to support the sort of innovative research you would like to do, and (b) are best able to offer you financial support, political support, and/or useful advice. Cultivate good relationships with those people and let them see the worth of yourself and your projects. Call upon them when you need them (but only when you need them—do not wear out your welcome).
- Wherever possible, cultivate friends and allies in all areas and at all levels, from high to low. You never know when a situation might arise that would require help from one of them. And of course, do whatever you can to aid them along the way too. Helping to form and take part in an informal mutual aid society can also give you much more clout in lobbying The Powers That Be for common goals that would benefit everyone in your gang.
- Sometimes, especially in the early stages of your career or the early stages of a project, it is best to “fly below the radar.” The less attention that people pay to you or to your project, the less likely they are to actively oppose you or your project.
- On the other hand, in some situations the opposite strategy is required—you have to give a very compelling, impressive sales pitch for yourself, your project, or your results. Sometimes that is for a very small, carefully targeting audience (such as a manager or a sponsor), but sometimes it needs to be as broad and public as possible. Since it is difficult to rapidly shift from flying below the radar to high visibility, and even more difficult to shift back again, make sure you plan and time your strategies carefully.
- The truth is, when you set out to do highly innovative research, you often do not know from the outset exactly what you will discover or invent, how long it will require, exactly what course you will take for the entire project, and how successful you will ultimately be. Good managers and sponsors would understand that, and support revolutionary innovators despite (and because of) those facts. Unfortunately the world is controlled almost entirely by bad managers and sponsors who do not understand those facts and demand that all details of a future research project be completely spelled out and guaranteed in advance. Some strategies to deal with that problem include doing the research project in secret before you propose it and receive funding for it, secretly doing a greater variety of work or more advanced work than just what you proposed and report, incorporating “weasel words” into your proposal that can allow some room for interpretation if necessary later, and proposing a research timeline with milestones (or “millstones,” as I like to call them) that can be easily met or reinterpreted down the line.
- Choose your battles wisely. During your career, sadly you will probably encounter far more opposition than you have the time, energy, allies, or resources to overcome. Therefore, think very carefully about which battles are most worthwhile for you to fight. (That is not to say that you should only fight battles you think you can win. Sometimes a losing battle needs to be fought, if it is in defense of an important moral principle or a vulnerable person/project.)
- In some situations it is easier to obtain permission in advance; in other situations it is easier to obtain forgiveness after the fact. If you feel you must take some action, know which type of situation you are in and act accordingly.

## Opposition to innovation

Ideas for revolutionary scientific innovations are generally met with negative feedback. Much of the feedback will pertain to the details of that particular scientific innovation. Of that science-specific criticism, some may be partially or fully accurate, and you should modify or abandon your ideas and plans accordingly. The rest of the science-specific criticism will be inaccurate; rebut it with the appropriate facts, and modify your future proposals to preempt or to immediately answer similar objections.

Unfortunately, a significant fraction of the negative reaction to new scientific ideas is simply because they are new, without any meaningful consideration of the scientific details. Some objections may be dressed up in scientific trappings to appear more legitimate, yet at their heart they will still boil down to a general rejection of anything new. Some examples of common non-science-specific objections to revolutionary ideas include:<sup>2</sup>

- This is a new idea, therefore it might not work, therefore if we tried it and it did not work it would have been a waste of our money and resources, therefore we should not try it.
- If you have not already conclusively demonstrated that your proposal will work, we dare not fund it. If you have already conclusively demonstrated that your proposal will work, there is no longer any need for us to fund it.
- If this new idea had any merit, it would have already been done in the past, or an organization better than yours/ours would have done it, or someone better than you would have done it. Since that does not seem to be the case, this new idea must not have any merit.
- If this person and their idea(s) had any merit, other organizations/sponsors would have already supported them. Since we are being asked to support this person and their idea(s), other organizations/sponsors have not. That proves that this person has no merit, their idea(s) have no merit, and we should not support this person or their idea(s). [Although this argument can be strong from the beginning, it grows even stronger after more time has elapsed and more organizations have decided not to support the person or their idea(s).]
- This is a new idea, therefore it is not part of our existing plans that we finalized earlier, therefore there is no place for it.
- This new idea is not how things have been done before, therefore it must somehow violate fundamental scientific principles [even if we cannot name a specific principle it clearly violates], therefore it must not be feasible.
- This new idea is not how we have done things before, therefore it must somehow violate our organization's rules [even if we cannot name a specific rule it clearly violates], therefore it must not be allowed.

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<sup>2</sup>These objections may be worded in many ways—usually not as candidly as I have paraphrased them—but tend to be variations on the themes listed here. These objections are not mutually exclusive; two or more may be given separately or combined together. This list is certainly not exhaustive, but it should give some idea of what revolutionary innovators are up against. And yes, I have personally encountered all of these, most of them repeatedly and from many different sources. I know others who have encountered them as well.

- This new idea did not come from a widely recognized lifelong authority in this field, so it is not worth considering. [How many new ideas have arisen that way? New ideas tend to come from new people; see for example pp. 25–33.]
- This idea did not come from this organization’s own designated official idea people, therefore it was “not invented here,” therefore it is not worth doing/does not belong in this organization. [And often likewise, the person who came up with this new idea does not belong here.]
- You filled the maximum word limit [that we permitted] of the research proposal with as many of the major details about your proposed project as possible, presented as clearly and as concisely as possible, but you did not provide enough details about the project to truly satisfy us, so we are rejecting your proposal.
- The person proposing this new project cannot predict accurately and in great detail exactly everything that will be discovered and exactly what will happen throughout the entire course of the proposed project. Or if they do predict it, they cannot provide absolute proof in advance that that is exactly what will be discovered and what will happen. Since we are not absolutely certain of all details of the outcome in advance, this project should never be supported even to begin.
- [Related to the previous objection:] The person proposing this new project has not stated in sufficient detail exactly what they will do if certain unexpected problems, discoveries, or other contingencies arise during the course of the project. Or even if they have stated what they would do in the case of some contingencies, they have not stated in sufficient detail exactly what they would do in the event of all possible contingencies, or for all possible contingencies of all those possible contingencies. Since we are not absolutely certain of all details of all contingencies in advance, this project should never be supported even to begin.
- First response: Thank you for providing all the details we requested in your proposal, but now we require more details before we can decide whether to support your proposed project. Second response: Thank you for providing all of those extra details we requested, but now we want even more details before we can decide. Third response: Thank you for providing even more details as requested, but now we want still more before we can decide. Fourth response... [Sadly it is not uncommon for sponsors, journal editors, or others in positions of power to keep moving the goalposts indefinitely until you give up or exhaust all of your internal resources in the endless rounds. Not only is it unfair for people in positions of power to move the goalposts, but they do not move the goalposts equally for everyone. For someone within their circle of friends, the goalposts stay where they should be, or are even brought closer to be easier to reach.]
- This new idea may not work, so at the very most, we should only consider doing a very small preliminary study. Even if that underfunded preliminary study shows spectacular promise, at the very most we might next consider doing a very small initial study. Even if that underfunded initial study is incredibly successful, we should at most consider doing another very small study. Even if that...

- Yes, you did exactly the work that we told you to do, and as quickly and as well as it could possibly be done, but we are no longer interested in that work at all. If back then you had only spent all of your time doing [unfunded] what we are interested in now, rather than what we told you to do then, we might be more interested in supporting you now.
- There is significant data that the problem you are trying to solve is a very serious, unsolved problem. However, maybe that problem will miraculously go away on its own, or somehow turn out never to have really even existed. Therefore we should not spend money on your proposed solution, on any other attempts to solve the problem, or even on investigations to study the problem. Rather, we should commit ourselves 100% to proceed with our expensive plans that assume that the problem does not exist at all and will not interfere with our plans.
- Everything we have ever seen regarding the planning, conduct, and results of your project has been entirely proper and correct. However, unspecified people have made unspecified claims that unspecified parts of your project were not entirely proper and correct. Unless you can immediately refute those unspecified claims with absolute proof to our satisfaction, we cannot provide any further support for your project. [Not only is this treatment grotesquely incorrect and unfair, but quite frequently other projects with clearly visible fatal flaws are readily supported by the same authorities. This treatment can be quite reminiscent of Franz Kafka's novel, *The Trial*.]
- [Related to the previous objection:] Everything we have ever seen you do and say has been entirely proper and correct. However, unspecified people have made unspecified claims that you were not entirely proper and correct in unspecified ways. Unless you can immediately refute those unspecified claims with absolute proof to our satisfaction, we cannot provide you any further support. [Again, not only is this treatment grotesquely incorrect and unfair, but quite frequently other people with manifestly profound flaws and misdeeds are readily supported by the same authorities.]
- This person is proposing an idea that they claim is new and helpful. It is highly unlikely that anything is actually new or actually helpful. Therefore the person proposing the allegedly new and helpful idea must certainly have some unrelated ulterior motive, and the idea must be just a ploy to achieve that ulterior and presumably evil objective. Thus neither this person nor this idea should ever be trusted or given financial or political support.
- [An alternate form of the previous objection:] People who try to think of new ideas are dangerous loose cannons (or entirely crazy) and are not fit to be trusted or hired for any sort of work.
- If you or your project were to succeed, it might make me or my [often unrelated] project look less successful in comparison. Therefore I am strongly opposed to you or your project. Therefore I will do everything I can to sabotage you or your project, or how you or your project are viewed by managers, sponsors, institutions, journals, etc.
- We refuse to acknowledge that your proposal, your data, or you even exist. Therefore your proposal, your data, and you do not exist. Therefore we and our system are already perfect exactly as we are.

- We decided not to fund your research proposal. Your proposal was then directly plagiarized by X [perhaps even with our assistance]. We readily approved funding for X to carry out the same research proposal. If only your proposal had been like X's proposal, we would have accepted it. [This can happen with journal articles as well as research funding proposals.]
- We decided that it was not worthwhile for us to fund you to develop the new ideas and new projects that you presented in your research proposal. However, we have subsequently decided to fund ourselves to develop precisely those new ideas and new projects. We are very proud of these new ideas, and we want the world to know that we are the ones who conceived and developed them all by ourselves. Also, we sincerely hope that you will continue to send us all of your future research proposals for further new ideas. [This can happen with journal articles as well as research funding proposals.]
- We decided not to fund you to develop your revolutionary new ideas that you described in your proprietary research proposal that you submitted to us in strict confidence, to which we agreed. However, you will be happy to know that we have decided to issue a broad public announcement informing laboratories all over the world about all of your new ideas and requesting that they send us their own proposals to carry out those same ideas. If you would like, you can submit a new proposal to us requesting to be one of the laboratories that we will fund to implement your ideas, and we will weigh your request along with all the others that we expect to receive.



## Types of harmful people

As already noted, positions of power tend to attract harmful people, and the perceived value of revolutionary innovations tends to attract harmful people, so unfortunately future creators should expect to encounter many harmful people during their careers.

Some harmful people may be quite unique in how and why they operate, but most harmful people fall into some common categories. Some of these categories include:<sup>3</sup>

- People in power who:
  - Tell you it is very important for you to work on a particular project, yet have absolutely no interest in that particular project—or in your performance on it—when you report back to them with your progress. Instead, they tell you it is very important for you to work on another particular project; then they have absolutely no interest in that second project or your performance when you report back to them with your progress. Instead, they tell you that it is very important for you to work on yet another particular project...
  - Insist the need to do something is so urgent that it is not possible to do it at all correctly. [To make matters worse, the sponsors who insist on a poorly planned crash program, or rushed emergency program, are usually the same sponsors who refused your requests to fund a well planned program with the same objective much earlier, when there was still time to accomplish the objective properly and successfully.] That mindless rush almost inevitably leads to lengthy and costly delays to fix the resulting problems, or to failure or cancellation of the program, and to an unjustly negative public perception of the fundamental idea. The rocket pioneer Wernher von Braun expressed a similar thought: “Crash programs fail because they are based on the theory that, with nine women pregnant, you can get a baby [in] a month” [[www.nmspacemuseum.org/inductee/wernher-von-braun](http://www.nmspacemuseum.org/inductee/wernher-von-braun)].
  - Have considerable amounts of power/fame/money, and therefore are almost always shown great deference and flattery by others, such that they come to believe that their own knowledge, ideas, and judgment must always be correct. They tend to be unwilling to consider the possibility that they might be incorrect, and they tend not to be open to new ideas that are not their own.
  - Are not evil themselves, but who foolishly trust the advice or testimony of evil people.
  - Are certain that a new innovator or innovation must violate some scientific or organizational rule, even if no such rule exists, and therefore staunchly oppose the innovator or innovation.

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<sup>3</sup>This list is not exhaustive, and these categories are not mutually exclusive.

- Dishonest people who:
  - Firmly declare that they will support you and/or your project but do not come through when you actually need them to provide or show any support.
  - Do not give proper credit to people who deserve credit.
  - Tell contradictory stories or make contradictory statements or promises to different people. In the most extreme cases, they may flatter a person to their face and stab that person in the back when the person is not looking.
  - Make up things, for whatever reason—to tell you what they think you want to hear, to make themselves look good, to cover up their mistakes, to attack you or your project, etc. [If a person wants to harm you or your project and cannot find real ammunition to use, they may simply make things up. Be prepared to disprove, avoid, or live with that.]
  - Try to gaslight others—try to create a false reality, as a means of controlling or bullying others.
  - Are guilty of something yet falsely accuse others of being guilty of that [often before or without being accused of what they, the guilty ones, have actually done—preemptive narrative inversion or projection]. If the dishonest, guilty person is never openly accused of what they have actually done, those in power may conclude that the falsely accused innocent person is the guilty party. If the dishonest, guilty person is accused, those in power may decide that both sides (the truly guilty party and the falsely accused innocent party) are equally to blame and then either take no action or punish both sides.
  - Make the same false claims repeatedly, and to different people in different settings over time, to make them seem more persuasive.
  
- Parasitic people who:
  - Try to steal someone else’s idea, innovation, discovery, or invention for themselves.
  - Try to steal all or part of the credit, funding, resources, personnel, control, or other aspects of a project.
  - Do not pull their weight on the team during the project yet demand their full share of the credit when the project succeeds.
  - Come out of nowhere to spontaneously and unilaterally declare themselves your close partner, or even your supervisor, after you already have a successful project.
  - Strongly oppose the initial creation of a new project but later insist on becoming part of (or taking credit for, or taking over) the project after it is a proven success.

- Other harmful people who:
  - Tend to create unnecessary problems (often not deliberately—they are just naturally good at it) that others must then solve, which takes considerable time and energy away from real work solving actual scientific problems. Some people are much better at starting fires than at putting them out.
  - Have a bad idea (one that is not scientifically feasible or practical, or is worse than some alternative approach, or is downright harmful, etc.) but are remarkably effective at winning financial and political support for that bad idea. They can easily waste resources (money, personnel, supplies, political support, etc.) and harm good innovators and innovations. Vannevar Bush called such people “tyros” [Bush 1970, pp. 121–148].
  - Have negligible expertise (via education, work, or natural talent and practice) in a given area, yet brag about their expertise in that area (often with great success in convincing others) and denigrate people who have genuine expertise in that area (again, often with great success in convincing others). There is some overlap between these harmful people and the tyros described previously, but the general behavior can be somewhat different.
  - Try to sabotage a person or a project, since they believe that the success of that person or that project might make themselves or their (often completely unrelated) project look bad by comparison.
  - Possess funding, a fortune, fame, a position, or power that is conditional upon their not doing the right thing, treating people properly, admitting that a problem is real, finding a good solution for a problem, etc.
  - Create, use, disseminate, share, or believe propaganda (manipulative, distorted appeals to prejudices and emotions), as opposed to the rational collection and analysis of evidence, facts, and truth.

For more information on harmful ways that some people try to influence the behavior of others, see Sections 12.2, 12.3, and A.2.13.

## 12.2 Advice from Scientific Innovators

Creators of any age, from elementary school through the end of their careers, should read books by and about other revolutionary scientific innovators. From such books, you can gain many insights and ideas for how to deal with various types of scientific and non-scientific obstacles to research. More generally, the books can be quite inspirational and motivational.

Some of the very best books that really analyze what made previous scientific innovators tick were written by István Hargittai and his colleagues.<sup>4</sup> I highly recommend that you read as many of those as possible. You can also seek out books by or about revolutionary innovators such as those listed on pp. 25–33. For many additional books by or about previous scientific innovators, see the Bibliography of this book and also that of *Forgotten Creators* [Rider 2020].

This section presents some advice from scientific innovators that I have found personally helpful:

12.2.1. Santiago Ramón y Cajal

12.2.2. Vannevar Bush

12.2.3. Norbert Wiener

12.2.4. Kelly Johnson and Ben Rich

12.2.5. Simon Ramo

12.2.6. Peter B. Medawar

12.2.7. Edward O. Wilson

12.2.8. Carl Sagan

The examples I give in this section are only excerpts. If you like them, there is much more to read and learn from the writings of these authors. If you do not find them helpful, seek out other authors whose experiences and advice seem most relevant to your own life.

Sometimes these authors describe both obstacles and strategies for avoiding or overcoming them. In a number of cases, the authors discuss the obstacles yet they themselves were unable to find a solution. Even authors who cannot describe a solution can still be helpful. It can be useful or at least comforting to know that the same problems you encounter have been encountered by other scientists before—you are not alone in facing such a problem, and you are certainly not imagining a problem where none exists.

Most importantly, the scientific innovators in this section, as well as the non-scientific innovators in Section 12.3, explain their personal principles regarding individuals' lives, innovative organizations, and governed societies of people. Just as I have, you can consider whether you would like to adopt or modify any of their principles and make them your own. Then, once you have adopted or created your own personal principles, you should adhere to them throughout your life (especially during those times when you feel pressure not to), unless you find better principles along the way.

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<sup>4</sup>Balazs Hargittai and István Hargittai 2015; Balazs Hargittai et al. 2014; István Hargittai 2000–2006, 2002, 2006, 2010, 2011, 2013, 2016.

### 12.2.1 Santiago Ramón y Cajal

Santiago Ramón y Cajal (1852–1934) was a Spanish neuroscientist who was decades ahead of most other scientists in his field; his research is still cited in new neuroscience articles over a century later. He won the Nobel Prize in Physiology or Medicine in 1906. He published an amazing book in 1897 (with some later updates), *Advice for a Young Investigator*, which is well worth reading in its entirety. I would especially like to highlight the following passage, which makes one of the same arguments that I have tried to make (see pp. 42, 93) [Ramón y Cajal 2004, pp. 92–95]:

In the complete absence of physical resources, any beginner would have to resort to a government [university professor's] laboratory. [...]

Nevertheless, it would be more pleasing to see the beginner (if physical resources are available) start his apprenticeship in a laboratory of his own—organized and maintained with his own modest savings. There is no doubt that the official establishment, with its master, offers valuable, and in many cases, irreplaceable guidance to us. But in general the work here is subject to many disadvantages. The number of hours worked tends to be short, there is endless conversation and hubbub, students and assistants come and go, and analytical instruments are in constant use. Besides wasting time, these and other annoyances associated with a university laboratory distract attention in a way that is rather harmful to scientific research.

Under such conditions it is much better to work alone, especially if guidance leaves something to be desired. Let books be our masters—wise mentors, serene, no bad temper, and no momentary lapses in ability. [See also Carl Sagan on p. 199.] We shall happily give them our major commitment—which is to discover ourselves before discovering scientific truth, to mold ourselves before molding nature. To fashion a strong brain, an original mind that is ours alone—this is the preliminary work that is absolutely essential. Then, after achieving technical maturity, what scope and facilities are available to us! Ibsen put these words in the mouth of one of his characters, directed at a friend: “Be yourself!” There is no better way of achieving this than by working alone.

Oh comforting solitude, how favorable thou art to original thought! How satisfying and rewarding are the long winter evenings spent in the *private laboratory*, at the very time when educational centers are closed to their workers! Such evenings free us from poorly thought out improvisations, strengthen our patience, and refine our powers of observation. What care we zealously lavish on our own instruments—each one representing a vanity disowned or a bad habit unindulged! Because we love them we appreciate their fine points, we are aware of their defects, and we avoid the traps they occasionally set for us. In short, we understand their friendly soul, which always responds humbly and quickly to our needs. [...]

It is appropriate to distinguish two sciences from this perspective. One is costly and aristocratic, and demands sumptuous temples and rich offerings; the other is more reasonable and familiar, more democratic, and accessible to the most humble purses. And this humble Minerva has special advantages. Its kindness affords better shelter for the blossoming of deep meditation than for the showy and ornate offerings placed upon the altars. Furthermore, there is a noble pride in accomplishment with simple means—the pride of neatness and frugality. Nothing highlights the energetic personality of the investigator better, distinguishing him from the throng of automatons in science, than those discoveries where perseverance and logic get the upper hand over mechanics, where the brain is paramount and material facilities are negligible.

In addition to textbook or theoretical learning, a vital part of acquiring an education as a young scientist is conducting original research. In general, you are far more likely to become a powerful future creator if you do your own research in your own laboratory, no matter how meager that may be, than if you serve as an indentured servant in someone else's laboratory, no matter how grand it may seem. Moreover, the sooner in life you begin (even elementary or middle school), and the more effort you pour into your own research projects and scientific resources, the more powerful you will become.

Ramón y Cajal offered further encouragement to young scientists to venture wherever their ideas and their resources might take them [Ramón y Cajal 2004, pp. 12, 14–17]:

Even in the most exact sciences there are always some laws that are maintained exclusively through the force of authority. To demonstrate their inaccuracy with new research is always an excellent way to begin genuine scientific work. It hardly matters whether the correction is received with harsh criticism, traitorous invective, or silence, which is even more cruel. Because right is on his side, the innovator will quickly attract the young, who obviously have no past to defend. And those impartial scholars who, in the midst of the smothering torrent of current doctrine, have learned how to keep their minds clear and their judgment independent will also gather on his side.

However, it is not enough to destroy—one must also build. Scientific criticism is justified only by establishing truth in place of error. Generally speaking, new principles emerge from the ruins of those abandoned, based strictly on facts correctly interpreted. [...]

It is fair to say that, in general, no problems have been exhausted; instead, men have been exhausted by the problems. Soil that appears impoverished to one researcher reveals its fertility to another. Fresh talent approaching the analysis of a problem without prejudice will always see new possibilities—some aspect not considered by those who believe that a subject is fully understood. [...]

So many apparently trivial observations have led investigators with a thorough knowledge of methods to great scientific conquests! [...]

Things that we see from a distance or do not know how to evaluate are considered small. [...]

Today, we can find many seeds of great discoveries that were mentioned as curiosities of little importance in the writings of the ancients[....] Who would have suspected that in this phenomenon of magnification, disregarded for centuries, slumbered the embryo of two powerful analytical instruments, the microscope and telescope—and two equally great sciences, biology and astronomy!

In summary, there are no small problems. Problems that appear small are large problems that are not understood. Instead of tiny details unworthy of the intellectual, we have men whose tiny intellects cannot rise to penetrate the infinitesimal. Nature is a harmonious mechanism where all parts, including those appearing to play a secondary role, cooperate in the functional whole. In contemplating this mechanism, shallow men arbitrarily divide its parts into essential and secondary, whereas the insightful thinker is content with classifying them as understood and poorly understood, ignoring for the moment their size and immediately useful properties. No one can predict their importance in the future.

### 12.2.2 Vannevar Bush

Vannevar Bush (1890–1974) was essentially the political father of the U.S. research world.<sup>5</sup> Bush was an electrical engineering professor and vice president at the Massachusetts Institute of Technology (MIT) as World War II approached and U.S. government funding for scientific research and development was minimal. Bush became president of the Carnegie Institution for Science in Washington, DC (1939–1955), as well as chair and member of the advisory board of the National Advisory Committee for Aeronautics (NACA, the predecessor of NASA, 1938–1948). In 1940, he successfully lobbied President Franklin Roosevelt to create the National Defense Research Committee (NDRC) and Office of Scientific Research and Development (OSRD), which Bush ran until 1947 and in which capacity he reported directly to the President. Bush’s NDRC and OSRD were in charge of creating, funding, and managing all military scientific R&D in the United States during these years, including U.S. developments in nuclear fission reactors and weapons, radar systems, proximity fuses, penicillin mass production, and other innovations. After the war, Bush proposed and successfully lobbied for the establishment of the major U.S. government research sponsoring agencies, including the creation of the National Science Foundation, the Atomic Energy Commission (now called the Department of Energy), and the military Research and Development Board (RDB, predecessor of later Department of Defense research sponsoring offices), as well as major expansions of NACA and the National Institutes of Health (NIH). Bush also strongly promoted corporate research by helping to found Raytheon (1922) and serving on the boards of directors for American Telephone and Telegraph (AT&T, 1949–1962), Merck (1949–1962), and other companies, and he had close personal ties to the leaders of major research universities around the country.

Bush explained his views on scientific innovation and innovators in several books that are well worth reading cover-to-cover. Here I would like to quote a representative selection from his writings in chronological order to illustrate the variety and the importance of his insights.

Well before World War II, Bush recognized and articulated the need for better and wiser research support in the United States. In his 1932 essay, “The Key to Accomplishment,” he wrote [Zachary 2022, pp. 8–9]:

The prime essential to an intelligent research program is not, however, apparatus or funds or young research workers; it is . . . a mature research director with a thorough knowledge of his field, a standing in his profession, a vision of possibilities, a courage to attack the unknown, a patience that is inexhaustible, and a kindly humanity that will cause his co-workers to rally about him with enthusiasm. Find such a man, and the rest of the research laboratory and program will appear. Such men are scarce, and they come high. It is my reasoned opinion, however, that no comprehensive research program can be successful in the long run, except by sheer luck, unless it is centered about such an individual. [...]

My advice then to the [...] executive who’s considering the launching of a research project is to seek out a[n Eli] Whitney or a [Frank] Jewett of about age 30, be very sure you have the right man and then keep him entirely happy. The results may come slowly, and the more comprehensive is a research, the slower it will come to fruition, but [results] will come nevertheless and they can be as far-reaching in their effect as is necessary to keep an organization busy for a generation.

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<sup>5</sup>Baxter 1946; Burchard 1948; Bush 1946, 1949, 1960, 1967, 1970; James Conant 1970; Jennet Conant 2002; Zachary 1997a, 1997b, 2022.

Prior to World War II, Bush focused primarily on corporate, not government, support for research. In his 1934 speech, “The Businessman in This Situation,” he argued that business managers by themselves had certain weaknesses and could benefit from corresponding strengths in good scientists [Zachary 2022, pp. 30–31]:

[The businessman] believes all inventors have long hair and should be shut up in cubicles. He thinks they should have a knowledge of business, and that if they do not they should be instructed in the same way that instruction is given in the art of poker. [...] He believes the way to sell any product is to repeat the same inane slogan millions of times, and paint storefronts in repulsive color combinations. [...] He thinks of the businessman as a super-being apart, who has the only true evaluation of success in the world, to whom homage should be paid.

The other side, the other picture, is this:

1. There have been and there will be great technical advances in this country. They will be brought about as they have always been by men of vision. Men who realize they play but one part in the drama, and who seek to understand and work with other players. In the realization that fruits of progress are many, and profit only one. That the satisfaction of creation, the joy of ministering to the happiness of one’s fellows, transcends profit. That these satisfactions are sought by hard-headed, competent men.
2. Success in the promotion of new products in the past has often gone to the opportunist who chanced upon and exploited the casual advance. The cream is skimmed.
3. The success in the future will go to that businessman, one among many, who evaluates and utilizes all the factors essential to real progress in this kind of world. To him the path is open, if sanity returns, and the [financial] fever passes.

Bush spent his whole life in the academic sector of research. From 1922 (with his founding of Raytheon) onward he also worked with and advocated for the industrial sector of research. In 1940, Bush was the chief architect who brought the government research sector into existence (at least in its modern form in the United States); he supported that too for the rest of his life. Bush knew the overlapping cultures of all three research sectors intimately.

I esteem Bush’s 1945 essay, “The Builders,” so highly that I quoted it on p. 2. Here it is in its entirety [Bush 1967, pp. 11–13]:

The process by which the boundaries of knowledge are advanced, and the structure of organized science is built, is a complex process indeed. It corresponds fairly well with the exploitation of a difficult quarry for its building materials and the fitting of these into an edifice; but there are very significant differences. First, the material itself is exceedingly varied, hidden and overlaid with relatively worthless rubble, and the process of uncovering new facts and relationships has some of the attributes of prospecting and exploration rather than of mining or quarrying. Second, the whole effort is highly unorganized. There are no direct orders from architect or quarrymaster. Individuals and small bands proceed about their businesses unimpeded and uncontrolled, digging where they will, working over their material, and tucking it into place in the edifice.

Finally, the edifice itself has a remarkable property, for its form is predestined by the laws of logic and the nature of human reasoning. It is almost as though it had once



existed, and its building blocks had then been scattered, hidden, and buried, each with its unique form retained so that it would fit only in its own peculiar position, and with the concomitant limitation that the blocks cannot be found or recognized until the building of the structure has progressed to the point where their position and form reveal themselves to the discerning eye of the talented worker in the quarry. Parts of the edifice are being used while construction proceeds, by reason of the applications of science, but other parts are merely admired for their beauty and symmetry, and their possible utility is not in question.

In these circumstances it is not at all strange that the workers sometimes proceed in erratic ways. There are those who are quite content, given a few tools, to dig away unearthing odd blocks, piling them up in the view of fellow workers, and apparently not caring whether they fit anywhere or not. Unfortunately there are also those who watch carefully until some industrious group digs out a particularly ornamental block; whereupon they fit it in place with much gusto, and bow to the crowd. Some groups do not dig at all, but spend all their time arguing as to the exact arrangement of a cornice or an abutment. Some spend all their days trying to pull down a block or two that a rival has put in place. Some, indeed, neither dig nor argue, but go along with the crowd, scratch here and there, and enjoy the scenery. Some sit by and give advice, and some just sit.

On the other hand there are those men of rare vision who can grasp well in advance just the block that is needed for rapid advance on a section of the edifice to be possible, who can tell by some subtle sense where it will be found, and who have an uncanny skill in cleaning away dross and bringing it surely into the light. These are the master workmen. For each of them there can well be many of lesser stature who chip and delve, industriously, but with little grasp of what it is all about, and who nevertheless make the great steps possible.

There are those who can give the structure meaning, who can trace its evolution from early times, and describe the glories that are to be, in ways that inspire those who work and those who enjoy. They bring the inspiration that not all is mere building of monotonous walls, and that there is architecture even though the architect is not seen to guide and order.

There are those who labor to make the utility of the structure real, to cause it to give shelter to the multitude, that they may be better protected, and that they may derive health and well-being because of its presence.

And the edifice is not built by the quarrymen and the masons alone. There are those who bring them food during their labors, and cooling drink when the days are warm, who sing to them, and place flowers on the little walls that have grown with the years.

There are also the old men, whose days of vigorous building are done, whose eyes are too dim to see the details of the arch or the needed form of its keystone, but who have built a wall here and there, and lived long in the edifice; who have learned to love it and who have even grasped a suggestion of its ultimate meaning; and who sit in the shade and encourage the young men.

From “The Builders” and from your own talents and opportunities, determine in which role you can make the most productive contribution to science and society, and pursue that work vigorously. Be open to taking different roles over the course of your life.

Based on his experiences in the academic, industrial, and government research sectors, in 1946 Bush wrote of “The Danger of Dictation of Science by Laymen” [Zachary 2022, pp. 150–151]:

There is also a danger that control of funds may occasion injurious dictation to science by laymen. The fact that this is a somewhat subtle matter renders the danger much greater. In applying science it is often correct that a group of laymen should set the general objectives—and in industrial research, for example, where men of diverse backgrounds and interest need to meet with the scientists and engineers in order to create a program that is sound from the standpoint of industry. The governing boards of universities rightly participate as the scientific research programs of their institutions are formulated, not merely because they must assure that plans and means shall be commensurate but also—and more importantly—because they must counsel in the defining of broad objectives which reach beyond the direct interests of the scientists into the greater question of the ultimate best interests of the country. In both cases, however, once the general objectives are defined, wise management leaves the methods of approach entirely to the scientists. The danger is that this lay participation will go beyond its appropriate function, enter into the methods themselves, and seek to influence the choice of the particular paths to be followed. If a scientist is really competent in his field, he knows better than anyone else how, in the exceedingly complex situation surrounding the frontier of knowledge, to single out an approach which may lead toward greater attainment. Interference with him by any individual, board, or committee, as he thus determines his way, annoys him greatly and should. The finding of the path is one of the finer parts of his art, in fact his rise to eminence depends very decidedly upon the wisdom with which he can thus choose.

Bush went even further in advocating for very independent, very creative scientific innovators in his 1951 essay, “A Few Quick” [Zachary 2022, pp. 194–204]:

[W]hen one wants a really startling departure from the pedestrian process of improvement in a technical area, it should be delivered bag and baggage to a group of young keen men, hardworking and intense, thoroughly competent and sound in fundamental science that underlies all technical advance of the sort, hardheaded on practice and costs, uninhibited, full of ginger, balked by no traditions of what cannot be done, holding with scant respect the old masters of practice in the field, with the absolute minimum of discipline and control consistent with having any organization at all. The group should of course be backed up very thoroughly indeed, protected against predators, protected against interests that know all the answers and resent the parvenu. Managing a group of this sort is not quieting to the nerves. Rare but existent is the older man who can fit into such a group and provide perspective and wisdom without putting on a brake. Some of the results will be bizarre and useless. But the occasional product of such a group is worth all it costs in money or headaches. The trouble is that regular complex organizations very seldom are willing to accept the headaches. [...]

But the smart way to get rapid advance in an unconventional way is to give a group of sound youngsters their heads. They must distinguish the really practical idea from

the thousands of screwball proposals that always abound, but if they are a sound group they will. [...]

All it needs is a bit more of unusual organization to give groups of this sort their heads and a scope of effort commensurate with the opportunities before us. This means money for development, opportunity for rigorous testing in the field, freedom from the absurd notion that failure in research should wreck a career, and above all access to the top through a line of authority that does not contain a single roadblock. It can readily be done, if those at the top really wish to do it, and if they understand it. Some of them do.

These exploratory groups should not be expected to produce anything useful for a considerable period. There should be no penalty on their failure to produce anything at all, if they spend government money economically and within the rules. [...] There are not many industrial organizations in the country that will stick their necks out to the extent of taking a contract along these lines, but there are some, and if they do not exist they can be assembled for the purpose. They must have on their staffs highly competent applied scientists and engineers, metallurgists, specialists on plastics, mathematicians—yes mathematicians, chemists, thermodynamicists, specialists on the physics of the solid state, crystallographers, a dozen other queer ducks, either full time or partly available as consultants. [...] They should not be committees; these produce compromises, not radical progress. They should have experimental production functions and test facilities. They should not be given a set of “military requirements” of the usual sort. [...] However they should be given access to the whole range of analytical studies in their formative stage, invited to present ideas and proposals, and incidentally paid enough to cover their costs while they study and prepare to do so. When an attractive plan appears in this manner, they should be given a contract to go ahead.

What will these unconventional efforts produce? I have no idea. [...] Their main contribution may be far from [...] any of the lines of development we now regard as established. Perhaps they will find nothing. In that case, we will have some assurance that we are not overlooking a bet which a potential enemy might stumble upon.

This is the sort of thing at which we can excel, but we have to organize intelligently to do it.

On 17 June 1957, four months before Sputnik, Bush gave a speech, “The Pioneer,” that connected scientific innovation to the traditional pioneering American spirit (and thus made his audience more likely to support scientific innovation) [Zachary 2022, pp. 265–269]:

The pioneer differs from the entrepreneur or the promoter. These latter two sometimes contribute substantially to progress, when their work is constructive in nature and not merely parasitic. But they are not pioneers in the sense that I wish to use tonight. For the entrepreneur and the promoter are looking for immediate results, in the organization of new industries, or the acquisition of new minerals, where the object is profit, and incidentally often a benefit to the region in which they operate. But they are seeking a short-term advantage of some sort.

The pioneer on the other hand takes the long view. He struggles and builds, not for himself primarily but for his children. It was this spirit that fired each of the best pioneers who opened up the West. He knew of course that he was not going to an easy life, that his lot would be hard and the vicissitudes many. But he held the vision of a sweeter land and a more satisfactory life, and held this vision in terms of what he was contributing to posterity, to his own children and those of his neighbors. This was the finest type of pioneer and his primary characteristic was that he looked beyond the affairs of the moment to a remote and very worthwhile goal.

The old geographical frontiers have now largely disappeared. There are several new frontiers, and most notable among these are the frontiers of science. And here also we need the pioneer, to take the long view, and to seize upon the opportunity that is overlooked or bypassed by those who pursued the well-trod paths. [...]

In fields such as this, which are the concern of everyone, but the immediate practical concern of none, where government proceeds haltingly or not at all, it seems to me that there is an opportunity for a modern type of pioneer, one who can take the long view, one who has a keen urge to do something for those who will follow him on this earth, a pioneer of courage, resourcefulness, and ingenuity, and above all a man who can work in a group effectively, and who is nevertheless thoroughly an individual.

The popularity of C. P. Snow's lectures and book *The Two Cultures* [Section 12.3.12; Snow 1964] prompted Bush to expound his own views of what culture is, and what differences in culture he saw in society [Zachary 2022, "Two Cultures," pp. 296–299]:

Any man who understands things, and is not interested in people, is not cultured. He has not been educated, and has not educated himself. [...] The time is past when great minds could encompass substantially all of knowledge—if it ever existed. It is rather a matter of interest, and a determination, to acquire genuine breadth, without at the same time losing the ability to excel in some intellectual specialization. [...]

What, then, should be the nature of education either formal or self-conducted which will inculcate this type of culture? This can best be answered by asserting what it should not be. First, it should not be over-specialized to the exclusion of breadth. The man who studies the chemical aspects of genetics, who becomes a master in that field, and who has no interest whatever in the current political scene, or the masterly eloquence of a Churchill, or the psychological insight of Shakespeare, is not cultured in accord with our definition. Neither is the individual who develops a reputation as an archaeologist of the Mayan civilization but who cares not a whit for the influence of the transistor on modern communications. Second, it should not be superficial. The chap who can talk impressively for three minutes, upon any subject under the sun, from moon probes to Cretan water works, but who cannot talk intelligently for 15 minutes, among experts, on any subject whatever, is just a dilettante. He may have breadth but he has no depth. Wisdom requires far more than extensive superficial knowledge; it requires also the ability to reason, whether by strict logic or by balance of evidence amid contradictions, an ability which is attained only by thinking intensively and exhaustively, surrounded by keen minds doing the same thing, competitors struggling for mastery, in a tough demanding subject.

It does not matter too much what that subject may be, provided it is joined with a breadth of interest in adjacent subjects and more widely. Our cultured man may be a lawyer or a surgeon or a business executive or a scientist or a banker or a linguist. There is no area of man's accomplishments which does not require, for eminence, discipline in the development of thought processes. The mathematician and the skilled clinician use widely different methods of reasoning in their work, but both types are needed for the effective handling of affairs in our complex civilization. The essence of acquiring a solidly based culture is that it should simultaneously create a trained mind capable of accomplishments in a specific area, and a broad range of interests effectively pursued by reason of that acquired skill, to the end that judgement may be soundly supported, to the end that there may be wisdom. [...]

Wisdom which extends only over the area of self-advancement is not wisdom at all. Success, measured in terms of the accumulation of a fortune, or even in terms of public acclaim, is still cramped into narrow confines. [...] Beyond these is a sublimated deep yearning to play an effective part in the great experiment on which mankind is embarked, to be a real factor in the evolving fabric of a civilized life. It is exemplified in a practical idealism, in seasoned altruism, in a genuine interest in the welfare of fellow men. [...] A culture, to be genuine, thus extends far beyond the basis for acquisition, far beyond even the basis for effective contribution to the material and professional affairs of the time; it stretches toward something much higher and much deeper. It aims to provide the basis for true wisdom. And only by pursuing this shadowy goal is there deep and abiding satisfaction in living.

There is a common fallacy in viewing this whole subject. We speak of necessity of experts, of professional skills, of adding to man's knowledge of his environment and of his relations with his fellows. From this we are apt to conceive of some sort of cultural aristocracy, some exclusive class to which only a few may belong. True culture knows no such boundaries; wisdom is not confined to manipulation of the intricate. Skill, which aids our great objectives, is admirable wherever found. A democratic society in which wisdom appeared only among a chosen elite would soon wither.

Consider a skilled mechanic, one who can fabricate the parts of a gyroscope inertial guidance system, working to tolerances far less than the wavelength of light. He is an accomplished man, contributing uniquely to our affairs. His skills have been built on assiduous study and practice over many years. The mysteries with which he deals are as fully mysteries to the great doctor or lawyer, as theirs are to him. He belongs to no national societies, writes no degrees after his name, makes no speeches. Yet he may be far more an accomplished citizen than his boss, or his boss's boss. Among the multitudes of such individuals are also those who have developed a broad range of interests, and a sound grasp of events and affairs. They are men of influence in their own circles. Without them our political structure would falter. We give them scant recognition and secondary material rewards only. But we would do well to avoid all snobbishness when we think of culture. These are cultured men. They are also, often, wise men. They often lead lives of more genuine satisfaction than those we acclaim. True culture must extend through the entire fabric of society, if our experiment in self-government is to work. Education, well-conceived and carried out, can help enormously, of course, in creating it. But the essential criterion for its furtherance is general recognition that it is worth the effort necessary to achieve it, at whatever level of social stratification it may appear.

As you are initially deciding on a career path, and then as you are challenged by obstacles and difficult choices throughout your career, it is vital to define the ideals that are most important to you, and to hang on to those no matter what happens. In “The Gentleman of Culture,” Bush outlined the ideals he thought future creators (and society in general) should hold [Bush 1967, pp. 31, 34, 45–49]. While Bush was born in the nineteenth century and spoke in old-fashioned terms of “gentlemen,” his comments apply to everyone and remain just as true today:

We in the United States are familiar enough with recurring waves of anti-intellectualism. Perhaps this was once inevitable; in a country of pioneers which prided itself on practicality, emphasis on the manly virtues might plausibly carry with it a distrust of the value of the aesthetic or the theoretical. Even so late as just after the Second World War the form of our national prejudice was exemplified by the invention of “egghead” as a term of opprobrium. This sort of thing is not merely injurious to the true enjoyment of the finer things of life; it is dangerous to the nation itself. [...]

On the other hand anti-science has at times fanned the flames of bigotry, doubted the loyalty of scientists as a group of citizens, and tended to discount and ridicule those whose contributions to our stock of knowledge are great and fundamental. Fear is seldom rational in its acts. The search for an escape from grim truth will usually find excuses. When danger threatens long enough, and insistently enough, it ends by being disregarded by wishful thinkers. All this can explain the presence of anti-intellectualism among us; the wonder is that we have not had more of it. [...]

True culture consists of a broad grasp of the world in which we live, and of the people who inhabit it; their history, their hopes and aspirations, their joys and sorrows. It includes a broad understanding of the current scene, industrial, artistic, political, social. It includes the course of science, its influence on the way we live, and on the ways in which we think. It is by nature interpretive, questioning, analytical. In short, it is the true basis of wisdom.

Let me illustrate by discussing science briefly, for science is emphatically an important part of culture today, as scientific knowledge and its applications continue to transform the world, and condition every aspect of the relations between men and nations. I will take just two examples.

Can a man be truly cultured who knows nothing whatever about solid-state physics; about the fascinating way in which electrons and holes move through a semiconductor, and the ways in which their progress can be controlled? [...] In particular, the transistor renders it possible to construct in small space powerful data-handling and analytical machinery. [...] Yet it cannot really be understood, even in its generality, without a sound, if limited, grasp of the physics on which it is based.

The other example comes from the field of astronomy, the science of the cosmos, of matters external to our little earth. [...] These are speculations and analyses which open and expand man’s mind. [...] The same conversion of mass to energy which keeps the stars radiating also now turns some wheels in our factories, and may well render it possible for man to continue his great adventure long after he has exhausted his fossil fuels. Who would live today and ignore this, the most magnificent example of the power of man’s thoughts about his position in the cosmos and his destiny [...]?

What is a cultured gentleman? What is he at his best? He is a man who aspires to wisdom, because of his keen interest and broad knowledge of all that conditions his relations with his fellows, and their relations with one another; who goes beyond this and strives to add to the sum total of human intellectual accomplishments, and to establish thinking on a higher and broader plane. He is a man who is modest and kind to the humble and the unfortunate. Above all, he is a man with a mission to minister to the welfare of the society in which he lives, and who takes a just pride in his guidance and his leadership. He is a member of the modern select group upon which the continuance and further development of our free way of life ultimately depends.

Basically the cultured gentleman needs to have a deep spirit of altruism, an urge to aid his fellow man, and especially thus to aid by his depth and breadth of thought, and his skill in imparting his ideals to those about him. He may not call himself a cultured gentleman, or allow others to do so; he may dislike the term, for which there is no good equivalent, because of its historic connotations. But he must aspire to be a leader, and a leader whose eminence is not based on how low cleverness, or demagoguery, or financial power, or clannishness of any form, but which rather is based upon presenting to his fellows ideals and programs which they will recognize and be willing to follow because of their inherent merit. He needs to be a forceful individual to be heard amid the discordant clamor. Above all, he needs to be one who will have the interest, the patience, the perseverance to attain a broad and deep grasp of the current scene in all its complicated ramifications, and to ponder thereon, as the true basis for wisdom.

This is an ideal which we can honestly and emphatically hold before our gifted youth with the firm conviction that it is worthy of their mettle, and that if they fully grasp it, they will then be inspired. Throughout our history we have had many citizens of this stamp; otherwise we would not now as a nation be what we are. They are all about us today, in positions of eminence, and in humble stations where their influence is bounded but none the less salutary. Whether we continue to prosper, whether we remain secure, whether we develop in this country a life truly worth living, depends upon whether in the next generation there are enough such men, sufficiently articulate, sufficiently powerful in honest and admirable ways, to guide us around the rocks in our path and lead us to the heights.

The values and personal characteristics promoted by Bush (such as a deep love of learning with as much breadth and depth as possible; lifelong patience and perseverance; an intense focus on helping humanity in general and the people you encounter in particular; and not being motivated by desire for power, money, or fame) may sound hopelessly idealistic and naive in the modern world, which seems to teach, practice, and value the very opposite of everything that Bush described. Yet it is important to live and work on behalf of these values, regardless of what the modern world may think. And if more people in the modern world could be persuaded to embrace these same values, organizations and nations might function as productively and effectively as they did when Bush and others like him practiced these values.

In his 21 November 1963 presentation to Congress (the day before President John F. Kennedy was assassinated), Bush returned to his earlier theme about hiring/funding very talented scientists and then entrusting them with the freedom and resources to pursue their innovations instead of micromanaging and hindering them [Zachary 2022, “What Is Research?” pp. 308–310]:

The deeply important scientific advances moving today are not easy to understand. If they were, they would have been accomplished long ago. Outstanding scientific progress, which will most affect the lives and health of our children, is not grasped by many. [...]

It makes sense to ask a young researcher in basic research what he is trying to find out, what sort of knowledge he hopes to have at the end of his program which does not now exist. Surprisingly often the answer will be hard to extract. But it makes no sense to ask him just how he is going to do it, what it will cost, or how long it will take.

The great scientific steps forward originate in the minds of gifted scientists, not in the minds of promoters. The best way to proceed is to be sure that really inspired scientists have what they need to work with, and leave them alone.

Future creators will inevitably have many interactions with the management of whatever organizations employ them and/or sponsor funding for their research. Creators may also become managers themselves, in order to lead or coordinate with a team to fully develop their innovations. Bush, whose experience managing scientific innovation was perhaps unrivaled in history, wrote an excellent essay on “The Art of Management” near the end of his life [Bush 1967, pp. 61–66]:

I can tell you one way how to determine whether a really accomplished manager is in command of an organization. See what his subordinates really think. [...] If a manager who really excels is present, a subordinate will know, when he is given a job, exactly what he is supposed to do, will know that he will be backed up and not interfered with. Moreover he will know that, if he makes a mistake, the boss will tell him so, but tell no one else, and will reason it out with him so that he will not make the same one again. He will know that if he has tough luck and gets into a jam, the boss will labor to get him out of it, and will tell no one that he is doing so, although it will soon be known throughout the shop. He will know that, if he makes too many mistakes, of if he is just not up to his job, he will be eased out, but that the boss will attempt to accomplish this with the minimum possible damage. Finally, he will know that, if he puts forth his best efforts, sweats at the job, and it still turns out badly, the boss will himself take responsibility for the failure, for that is the heart of sound delegation, and sound delegation is of the essence of good management. [...]

[T]he good boss never holds a grudge. By the same token, the boss does not dissemble. Everyone, from childhood’s hour onward, wants to know where he stands; the boss owes it to his staff to let them know. No good boss can ever have a secret weapon. The most corrosive element in human relations is a sense of injustice. Such a lingering sense is poisonous, and an organization which has been invaded by a sense of injustice is seriously ill. The good boss may have plenty of eccentricities, but a staff which holds confidence in his justice will overlook or even relish them all; a boss who practices dissimulation will be disliked for having a good baritone voice.

In the good boss’s shop you will witness a change of atmosphere when a bit of skulduggery appears. There will now be no temporizing, and there will be no doubt who is running the show. The air will be charged with electricity; timid souls will get under their desks. Everything can wait, but not wait long, until the unethical or illegal practice is ferreted out and eliminated. [...]



The boss should not get too gay with his own ideas! Remember that, if he has had any sense, he will have gathered about him a group of individuals, many of whom are more skilled than he in phases of the job. [...]

The good boss will be punctilious in giving credit where credit is due. All down the line, his example will be followed by his colleagues, and by their subordinates in turn. Nothing is quite so despised as the man who filches the credit which is the rightful due of another. Moreover, no form of thievery is sillier, for the truth always leaks out; everyone knows who the credit-snatcher is, and is skeptical of all credit to him. [...]

An important part of the art of management is the art of listening. Some managers do not listen at all, even when they appear to. Some listen too much, but merely listen. No manager can be expert in all phases of modern management; he is fortunate if he can be really expert in one. He has to depend on his team in phases where he is not fully versed himself. [...]

No pose, no sanctimonious attitude, no back-slapping, or false humility will get across the footlights with an intelligent audience, and if the members of the organization are unintelligent, the case is hopeless anyway. This refers not merely to vice-presidents; it also applies to janitors.

You should read this entire essay by Bush. If you are an innovator seeking employers and/or sponsors, try to find managers who act as Bush described. If you are a manager, model your behavior and your decision-making process on Bush's words. In my personal experience within the modern U.S. research system, most managers in most organizations do almost exactly the opposite of what Bush recommended, with predictably disastrous consequences for their employees, for others such as customers, and for innovation. Paradoxically, nowadays such bad managers are often richly rewarded, promoted to even higher levels of power, and given the authority to select bad people to become new bad managers, illustrating just how deeply dysfunctional the U.S. research system has become over the many decades since Bush helped to create it.

Bush's final book, *Pieces of the Action*, mixed autobiography with more advice and insight. Among many other helpful parts of that book, he described people or organizations that are obstacles to revolutionary scientific innovations. Since much of Bush's personal experience involved military research and development, he invoked that context as an example, yet his insights apply to all sorts of organizations and fields [Bush 1970, pp. 69–70]:

In a complex society, too, there is a wonderful chance to set up roadblocks. We have all seen them—the stumbling blocks of smugness, greed, conceit, inertia, empire-building. Some are placed by the stuffed shirt who takes pride in putting others, especially younger others, in their places. We remember the big toad in the small puddle who thinks he is still the chief toad when the puddle has become an ocean. Beside him belongs the dull-brained traditionalist who was doing something in a set way forty years ago and sees no reason to change now. [...]

When he knows that stumbling blocks may get in the way of a joint effort in which he is engaged, a man who is light on his feet tries to anticipate them, to figure out where they may arise and why, and how best to evade them. This means he tries to figure

out strategies—even stratagems, if necessary—to get them out of the way so that the work can go ahead. Planning strategies means taking into account the personal quirks of some individual who almost always is the source of the blockade, and devising ways to annul his blockade by disarming him, by avoiding him by an end run, or, if necessary and possible, by knocking him on the head, figuratively of course. The justification is the importance of the work and the depth of one’s commitment to it.

These hazards occur whenever men must work together in organizations—in business, campaigns, research, what have you. They are found in military undertakings, especially when collaboration between civilians and the military is vital, as in time of major war. In this chapter I shall discuss primarily a particular sort of stumbling block. It appears when an officer in high command has a fixed conviction after technical progress has made it obsolete. It also occurs when a relatively unintelligent individual suddenly boosted to control of important military procedures, as is bound to happen occasionally under the stress of war, throws his weight around for effect. Unfortunately it also occurs because highly capable officers become so severely burdened that they just cannot find the time to keep up to date. It occurs in especially difficult form when some section of the vast military organization has developed special skills and the vested interests that go with them, and has walled itself off from interference not only by civilians but also by other military branches or even by the high command. However this sort of thing occurs, it is a lame leg in the march of progress and we need to overcome it or avoid it.

Bush provided examples of the difficulties of obtaining financial and political support for good revolutionary innovations. However, he also devoted an interesting chapter to the problem of the occasional individual (whom Bush dubbed a “tyro”) who has very bad scientific ideas yet is far too politically skillful and successful at obtaining support for those ideas, which can waste resources and harm good innovators and innovations [Bush 1970, pp. 121–148].

Perhaps most importantly, in his final book Bush urged future creators to do what they love, and to believe in what they do [Bush 1970, p. ix]:

He who struggles with joy in his heart struggles the more keenly because of that joy. Gloom dulls, and blunts the attack. We are not the first to face problems, and as we face them we can hold our heads high.

### 12.2.3 Norbert Wiener

Norbert Wiener (1894–1964) received his Ph.D. from Harvard when he was only 18 and went on to spend his career pioneering cybernetics as a professor at MIT.<sup>6</sup> In 1954, he wrote a book of advice, *Invention: The Care and Feeding of Ideas*, but unfortunately it was not finally published until long after his death. I strongly recommend reading all of Wiener's book, yet I would especially like to call attention to a passage in which he discussed how the naked pursuit of money and power for their own sake could corrupt scientific research and academia [Wiener 1993, pp. 34–36]:

I will not say that this type of integrity has vanished in business, but merely that in the balance between integrity and aggressiveness, the needle has shifted over pretty far in the direction of aggressiveness. [...]

The businessman is brought up sharp by meeting the scientist who cares more about his science than about the tangible rewards of science. He feels that he has come into contact with a smooth, hard, impregnable fortress of the soul, in which he can find no obvious point of attack. To him the scientist or the man of letters represents a core of possible defiance. In this threat of defiance he sees something to be eradicated and stamped out. The less that the free-lance individual demands of him in property and the riches of the world, the less sure is the businessman of his own final dominance.

Thus the powers that be are very glad to see that in the new generation there is a trend away from self-sacrifice, from the passion for learning, and from all these uncontrollables. They are delighted that the doctors are showing an increasing interest in the arts of spreading their practice and collecting their bills. They derive a very real satisfaction from the fact that the young engineers and scientists are flocking to their [corporate] laboratories and leaving the universities and that the institutions of pure research are understaffed and dangerously weak. Those scientists who cannot talk in sums of money less than a million dollars are his own men, and he encourages them, perhaps not to join his own country clubs, but to join country clubs of a slightly smaller prestige, and to buy, not Cadillacs, but the precise make of car that would show at the same time a proper deference for his own superiority and a proper worship of his own ideals.

What he fails to see is that he is paying for the immediate subserviency of the scientist in the inability of the scientist to furnish the long-time and deep-lying developments on which the community as a whole and he himself in particular ultimately depend. For the megabuck scientist, a really deep study of the laws of nature demands at least a temporary retirement from the ranks of scientific management, and many hours of contemplation in the peace of his own study, before anything emerges which will bring him spectacular attention.

This is a gamble which he cannot afford to take. It withdraws him from the very intense struggle for top position in which he has been indoctrinated. If for one moment he fails to watch what is fashionable and what the other men are doing, he invites another climber to push him off the ladder. Thus the world of competition and of self-advancement can only continue to exist by virtue of the existence somewhere within it of a corner in

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<sup>6</sup>Levinson 1966; Wiener 1953, Wiener 1954, Wiener 1956, Wiener 1961, Wiener 1964, Wiener 1993.

which scientists are not self-seeking, and only compete in a deep joint effort to disclose the secrets of nature.

If we want to discover or develop the true scientist, we must begin early in the childhood of the man who is to become a scientist. The man who is to be devoted must have had a chance to see what devotion is. The man who is to be governed by a desperate curiosity about nature and by an unwillingness to be baffled by anything that he can possibly overcome, must form this orientation early, before he is caught by the better-paying worldly values. Our schools must teach something more than conformity, and must demand something more than well-rounded nonentities. Whether the courses of the high school be in modern languages or classics or mathematics, they must recover a part of the bite and weight they once had. Short of this, our civilization will drift into a Byzantine mediocrity, and our science will be governed by officials or employees, not by men.

This problem that Wiener first described in 1954 has grown to be orders of magnitude worse in the decades since that time.<sup>7</sup> In fact, if Wiener were alive today, he might be absolutely appalled by the current state and current behavior of the universities that educated and employed him, and of countless others like them.<sup>8</sup>

For more information on problems with academic research, see Section 1.2.5.5.

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<sup>7</sup>Here is an illustrative example of this general problem from another source. In his book on potential applications of general relativity, the physicist Enrico Rodrigo made some interesting observations about the modern scientific system [Rodrigo 2010, pp. 27, 310]:

A wormhole solution was known in 1916. Why did a thorough investigation of wormhole physics not begin until the late 1980s? Beyond the fact that wormhole and black hole solutions were universally regarded as physically uninteresting until about 1935, the development of wormhole physics was retarded by sociological factors. Physicists are not in general financially independent. To survive, they must be employed. To be employed, they must be credible. To be credible, they must eschew topics of great interest to crackpots. [Crackpots are those engaged in the promulgation of irrationally held ideas typically involving the occult, fantasy, or science fiction.] One indication of the stigma associated with the subject is that the first wormhole paper of the “modern era” when published in 1988 was not billed as a research paper (which it was) but as “a tool for teaching general relativity”. It was only because its lead author was an established physicist of unquestioned credibility that less established physicists subsequently felt it professionally safe to publish traversable wormhole papers as well. [...] One aspect of my education in physics, of which I was never particularly fond, was what seemed to me to be an under-emphasis on the unknown. A detailed awareness of one’s ignorance is not only the first step toward greater understanding, it also engenders appreciation for the hard-won knowledge that we as a civilization do possess.

Rodrigo aptly described the problem in the field of wormhole physics, but scientific research across the board suffers from the same problem. When entire fields of scientists are terrified to conduct or publish (or allow others to conduct or publish) any research that seems too new, important, or revolutionary, they are not a group of Galileos, but rather the Inquisition. They have become the complete opposite of everything that research scientists are supposed to be. Furthermore, as Rodrigo very astutely pointed out, the education of future creators should cover what is unknown as well as what is known. This book has tried to do that, and K–12 and university education systems should too. In order to help future creators as much as possible, any such coverage should try to offer useful suggestions on potentially promising ways to explore those unknown areas, or on previous methods of exploration that have failed and should not be blindly repeated.

<sup>8</sup>See for example: Brodwin 2019; Buranyi 2017; Farrow 2019; Francis 2020; Sarkowski 2001.

### 12.2.4 Kelly Johnson and Ben Rich

The Lockheed (now Lockheed-Martin) Skunk Works is an example of a corporate research and development laboratory that was especially noted for its innovation.<sup>9</sup> Most famously it developed the U-2 and SR-71 spy planes and the F-117 stealth fighter. The Skunk Works was founded by Clarence “Kelly” Johnson (1910–1990) in 1938 and run by him until his retirement in 1975.

Johnson developed “14 Rules and Practices” for the efficient operation of the Skunk Works:

1. The Skunk Works manager must be delegated practically complete control of his program in all aspects. He should report to a division president or higher.
2. Strong but small project offices must be provided both by the military and industry.
3. The number of people having any connection with the project must be restricted in an almost vicious manner. Use a small number of good people (10% to 25% compared to the so-called normal systems).
4. A very simple drawing and drawing release system with great flexibility for making changes must be provided.
5. There must be a minimum number of reports required, but important work must be recorded thoroughly.
6. There must be a monthly cost review covering not only what has been spent and committed but also projected costs to the conclusion of the program.
7. The contractor must be delegated and must assume more than normal responsibility to get good vendor bids for subcontract on the project. Commercial bid procedures are very often better than military ones.
8. The inspection system as currently used by the Skunk Works, which has been approved by both the Air Force and Navy, meets the intent of existing military requirements and should be used on new projects. Push more basic inspection responsibility back to subcontractors and vendors. Don’t duplicate so much inspection.
9. The contractor must be delegated the authority to test his final product in flight. He can and must test it in the initial stages. If he doesn’t, he rapidly loses his competency to design other vehicles.
10. The specifications applying to the hardware must be agreed to well in advance of contracting. The Skunk Works practice of having a specification section stating clearly which important military specification items will not knowingly be complied with and reasons therefore is highly recommended.
11. Funding a program must be timely so that the contractor doesn’t have to keep running to the bank to support government projects.
12. There must be mutual trust between the military project organization and the contractor, the very close cooperation and liaison on a day-to-day basis. This cuts down misunderstanding and correspondence to an absolute minimum.
13. Access by outsiders to the project and its personnel must be strictly controlled by appropriate security measures.

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<sup>9</sup>Johnson and Smith 1989; Pace 2016; Rich 1994, 1995; Yenne 2014.

14. Because only a few people will be used in engineering and most other areas, ways must be provided to reward good performance by pay not based on the number of personnel supervised.

Of course, Johnson developed his rules for the specific case of a corporate Skunk Works that was funded by government agencies to develop highly advanced classified aircraft. Although some of his rules are not applicable to other situations, some of them are applicable to a wide range of cases, and others can be applied with suitable modifications. The most important thing about Johnson's rules, though, is that he invested the thought and energy to develop a small set of principles that would help him do as much good as possible, and he and others around him stuck to those principles. Use or modify some of Johnson's rules if you can, or otherwise develop a set of principles that will be just as effective for your own particular circumstances.

Johnson's longtime assistant, Ben Rich (1925–1995), ran the Skunk Works during the period 1975–1991. Shortly before his death, Rich wrote about his long career at the Skunk Works and the lessons that he hoped others would learn from its successes [Rich and Janos 1994, pp. 315–318]:

Any company whose fortune depends on developing new technologies should have a Skunk Works in operation[...] But if Lockheed's Skunk Works has been a tremendously successful model, why haven't hundreds of other companies tried to emulate it? One reason, I think, is that most other companies don't really understand the concept or its scope and limitations, while many others are loath to grant the freedom and independence from management control that really are necessary ingredients for running a successful Skunk Works enterprise. [...]

To buck smothering bureaucratic controls inside or outside government takes unusual pluck and courage. Smallness, modest budgets, and limiting objectives to modest numbers of prototypes are not very rewarding goals in an era of huge multinational conglomerates with billion-dollar cash flows. There are very few strong-willed individualists in the top echelons of big business—executives willing or able to decree the start of a new product line by sheer force of personal conviction, or willing to risk investment in unproven technologies. As salaries climb into the realm of eight-figure annual paychecks for CEOs, and company presidents enjoy stock options worth tens of millions, there is simply too much at stake for any executive turtle to stick his neck out of the shell. Very, very few in aerospace or any other industry are concerned about the future beyond the next quarterly stockholders' report. [...]

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. [...] Going “skunky” is a very practical way to take modest risks, provided that top management is willing to surrender oversight in exchange for a truly independent operation that can make everyone look good if its technology innovations really catch on, as with stealth. By keeping low overhead and modest investment, a Skunk Works failure is an acceptable research and development risk to top management.

For more information on modern problems with corporate research, see Section 1.2.5.5.

Although the Lockheed Skunk Works was part of a corporation, it was fully dependent upon government funding. Therefore, Ben Rich also had important insights into modern problems that

are common in government-run and/or government-funded research laboratories and programs [Rich and Janos 1994, pp. 327–328]:

The Skunk Works concept as a vibrant force in the American defense industry can come into its own only if and when the government reverses some of its counterproductive practices. And the most obvious place to start in achieving greater efficiency is to ferociously attack unnecessary bureaucratic red tape and paperwork. [...]

Everyone in the defense industry knows that bureaucratic regulations, controls, and paperwork are at critical mass and, if unchecked, in danger of destroying the entire system. An Air Force general in procurement at the Pentagon once confided to me that his office handled thirty-three million pieces of paper every month—over one million per day. He admitted that there was no way his large office staff could begin to handle that kind of paper volume, much less read it. [...] There is so much unnecessary red tape that by one estimate only 45 percent of a procurement budget actually is spent producing the hardware.

Oversight is vitally important, but we are being managed to death and constantly putting more funds and resources into the big end of the funnel to get an ever smaller trickle of useful output from the small end.

U.S. government-funded research began to decline around 1970 when the Space Race ended and the Cold War relaxed. Then the decline became even worse with the end of the Cold War in 1991.

Lynn Gref (1941–2013), who spent his career conducting and managing research at Department of Defense (DOD) and NASA laboratories, described the decline of applied research or “Phase Two” research at government laboratories [Gref 2010, pp. 116–117]:

It is in Phase Two research (device phase) that a decline in research activity of at least a decade duration can be detected. Now let us consider the indicators of a decline in Phase Two research. [...] Industry has become the dominant source of funds for R&D. Industry is even more dominant for R&D outside of the medical science arena. This is in itself not necessarily bad. However, it will become evident that industry has lost much of its ability or willingness to perform the Phase Two research that leads to the revolutionary devices of the future.

Second, R&D performed at the Government’s laboratories has declined more than 50% since 1970 based on funding received[...] Most of their work falls into Phase Two. After the end of the Cold War, funding for new weapons systems declined dramatically. (The Iraq War has brought an influx of orders for existing weapons systems and benefited much of the remaining defense industry, but it has had the devastating effect of further restricting R&D funding to efforts with an immediate application to the war.) The defense industry went through a major restructuring and consolidation between the end of the Cold War and the beginning of the Iraq War. During this period, industry went after all available funding from the DOD. The large companies turned to sources they previously shunned including Phase Two research. The companies employed massive lobbying efforts to achieve these objectives. Consequently, a goal of the DOD’s laboratories became spending approximately 70% of their funding with industry. (The DOD originally established the laboratories to perform research needed by the services. Buying research from industry is a very recent occurrence.) This had two negative effects. First, it further reduced the funds retained by the laboratories to use

for their in-house activities including research. The impact was that of a funding cut. Second, the technologists at the laboratories had to use their time to perform contracting functions—writing requests for proposals, evaluating proposals and monitoring the work of contractors—instead of performing their own research. The reduction of internal funding and the change in assignments has dramatically reduced research performed at the DOD laboratories. In addition, studies initiated by Congress have pointed to a perceived excess capacity in DOD laboratories and suggested restructuring the laboratories so that they would be Government owned and contractor operated. In this latter case, industry would perform all of DOD’s research other than that done by universities. Recalling [...] the rich heritage of innovation of the Naval Research Laboratories and the other DOD service laboratories, the decline in technology development by DOD’s laboratories is a tragedy for Phase Two of the development cycle.

The “industrialization of Government research” has not been unique to the DOD. It has affected agencies such as NASA. NASA has terminated “block” funding of technology work at its center laboratories. It has replaced the technology development that its centers previously performed on an assigned basis with various competitions, most of which are open to all comers. With these competitions has come the pressure on NASA to award industry a greater proportion of the R&D dollars. The contraction and consolidation of the military industrial contractors that occurred after the end of the Cold War certainly had a part in this change at NASA as it did with the DOD laboratories. With the need to survive, NASA’s research funds became fair game for these contractors. Unfortunately, when the researchers at the NASA centers fail to obtain funding for their efforts, then they must go elsewhere and their research ends. For example, JPL received from NASA approximately \$100M on an assigned basis for Phase Two research in FY2000 and today it is less than \$50M, mostly obtained on a competitive basis.

Furthermore, competition for Phase Two funding does not foster risk taking and long-term efforts. No matter how one cuts it, the winners of funding are those who can demonstrate the best value for the Government. That is, winners are those that can identify measurable benefits of their research, demonstrate the risks of the proposed work are reasonable and manageable, prove the approach to the research is sound, and argue that success is likely. That just is not the real life situation for Phase Two research [...] where failure occurs more often than success.

Competing for research funding is an environment in which research becomes incremental and unimaginative. In other words, the competitive environment turns the researchers into “surviving” financially. Improving the materials and processes used to build a device is much more likely to meet the requirements of a competition than some “wild new” idea that may take a decade or more to work out with few, if any, applications apparent[...]. Similarly, proposing an enhancement to work that has already been funded and is in a proven interest area of the sponsor is more likely to be a successful bid than an “out of the box” or “off the wall” idea. Such a chilling environment for innovation is not conducive to funding research ideas that could really have an impact similar to those of NRL’s radar developments of the past.

Thus both Rich and Gref described government research programs that had become too hamstrung by red tape to even function, and that spent their money on mountains of paperwork instead of actual research. For more information on problems with government research, see Section 1.2.5.5.



### 12.2.5 Simon Ramo

Simon Ramo (1913–2016) ran a very innovative electronics program at General Electric (1936–1946), then created and ran the highly innovative research program at Hughes Aircraft (1946–1953), and then co-founded and managed research at TRW (Thompson Ramo Wooldridge, 1953–1978).<sup>10</sup> Along the way, Ramo reported directly to U.S. presidents and led development of the first U.S. electron microscopes, long-range air defense systems, intercontinental ballistic missiles, interplanetary space probes, and other technologies.

Writing in the 1970s (and published in 1980), Ramo described in real time and with acute perception how serious problems arose in U.S. corporate research in the 1970s [Ramo 1980a, pp. 55–56]:

New technology is by its nature speculative. Risk taking is part of the task of management in the private sector but in periods of diminishing rewards smaller risks will be favored. This means priority will go to sticking to existing technology and making only small changes in techniques of manufacture and in the products themselves. Managers of R&D in American corporations are now reporting a heavy shift in emphasis to short-term programs either to produce safe, non-speculative, incremental improvements or else to learn how to comply with new government environmental and safety regulations. Basic research has been disappearing from private U.S. industry. Another factor is that principal executives, while not disinterested in long-term investments that may enhance the company's position after they have retired, have a natural desire to see results while they are still in the driver's seat. They are increasingly less motivated to make risky, long-term investments as their concern grows about U.S. economic-political stability over the lengthening period required to see a speculative investment through to successful completion. [...]

After World War II there was a burgeoning in the United States of new technological industries: computers, agricultural technology, instant copiers, telecommunications, jet transport, semiconductors, nuclear reactors, spacecraft, fast foods, new chemicals and pharmaceuticals, and many more. Some of these product areas are now approaching maturity. We need new ideas and enterprises as well as continued enhancement and expansion of the fields in which we have a strong position.

Nearly a decade later, Ramo wrote of “The Decline of U.S. Technology Leadership” and confirmed his view that the decline had begun around 1970 [Ramo 1988, pp. 184, 200]:

As the 1960s ended, the public's love affair with advances in technology seemed to pass its peak. [...] Coincidentally, worldwide belief in America's preeminence in technology attained its zenith in the early 1970s, and a new image of the United States as a fading leader in technology began to emerge. [...]

In our country, when we face an important problem that requires an attack by government, serious action is taken only after most citizens have clearly perceived the problem. For strong public pressure to form, the situation must first become so bad that it is widely seen as intolerable. Hence, the pragmatic American formula for progress is that things have to get much worse before they can get better.

Ramo was an optimist, or at least wanted to use optimistic language to encourage his readers to envision and pursue potential improvements. Thus in his 1980 and 1988 passages quoted above, he hoped that people would see how bad the problems he described were becoming, and would take action to solve those problems. Unfortunately, that did not happen, and the problems diagnosed by Ramo in the 1970s and 1980s have only worsened over the several decades since then.

<sup>10</sup>NYT 2016-06-30 p. A25; Dyer 1998; Stephen B. Johnson 2002; Ramo 1980a, 1980b, 1983, 1988, 2005.

By 2005, the long-lived Ramo was alarmed at not only the declining innovation but also the escalating corporate problems of unethical behavior, gross incompetence, and concentration of corporate income into the hands of just a few people at the top, instead of all the employees who worked to create that corporate income. Ramo again couched his warnings in optimistic language that things could and should be improved [Ramo 2005, pp. 139–141]:

Once management takes on a dictator style it is unlikely to change until the company’s performance is seen to deteriorate badly and often even well beyond that point. Sadly the likelihood of that downturn happening is great. [...]

The public, the relevant government agencies, the accounting firms, shareholder groups, and employees of corporations now believe that management mishaps have become far worse than is tolerable. [...] Superior criteria for realistically assessing conflicts of interest will be worked out. Demands for greater competence and ethical behavior by corporate leaders will grow and that will force change. [...]

Do not get caught going to board meetings where you are supplied with less knowledge than you should have. Don’t join a board if you have a real conflict of interest. Don’t pay the CEO excessively or allow him or her to overcompensate you as a reward for your engaging in such overcompensation. [...]

Be highly ethical, informed, and determined to be a good director.

Ramo also emphasized the importance of teaching innovation skills to future creators, and of conducting research to study the most effective methods of teaching and practicing innovation [Ramo 1980a, pp. 279–280]:

[U]niversity goals need to include the enhancing of student originality in approaching problems and challenges more generally. [...] We are speaking of innovation that will pay off, of inventing to fill real needs, of matching ideals and wisdom to the requirements of the society. The problem is to encourage the forming of good ideas—ideas that will really work. This requires that the effort go beyond spurring original thinking, although that is a necessary requirement and a beginning. Useful innovation must derive from a superior understanding of both the problem and the criteria for a sound, acceptable solution.

At present, the creative effort of university students is more likely to be shown and brought out in extracurricular affairs. The existing curriculum does not go directly to the intellectual processes of innovating or to analysis that can guide and judge creating when attempted. Research programs and courses of study specifically intended to develop worthwhile innovative talent, whether of technological or non-technological character, are rather uncultivated fields as yet. If at the university level we are not yet able to deal with the underlying intellectual processes, research programs are necessary before courses of instruction can be constructed with confidence. However, experimental courses to stimulate and encourage creativity could be tried and these might even be part of the research process.

Other nations do not yet appear very active either in university programs dealing with innovation. Rarely, anywhere, is the creative process regarded as ready for laying out as an intellectual discipline. If, through avid interest and an innovative approach to innovation, we were to create new university programs in the subject, the results might be disappointing. Since such programs have hardly been tried, we really don’t know. They might turn out to be remarkably productive.

For more information on teaching and studying innovation, see Section 1.2.4.4 and Chapter 10.

### 12.2.6 Peter B. Medawar

Peter B. Medawar (1915–1987) was a British immunologist who won the Nobel Prize in Physiology or Medicine in 1960 for his discoveries regarding acquired immunological tolerance. His 1979 book, *Advice To A Young Scientist*, is well worth reading in its entirety, although Medawar worked and wrote at a time when the scientific research system and society in general were much less dysfunctional than they are now in many ways. As a result, modern readers might be tempted to consider some of Medawar’s advice inapplicable to their current situations, yet they should view it as a useful metric of how things should work and how they once did work. Medawar ended his book with a deep consideration of the role of scientists in improving the world. He cautioned that there are limitations on how much and how rapidly science can improve the world, yet he counseled that any improvement, no matter how modest, is helpful. Medawar also outlined the feudal, class-based, highly unequal and undesirable society that had existed before his own, improved, mid-twentieth-century world. Twenty-first century readers may be struck by how successful “Arcadian thinkers” have been at causing the world to regress to that problematic state [Medawar 1979, Ch. 12]:

Scientists tend also to be Utopian in temperament—to believe in the possibility in principle, perhaps even in fact, of a different and altogether better world. [...] The old Utopias—New Atlantis, Christianopolis and the City of the Sun—were faraway contemporary societies, but the Utopias men dream of today lie in the distant future or on a planet of a distant undiscovered sun.

Arcadian thinking looks not forward nor far away but backward to a golden age that could yet return. [...] One such latter-day Arcadia envisages as the highest condition of man the state of the prosperous English landed gentleman of the eighteenth century. Living on the wholesome and abundant produce of the home farm, he was surrounded by a contented and respectful tenantry, whose interests he genuinely looked after; he gave employment, moreover, to a large number of loyal indoor and outdoor servants, to whom his convocation for morning prayers or regular attendance at church set an example of manly piety. The landed gentleman raised a large family, the eldest male member of which would succeed him in the care and management of his estate; his daughters, when not supporting their mother in the execution of all manner of good work, added still further distinction to the family name by advantageous marriages. To complete the Arcadian microcosm, a young resident tutor, with an eye perhaps on the family living, did his best to educate the young in a style Dr. Johnson would have approved[...]

This was without doubt a wonderful world for the landed gent himself, but nothing like so much fun for the domestic staff, none earlier to bed than the latest sitter-up and some up at dawn to lay fires in the bedrooms and living rooms and have everything shipshape before the quality came down. The outdoor staff worked very hard, too, probably deriving less satisfaction than their masters from contemplating their place in the established order of things, being at all times conscious that their own and their families’ livelihoods depended on the approval and goodwill of the landed gentleman or his agent.

Nor was it so much fun for the landed gentleman’s wife; she strove by repeated childbearing to make good the ravages of a merciless infant mortality and might be condemned to nurse—in secret—painful and disabling ailments that pride, propriety, and a well-founded doubt of the efficacy of medical treatment made it useless to declare. Her own bondage to the established order of things was no less absolute and perhaps in some ways more demanding than that of the domestic staff. [...]

Scientists seldom have the upbringing and the worldly wisdom to cast themselves as principals and would be more likely to wonder what it would be like to be at best the resident tutor or, more likely, the chap who went around unstopping the drains. [...]

Sanguine or despondent, Utopian or Arcadian in temperament, scientists, like most other folk, want to feel they have some special reason for being alive—not just for “being in this world,” as the saying is, but for being a scientist rather than anything else.

One soon picks up from the conversations or declared opinions of scientists, especially young ones, that the belief that animates many of them is what Sir Ernst Gombrich has called “scientific messianism.” It goes naturally with Utopianism—a better world is possible in principle and may be brought into existence by a great transformation of society. Science, they believe, will be the agent of this transformation, and the problems that beset mankind—not excluding those which grow out of the imperfections of human nature—will yield to a scientific inquiry that will point the way to those sunlit uplands of peace and plenty that seem like a secular heaven to a weary and rather battered world. [...]

A scientist who works for the advancement of medicine or agriculture or the improvement of manufactures can be—often is—an agent of material progress. As such, he will be frowned upon[...]

The Times rapped Edwin Chadwick sharply over the knuckles for presuming to improve the health of Londoners by laying down adequate sewers. No, declared The Times, speaking with the voice of antiscience throughout the ages, Londoners would rather “take their chance with cholera and the rest than be bullied into health by Mr. Chadwick and his colleagues.” [...] The spirit of The Times’s denunciation of Edwin Chadwick is still abroad[...]

The real case against the adequacy of the material progress made possible by science rests upon the exposure of a simple doctrinal fallacy that is a modern secular equivalent of the doctrine of original sin: the doctrine of original virtue. Give human beings the assurance of food, warmth, shelter and freedom from pain, and their natural goodness will prevail—they will become peaceable, loving, and cooperative, eager to help others and to work for the common weal. Give children love and warmth and protection, and they will be loving and lovable, outgoing and unselfish, sharing their toys and other possessions spontaneously with their friends, enjoying a clear instinctual perception of what is best for them at the time and thereafter. Inexperienced teachers and young parents do sometimes seriously believe that children not only know what is best to eat and best to do but also what they should learn or not learn; they also have serious misgivings lest firmness or an exercise of authority should deprive children of their spontaneous creativity and innocent perceptiveness.

Nothing, I think, has ever formally disproved the doctrine of original virtue, though there is precious little incentive to believe it true. Yet one cannot help thinking the tendency to believe in it is a lovable human trait.

If the doctrine of original virtue were true, then scientific messianism would embody a valid ambition because science could one day create the ambience in which natural virtue would prevail; but let us consider instead what lesser ambition scientists might

entertain for science.

Many young scientists hope that the science they come to love can be the agent of a social transformation leading to the betterment of mankind; accordingly they lament that so few politicians are scientifically trained and that so few have a deep understanding of the promise and the accomplishments of science. These lamentations betray a deep misunderstanding of the nature of the most exigent problems that confront the world: the problems of overpopulation and of achieving harmonious coexistence in a multiracial society. These are not scientific problems and do not admit of scientific solutions. This does not mean that scientists are confined to being shocked spectators of events or political dispositions that threaten the well-being of nations and ultimately mankind; scientists, as scientists, will find that they have necessary and distinctive contributions to make to the solution of these problems—but they are solutions that fall short of ushering in the millennium.

As to overpopulation, for example, they can try to devise harmless and acceptable methods of birth control—not at all an easy task, considering how much of an organism's physiology and behavioral repertoire is devoted to the propagation of its land. But supposing them to be successful, they will have no special skills for solving the subsequent political, administrative, and educational problems of bringing these contraceptive measures into use among peoples who cannot read hortatory pamphlets, are not well used to taking precautions, and may anyway want to have as many children as possible.

Again, what can a scientist as such do about interracial tensions? Here his function is more likely to be critical than political; he will expose, maybe, the preposterous pretensions of racism and the whole farrago of genetic elitism that grew out of the writings of wicked old Sir Francis Galton. He may in the end convince political wrongdoers in the domain of race relations that they must not look to science to uphold or condone their malefactions. There are, in short, innumerable ways in which scientists can work for the melioration of human affairs.

The functions of a social mechanic or critic might be thought by many scientists to diminish their own—and science's—standing in the world. These would be mean-minded sentiments, though, and scientists will lose the influence they ought to and can exert if their pretensions are too grand or the claims they make for the efficacy of science exceed its capabilities.

The role I envisage for the scientist is that which may be described as “scientific meliorism.” A meliorist is simply one who believes that the world can be made a better place (“Ah, but what do you mean by better?” and so on, and so on) by human action wisely undertaken; meliorists, moreover, believe that they can undertake it. Legislators and administrators are, characteristically meliorists, and the thought that they are so is an important element of their personal *raison d'être*. They realize that improvements are most likely to be brought about by identifying what is amiss and then trying to put it right—by procedures that fall short of transforming the whole of society or recasting the entire legal system. Meliorists are comparatively humble people who try to do good and are made happy by evidence that it has been done. This is ambition enough for a wise scientist, and it does not by any means diminish science; the declared purpose of the oldest and most famous scientific society in the world is no more grandiose than that of “improving natural knowledge.”

### 12.2.7 Edward O. Wilson

Edward O. Wilson (1929–2021) was a world-renowned expert on entomology and evolutionary biology. In his book *Letters to a Young Scientist*, he described common (though certainly not universal or prerequisite) characteristics of the mindset of future creators. He also emphasized the fact that revolutionary ideas are usually created by individuals, even though it often ultimately requires a team to fully realize those ideas [Wilson 2014, pp. 91–93]:

The conventional wisdom holds that science of the future will be more and more the product of “teamthink,” multiple minds put in close contact. [...]

But is groupthink the best way to create really new science? Risking heresy, I hereby dissent. I believe the creative process usually unfolds in a very different way. It arises and for a while germinates in a solitary brain. It commences as an idea and, equally important, the ambition of a single person who is prepared and strongly motivated to make discoveries in one domain of science or another. The successful innovator is favored by a fortunate combination of talent and circumstance, and is socially conditioned by family, friends, teachers, and mentors, and by stories of great scientists and their discoveries. He (or she) is sometimes driven, I will dare to suggest, by a passive-aggressive nature, and sometimes an anger against some part of society or problem in the world. There is also an introversion in the innovator that keeps him from team sports and social events. He dislikes authority, or at least being told what to do. He is not a leader in high school or college, nor is he likely to be pledged by social clubs. From an early age he is a dreamer, not a doer. His attention wanders easily. He likes to probe, to collect, to tinker. He is prone to fantasize. He is not inclined to focus. He will not be voted by his classmates most likely to succeed.

When prepared by education to conduct research, the most innovative scientists of my experience do so eagerly and with no prompting. They prefer to take first steps alone. They seek a problem to be solved, an important phenomenon previously overlooked, a cause-and-effect connection never imagined. An opportunity to be the first is their smell of blood. [...]

An innovator may [later] add a mathematician or statistician, a computer expert, a natural-products chemist, one or several laboratory or field assistants, a colleague or two in the same specialty—whoever it takes for the project to succeed becomes a col-laborator.

Of course, not all revolutionary innovations arise as Wilson outlined, and not all revolutionary innovators possess all the characteristics that Wilson attributed to them. Nonetheless, his words do describe frequent patterns. I highly recommend reading all of his book.

### 12.2.8 Carl Sagan

Carl Sagan (1934–1996) was a professor of astronomy and planetary science at Cornell and worked closely with NASA to plan and to analyze data sent back by several robotic interplanetary probes. He is best remembered as a skilled explainer of science to the public through his many books and lectures and his *Cosmos* television miniseries.

Some future creators might be lucky enough to be surrounded by excellent teachers and mentors, but many will not. Students who aspire to be future creators should educate themselves at least in part, and perhaps in whole if necessary. Books are an enormous part of self-education. Sagan eloquently summarized the power of books [Sagan 1995, p. 357]:

Books, purchasable at low cost, permit us to interrogate the past with high accuracy; to tap the wisdom of our species; to understand the point of view of others, and not just those in power; to contemplate—with the best teachers—the insights, painfully extracted from Nature, of the greatest minds that ever were, drawn from the entire planet and from all of our history. They allow people long dead to talk inside our heads. Books can accompany us everywhere. Books are patient where we are slow to understand, allow us to go over the hard parts as many times as we wish, and are never critical of our lapses. Books are key to understanding the world and participating in a democratic society.

For the reasons that Sagan described, textbooks are often better than the best in-person teachers that one can find. (See also Santiago Ramón y Cajal on p. 173.) For recommendations of some of the very best science-related textbooks, see Section 1.2.3.1. As Sagan mentioned, one can also learn far more than just scientific facts from books. One can relive the experiences and hear the opinions of both scientists and nonscientists, and learn about everything from the universe to human nature.

Sagan addressed another topic that is important for future creators: always being willing to seriously consider new ideas from yourself or from other sources, while simultaneously rigorously evaluating all ideas, new or old, to find the best and most accurate ones [Sagan 1995, pp. 304–306]:

[A]t the heart of science is an essential balance between two seemingly contradictory attitudes—an openness to new ideas, no matter how bizarre or counterintuitive, and the most ruthlessly skeptical scrutiny of all ideas, old and new. This is how deep truths are winnowed from deep nonsense. The collective enterprise of creative thinking *and* skeptical thinking, working together, keeps the field on track. Those two seemingly contradictory attitudes are, though, in some tension. [...]

If you're only skeptical, then no new ideas make it through to you. You never can learn anything. You become a crotchety misanthrope convinced that nonsense is ruling the world. (There is, of course, much data to support you.) Since major discoveries at the borderlines of science are rare, experience will tend to confirm your grumpiness. But every now and then a new idea turns out to be on the mark, valid and wonderful. If you're too resolutely and uncompromisingly skeptical, you're going to miss (or resent) the transforming discoveries in science, and either way you will be obstructing understanding and progress. Mere skepticism is not enough.

At the same time, science requires the most vigorous and uncompromising skepticism, because the vast majority of ideas are simply wrong, and the only way to winnow the wheat from the chaff is by critical experiment and analysis. If you're open to the point

of gullibility and have not a microgram of skeptical sense in you, then you cannot distinguish the promising ideas from the worthless ones. Uncritically accepting every proffered notion, idea, and hypothesis is tantamount to knowing nothing. Ideas contradict one another; only through skeptical scrutiny can we decide among them. Some ideas really are better than others.

The judicious mix of these two modes of thought is central to the success of science. Good scientists do both. On their own, talking to themselves, they churn up many new ideas, and criticize them systematically. Most of the ideas never make it to the outside world. Only those that pass a rigorous self-filtration make it out to be criticized by the rest of the scientific community.

Because of this dogged mutual criticism and self-criticism, and the proper reliance on experiment as the arbiter between contending hypotheses, many scientists tend to be diffident about describing their own sense of wonder at the dawning of a wild surmise. This is a pity, because these rare exultant moments demystify and humanize the scientific endeavor. [...]

Both skepticism and wonder are skills that need honing and practice. Their harmonious marriage within the mind of every schoolchild ought to be a principal goal of public education. I'd love to see such a domestic felicity portrayed in the media, television especially: a community of people really working the mix—full of wonder, generously open to every notion, dismissing nothing except for good reason, but at the same time, and as second nature, demanding stringent standards of evidence—and these standards applied with at least as much rigor to what they hold dear as to what they are tempted to reject with impunity.

In practice, most people fail to do a satisfactory job at one (or both) of the tasks that Sagan outlined above. Future creators should always make sure are doing both, and doing them as well as they can.

On 7 February 1988, when there was still a Cold War between the United States and Soviet Union, Sagan published an essay in *Parade* magazine about “The Common Enemy” that those and other countries face, and which they should work together to overcome [reprinted in Sagan 1997, Ch. 14]. Although the details of global politics have changed in the decades since then, many points that he made are still generally applicable:

An alien invasion is, of course, unlikely. But there is a common enemy—in fact, a range of common enemies, some of unprecedented menace, each unique to our time. They derive from our growing technological powers and from our reluctance to forgo perceived short-term advantages for the longer-term well-being of our species.

The innocent act of burning coal and other fossil fuels increases the carbon dioxide greenhouse effect and raises the temperature of the Earth, so that in less than a century, according to some projections, the American Midwest and the Soviet Ukraine—current breadbaskets of the world—may be converted into something approaching scrub deserts. Inert, apparently harmless gases used in refrigeration deplete the protective ozone layer; they increase the amount of deadly ultraviolet radiation from the Sun that reaches the surface of the Earth, destroying vast numbers of unprotected microorganisms that lie at the base of a poorly understood food chain—at the top of which precariously teeter



we. American industrial pollution destroys forests in Canada. A Soviet nuclear reactor accident endangers the ancient culture of Lapland. Raging epidemic disease spreads worldwide, accelerated by modern transportation technology. And inevitably there will be other perils that with our usual bumbling, short-term focus, we have not yet even discovered. [...]

It is evident that many national institutions and dogmas, however effective they may once have been, are now in need of change. No nation is yet well-fitted to the world of the twenty-first century. The challenge then is not in selective glorification of the past, or in defending national icons, but in devising a path that will carry us through a time of great mutual peril. To accomplish this, we need all the help we can get.

A central lesson of science is that to understand complex issues (or even simple ones), we must try to free our minds of dogma and to guarantee the freedom to publish, to contradict, and to experiment. Arguments from authority are unacceptable. We are all fallible, even leaders. But however clear it is that criticism is necessary for progress, governments tend to resist. The ultimate example is Hitler's Germany. Here is an excerpt from a speech by the Nazi Party leader Rudolf Hess on June 30, 1934: "One man remains beyond all criticism, and that is the Führer. This is because everyone senses and knows: He is always right, and he will always be right. The National Socialism of all of us in anchored in uncritical loyalty, in a surrender to the Führer."

The convenience of such a doctrine for national leaders is further clarified by Hitler's remark: "What good fortune for those in power that people do not think!" Widespread intellectual and moral docility may be convenient for leaders in the short term, but it is suicidal for nations in the long term. One of the criteria for national leadership should therefore be a talent for understanding, encouraging, and making constructive use of vigorous criticism. [...]

[W]hat passes for public debate is still, on closer examination, mainly repetition of national slogans, appeal to popular prejudice, innuendo, self-justification, misdirection, incantation of homilies when evidence is asked for, and a thorough contempt for the intelligence of the citizenry. What we need is an admission of how little we actually know about how to pass safely through the next few decades, the courage to examine a wide range of alternative programs, and, most of all, a dedication not to dogma but to solutions. Finding any solution will be hard enough. Finding ones that perfectly correspond to eighteenth- or nineteenth-century political doctrines will be much more difficult.

Our two nations must help one another figure out what changes must be made; the changes must help both sides; and our perspective must embrace a future beyond the next Presidential term of office or the next Five Year Plan. We need to reduce military budgets; raise living standards; engender respect for learning; support science, scholarship, invention, and industry; promote free inquiry; reduce domestic coercion; involve the workers more in managerial decisions; and promote a genuine respect and understanding derived from an acknowledgment of our common humanity and our common jeopardy.

Although we must cooperate to an unprecedented degree, I am not arguing against healthy competition. But let us compete in finding ways to reverse the nuclear arms

race and to make massive reductions in conventional forces; in eliminating government corruption; in making most of the world agriculturally self-sufficient. Let us vie in art and science, in music and literature, in technological innovation. Let us have an honesty race. Let us compete in relieving suffering and ignorance and disease; in respecting national independence worldwide; in formulating and implementing an ethic for responsible stewardship of the planet.

Let us learn from one another. Capitalism and socialism have been mutually borrowing methods and doctrine in largely unacknowledged plagiarisms for a century. Neither the U.S. nor the Soviet Union has a monopoly on truth and virtue. I would like to see us compete in cooperativeness. In the 1970s, apart from treaties constraining the nuclear arms race, we had some notable successes in working together—the elimination of smallpox worldwide, efforts to prevent South African nuclear weapons development, the *Apollo-Soyuz* joint manned spaceflight. We can do much better. Let us begin with a few joint projects of great scope and vision—in relief of starvation, especially in nations such as Ethiopia, which are victimized by superpower rivalry; in identifying and defusing long-term environmental catastrophes that are products of our technology; in fusion physics to provide a safe energy source for the future; in joint exploration of Mars, culminating in the first landing of human beings—Soviets and Americans—on another planet.

Perhaps we will destroy ourselves. Perhaps the common enemy within us will be too strong for us to recognize and overcome. Perhaps the world will be reduced to medieval conditions or far worse.

But I have hope. Lately there are signs of change—tentative but in the right direction and, by previous standards of national behavior, swift. Is it possible that we—we Americans, we Soviets, we humans—are at last coming to our senses and beginning to work together on behalf of the species and the planet?

Nothing is promised. History has placed this burden on our shoulders. It is up to us to build a future worthy of our children and grandchildren.

After the end of the Cold War, and shortly before his death, Sagan published *The Demon-Haunted World: Science as a Candle in the Dark*. In explaining the title of the book, he wrote about the risk of the United States (or other countries) abandoning science, reason, and democracy for scams, delusions, and demagoguery [Sagan 1995, pp. 25–27]:

I have a foreboding of an America in my children's or grandchildren's time—when the United States is a service and information economy; when nearly all the manufacturing industries have slipped away to other countries; when awesome technological powers are in the hands of a very few, and no one representing the public interest can even grasp the issues; when the people have lost the ability to set their own agendas or knowledgeably question those in authority; when, clutching our crystals and nervously consulting our horoscopes, our critical faculties in decline, unable to distinguish between what feels good and what's true, we slide, almost without noticing, back into superstition and darkness.

The dumbing down of America is most evident in the slow decay of substantive content in the enormously influential media, the 30-second sound bites (now down to 10

seconds or less), lowest common denominator programming, credulous presentations on pseudoscience and superstition, but especially a kind of celebration of ignorance. [...] The plain lesson is that study and learning—not just of science, but of anything—are avoidable, even undesirable.

We've arranged a global civilization in which the most crucial elements—transportation, communications, and all other industries; agriculture, medicine, education, entertainment, protecting the environment; and even the key democratic institution of voting—profoundly depend on science and technology. We have also arranged things so that almost no one understands science and technology. This is a prescription for disaster. We might get away with it for a while, but sooner or later this combustible mixture of ignorance and power is going to blow up in our faces.

*A Candle in the Dark* is the title of a courageous, largely Biblically based, book by Thomas Ady, published in London in 1656, attacking the witch hunts then in progress as a scam “to delude the people.” Any illness or storm, anything out of the ordinary, was popularly attributed to witchcraft. Witches must exist. Ady quoted the “witchmongers” as arguing—“else how should these things be, or come to pass?” For much of our history, we were so fearful of the outside world, with its unpredictable dangers, that we gladly embraced anything that promised to soften or explain away the terror. Science is an attempt, largely successful, to understand the world, to get a grip on things, to get hold of ourselves, to steer a safe course. Microbiology and meteorology now explain what only a few centuries ago was considered sufficient cause to burn women to death.

Ady also warned of the danger that “the Nations [will] perish for lack of knowledge.” Avoidable human misery is more often caused not so much by stupidity as by ignorance, particularly our ignorance about ourselves. I worry that, especially as the Millennium edges nearer, pseudoscience and superstition will seem year by year more tempting, the siren song of unreason more sonorous and attractive. Where have we heard it before? Whenever our ethnic or national prejudices are aroused, in times of scarcity, during challenges to national self-esteem or nerve, when we agonize about our diminished cosmic place and purpose, or when fanaticism is bubbling up around us—then, habits of thought familiar from ages past reach for the controls.

The candle flame gutters. Its little pool of light trembles. Darkness gathers. The demons begin to stir.

A little later in the book, Sagan added [Sagan 1995, pp. 38–39]:

The values of science and the values of democracy are concordant, in many cases indistinguishable. Science and democracy began—in their civilized incarnations—in the same time and place, Greece in the seventh and sixth centuries B.C. Science confers power on anyone who takes the trouble to learn it (although too many have been systematically prevented from doing so). Science thrives on, indeed requires, the free exchange of ideas; its values are antithetical to secrecy. Science holds to no special vantage points or privileged positions. Both science and democracy encourage unconventional opinions and vigorous debate. Both demand adequate reason, coherent argument, rigorous standards of evidence and honesty. Science is a way to call the bluff of those who only pretend to knowledge. It is a bulwark against mysticism, against superstition, against religion misapplied to where it has no business being. If we're true to its values, it can tell

us when we're being lied to. It provides a mid-course correction to our mistakes. The more widespread its language, rules, and methods, the better chance we have of preserving what Thomas Jefferson and his colleagues had in mind. But democracy can also be subverted more thoroughly through the products of science than any pre-industrial demagogue ever dreamed.

Finding the occasional straw of truth awash in a great ocean of confusion and bamboozle requires vigilance, dedication, and courage. But if we don't practice tough habits of thought, we cannot hope to solve the truly serious problems that face us—and we risk becoming a nation of suckers, up for grabs by the next charlatan who saunters along.

[...]

An extraterrestrial being, newly arrived on Earth—scrutinizing what we mainly present to our children in television, radio, movies, newspapers, magazines, the comics, and many books—might easily conclude that we are intent on teaching them murder, rape, cruelty, superstition, credulity, and consumerism. We keep at it, and through constant repetition many of them finally get it. What kind of society could we create if, instead, we drummed into them science and a sense of hope?

Sagan elaborated on the power of charlatans to “bamboozle” members of the public [Sagan 1995, p. 241]:

One of the saddest lessons of history is this: If we've been bamboozled long enough, we tend to reject any evidence of the bamboozle. We're no longer interested in finding out the truth. The bamboozle has captured us. It's simply too painful to acknowledge, even to ourselves, that we've been taken. Once you give a charlatan power over you, you almost never get it back.

In a later chapter of the book, Sagan further explained upon his concerns [Sagan 1995, pp. 414–416]:

It is possible—given absolute control over the media and the police—to rewrite the memories of hundreds of millions of people, if you have a generation to accomplish it in. Almost always, this is done to improve the hold that the powerful have on power, or to serve the narcissism or megalomania or paranoia of national leaders. It throws a monkey wrench into the error-correcting machinery. It works to erase public memory of profound political mistakes, and thus to guarantee their eventual repetition.

In our time, with total fabrication of realistic stills, motion pictures, and videotapes technologically within reach, with television in every home, and with critical thinking in decline, restructuring societal memories even without much attention from the secret police seems possible. [...S]mall numbers of people will have so much control over news stories, history books, and deeply affecting images as to work major changes in collective attitudes. [...]

Trends working at least marginally towards the implantation of a very narrow range of attitudes, memories, and opinions include control of major television networks and newspapers by a small number of similarly motivated powerful corporations and individuals, the disappearance of competitive daily newspapers in many cities, the replacement of substantive debate by sleaze in political campaigns, and episodic erosion of the principle of the separation of powers. [...]

Ethnocentrism, xenophobia, and nationalism are these days rife in many parts of the world. Government repression of unpopular views is still widespread. False or misleading memories are inculcated. For the defenders of such attitudes, science is disturbing.

At the very end of the book, Sagan summarized his hopes and concerns [Sagan 1995, pp. 424–434]:

There is no nation on Earth today optimized for the middle of the twenty-first century. We face an abundance of subtle and complex problems. We need therefore subtle and complex solutions. Since there is no deductive theory of social organization, our only recourse is scientific experiment—trying out sometimes on small scales (community, city and state level, say) a wide range of alternatives. One of the perquisites of power on becoming prime minister in China in the fifth century BC was that you got to construct a model state in your home district or province. It was Confucius' chief life failing, he lamented, that he never got to try.

Even a casual scrutiny of history reveals that we humans have a sad tendency to make the same mistakes again and again. We're afraid of strangers or anybody who's a little different from us. When we get scared, we start pushing people around. We have readily accessible buttons that release powerful emotions when pressed. We can be manipulated into utter senselessness by clever politicians. Give us the right kind of leader and, like the most suggestible subjects of the hypnotherapists, we'll gladly do just about anything he wants—even things we know to be wrong. The framers of the Constitution were students of history. In recognition of the human condition, they sought to invent a means that would keep us free in spite of ourselves. [...]

Jefferson was an early hero of mine, not because of his scientific interests (although they very much helped to mould his political philosophy), but because he, almost more than anyone else, was responsible for the spread of democracy throughout the world. The idea—breathhtaking, radical, and revolutionary at the time (in many places in the world, it still is) is that not kings, not priests, not big city bosses, not dictators, not a military cabal, not a *de facto* conspiracy of the wealthy, but ordinary people, working together, are to rule the nations. Not only was Jefferson a leading theoretician of this cause; he was also involved in the most practical way, helping to bring about the great American political experiment that has, all over the world, been admired and emulated since. [...]

He had written in the Declaration of Independence that we all must have the same opportunities, the same “unalienable” rights. And if the definition of “all” was disgracefully incomplete in 1776, the spirit of the Declaration was generous enough that today “all” is far more inclusive. [See Section 12.3.6.]

Jefferson was a student of history—not just the compliant and safe history that praises our own time or country or ethnic group, but the real history of real humans, our weaknesses as well as our strengths. History taught him that the rich and powerful will steal and oppress if given half a chance. He described the governments of Europe, which he saw at first hand as the American ambassador to France. Under the pretense of government, he said, they had divided their nations into two classes: wolves and sheep. Jefferson taught that every government degenerates when it is left to the rulers alone, because rulers—by the very act of ruling—misuse the public trust. The people themselves, he said, are the only prudent repository of power.

But he worried that the people—and the argument goes back to Thucydides and Aristotle—are easily misled. So he advocated safeguards, insurance policies. One was the constitutional separation of powers; accordingly, various groups, some pursuing their own selfish interests, balance one another, preventing any one of them from running away with the country: the executive, legislative and judicial branches; the House and the Senate; the States and the Federal Government. He also stressed, passionately and repeatedly, that it was essential for the people to understand the risks and benefits of government, to educate themselves, and to involve themselves in the political process. Without that, he said, the wolves will take over. Here's how he put it in *Notes on Virginia*, stressing how the powerful and unscrupulous find zones of vulnerability they can exploit:

In every government on earth is some trace of human weakness, some germ of corruption and degeneracy, which cunning will discover and wickedness insensibly open, cultivate and improve. Every government degenerates when trusted to the rulers of the people alone. The people themselves therefore are its only safe depositories. And to render even them safe, their minds must be improved . . . [...]

He argued that the cost of education is trivial compared to the cost of ignorance, of leaving the government to the wolves. He taught that the country is safe only when the people rule. [...]

When we consider the founders of our nation—Jefferson, Washington, Samuel and John Adams, Madison and Monroe, Benjamin Franklin, Tom Paine and many others—we have before us a list of at least ten and maybe even dozens of great political leaders. They were well-educated. Products of the European Enlightenment, they were students of history. They knew human fallibility and weakness and corruptibility. They were fluent in the English language. They wrote their own speeches. They were realistic and practical, and at the same time motivated by high principles. They were not checking the pollsters on what to think this week. They knew what to think. They were comfortable with long-term thinking, planning even further ahead than the next election. They were self-sufficient, not requiring careers as politicians or lobbyists to make a living. They were able to bring out the best in us. They were interested in and, at least two of them, fluent in science. They attempted to set a course for the United States into the far future—not so much by establishing laws as by setting limits on what kinds of laws could be passed.

The Constitution and its Bill of Rights have done remarkably well, constituting, despite human weaknesses, a machine able, more often than not, to correct its own trajectory.

At that time, there were only about two and a half million citizens of the United States. Today there are about a hundred times more. So if there were ten people of the caliber of Thomas Jefferson then, there ought to be  $10 \times 100 = 1,000$  Thomas Jeffersons today.

Where are they?

One reason the Constitution is a daring and courageous document is that it allows for continuing change, even of the form of government itself, if the people so wish. Because no one is wise enough to foresee which ideas may answer urgent societal needs—even

if they're counterintuitive and have been troubling in the past—this document tries to guarantee the fullest and freest expression of views. [...]

New ideas, invention, and creativity in general, always spearhead a kind of freedom—a breaking out from hobbling constraints. Freedom is a prerequisite for continuing the delicate experiment of science—which is one reason the Soviet Union could not remain a totalitarian state and be technologically competitive. At the same time, science—or rather its delicate mix of openness and skepticism, and its encouragement of diversity and debate—is a prerequisite for continuing the delicate experiment of freedom in an industrial and highly technological society. [...]

Now it's no good to have such rights if they're not used—a right of free speech when no one contradicts the government, freedom of the press when no one is willing to ask the tough questions, a right of assembly when there are no protests, universal suffrage when less than half the electorate votes, separation of church and state when the wall of separation is not regularly repaired. Through disuse they can become no more than votive objects, patriotic lip-service. Rights and freedoms: use 'em or lose 'em.

Due to the foresight of the framers of the Bill of Rights—and even more so to all those who, at considerable personal risk, insisted on exercising those rights—it's hard now to bottle up free speech. School library committees, the immigration service, the police, the FBI—or the ambitious politician looking to score cheap votes—may attempt it from time to time, but sooner or later the cork pops. The Constitution is, after all, the law of the land, public officials are sworn to uphold it, and activists and the courts episodically hold their feet to the fire.

However, through lowered educational standards, declining intellectual competence, diminished zest for substantive debate, and social sanctions against skepticism, our liberties can be slowly eroded and our rights subverted. The Founders understood this well: “The time for fixing every essential right on a legal basis is while our rulers are honest, and ourselves united,” said Thomas Jefferson. [...]

Education on the value of free speech and the other freedoms reserved by the Bill of Rights, about what happens when you don't have them, and about how to exercise and protect them, should be an essential prerequisite for being an American citizen—or indeed a citizen of any nation, the more so to the degree that such rights remain unprotected. If we can't think for ourselves, if we're unwilling to question authority, then we're just putty in the hands of those in power. But if the citizens are educated and form their own opinions, then those in power work for *us*. In every country, we should be teaching our children the scientific method and the reasons for a Bill of Rights. With it comes a certain decency, humility and community spirit. In the demon-haunted world that we inhabit by virtue of being human, this may be all that stands between us and the enveloping darkness.

Unfortunately, the societal defects that Sagan perceived or feared in 1995 have grown exponentially in the decades since then, greatly impacting both scientists and non-scientists alike. Moreover, these pathologies now affect not only the United States, but to varying degrees most countries around the world. I'm afraid that future creators will have to face these problems (or even worse). Hopefully they will not be overpowered by these problems; perhaps they can find ways to finally solve them.

## 12.3 Advice from Non-Scientific Innovators

There have also been countless innovators who were not scientists. Even though they were not trying to solve scientific problems, they did have to develop very creative solutions to the types of problems that they did focus on. In addition, along the way, they had to face and overcome many of the same sorts of non-scientific obstacles that scientists also encounter: difficulties in finding financial and political support, personal struggles, attacks from people and organizations that opposed them, etc. Thus scientists may find inspiration or at least consolation by reading books by or about non-scientific innovators.

The most helpful books concern people who were both (a) highly innovative and (b) deeply committed to helping others through their innovations, not just using their innovations to gain fame, fortune, or power for themselves. (Of course, it may also prove useful to learn about the approaches taken by people who were highly innovative but not philanthropic, or deeply committed to helping people but not especially innovative.)

This section presents excerpts from some of the sources (in chronological order) that I have personally found helpful:

12.3.1. Sun Tzu

12.3.2. Confucius

12.3.3. The Bible

12.3.4. Marcus Aurelius

12.3.5. Niccolò Machiavelli

12.3.6 United States Declaration of Independence and Constitution

12.3.7. Louisa May Alcott

12.3.8. Statue of Liberty

12.3.9. Anton Chekhov

12.3.10. Rudyard Kipling

12.3.11. Rainer Maria Rilke

12.3.12. C. P. Snow



12.3.13. Dietrich Bonhoeffer

12.3.14. United Nations Universal Declaration of Human Rights

12.3.15. Ferdinand Demara, Jr. and Frank Abagnale, Jr.

12.3.16. Walter M. Miller, Jr.

12.3.17. Jimmy Carter

12.3.18. Daniel Keyes

12.3.19. Fred Rogers

12.3.20. Martin Luther King, Jr.

12.3.21. 14th Dalai Lama

12.3.22. Joseph Brodsky

12.3.23. Octavia Butler

Please seek out authors who feel especially meaningful for you. For some additional examples of important non-scientific innovators, see Section 1.2.3.6.

Most importantly, as you read these sources, pay careful attention to what principles they teach and practice regarding the proper behavior of individuals, groups, and society. Then consider which of those principles you would like to adopt or modify for your own life. You will also notice that some principles appear repeatedly among the various sources in this section and in Section 12.2.

### 12.3.1 Sun Tzu

*The Art of War* is an ancient Chinese book of advice regarding military strategy. Tradition holds that it was written by a retired general, Sun Tzu, around 500 B.C., although some parts may have come from earlier or later authors.

Much of the advice in *The Art of War* is so far-reaching and insightful that it can be applied to situations other than physical combat. Some of the advice is helpful if read in the context of the best strategies for attacking a scientific problem instead of a military opponent. Other parts may be applied to strategies for winning political and/or financial support for a project.

I recommend that future creators should do everything within their power to avoid making political enemies, and that they should try to mollify or avoid any enemies that do exist. Yet despite a creator's best efforts, it is inevitable that some people will declare themselves to be fiercely opposed to the creator and/or the creator's scientific innovations. Such opponents will often attack the creator or their projects in ways that violate scientific, institutional, legal, or ethical principles. In these situations, the creator must be prepared to defend against the attacks as effectively yet as properly as possible, and even to counterattack in ways that are both necessary and appropriate. *The Art of War* can be especially helpful in thinking about (completely nonviolent, legal, and ethical) strategies for dealing with such political opponents.

Lionel Giles translated *The Art of War* into English in 1910, and that complete translation is now freely available on the internet.<sup>11</sup> I strongly urge you to read the whole work, but below are some excerpts that seem especially relevant to one or more of the above applications:

#### Book I. Laying Plans

16. While heeding the profit of my counsel, avail yourself also of any helpful circumstances over and beyond the ordinary rules.

17. According as circumstances are favorable, one should modify one's plans.

26. Now the general who wins a battle makes many calculations in his temple ere the battle is fought. The general who loses a battle makes but few calculations beforehand. Thus do many calculations lead to victory, and few calculations to defeat: how much more no calculation at all! It is by attention to this point that I can foresee who is likely to win or lose.

#### Book II. Waging War

17. Therefore in chariot fighting, when ten or more chariots have been taken, those should be rewarded who took the first. Our own flags should be substituted for those of the enemy, and the chariots mingled and used in conjunction with ours. The captured soldiers should be kindly treated and kept.

18. This is called, using the conquered foe to augment one's own strength.

#### Book III. Attack by Strategem

1. Sun Tzu said: In the practical art of war, the best thing of all is to take the enemy's country whole and intact; to shatter and destroy it is not so good. So, too, it is better

<sup>11</sup><https://archive.org/details/artofwaroldestmi00suntuoft>

<https://gutenberg.org/ebooks/17405>

to recapture an army entire than to destroy it, to capture a regiment, a detachment or a company entire than to destroy them.

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

3. Thus the highest form of generalship is to balk the enemy's plans; the next best is to prevent the junction of the enemy's forces; the next in order is to attack the enemy's army in the field; and the worst policy of all is to besiege walled cities.

6. Therefore the skillful leader subdues the enemy's troops without any fighting; he captures their cities without laying siege to them; he overthrows their kingdom without lengthy operations in the field.

17. Thus we may know that there are five essentials for victory: (1) He will win who knows when to fight and when not to fight. (2) He will win who knows how to handle both superior and inferior forces. (3) He will win whose army is animated by the same spirit throughout all its ranks. (4) He will win who, prepared himself, waits to take the enemy unprepared. (5) He will win who has military capacity and is not interfered with by the sovereign.

#### Book IV. Tactical Dispositions

8. To see victory only when it is within the ken of the common herd is not the acme of excellence.

9. Neither is it the acme of excellence if you fight and conquer and the whole Empire says, "Well done!"

10. To lift an autumn hair is no sign of great strength; to see the sun and moon is no sign of sharp sight; to hear the noise of thunder is no sign of a quick ear.

11. What the ancients called a clever fighter is one who not only wins, but excels in winning with ease.

12. Hence his victories bring him neither reputation for wisdom nor credit for courage.

13. He wins his battles by making no mistakes. Making no mistakes is what establishes the certainty of victory, for it means conquering an enemy that is already defeated.

14. Hence the skillful fighter puts himself into a position which makes defeat impossible, and does not miss the moment for defeating the enemy.

16. The consummate leader cultivates the moral law, and strictly adheres to method and discipline; thus it is in his power to control success.

#### Book V. Energy

1. Sun Tzu said: The control of a large force is the same principle as the control of a few men: it is merely a question of dividing up their numbers.

2. Fighting with a large army under your command is nowise different from fighting with a small one: it is merely a question of instituting signs and signals.

21. The clever combatant looks to the effect of combined energy, and does not require too much from individuals. Hence his ability to pick out the right men and utilize combined energy.

#### Book VI. Weak Points and Strong

1. Sun Tzu said: Whoever is first in the field and awaits the coming of the enemy, will be fresh for the fight; whoever is second in the field and has to hasten to battle will arrive exhausted.

2. Therefore the clever combatant imposes his will on the enemy, but does not allow the enemy's will to be imposed on him.

5. Appear at points which the enemy must hasten to defend; march swiftly to places where you are not expected.

6. An army may march great distances without distress, if it marches through country where the enemy is not.

7. You can be sure of succeeding in your attacks if you only attack places which are undefended. You can ensure the safety of your defense if you only hold positions that cannot be attacked.

8. Hence that general is skillful in attack whose opponent does not know what to defend; and he is skillful in defense whose opponent does not know what to attack.

11. If we wish to fight, the enemy can be forced to an engagement even though he be sheltered behind a high rampart and a deep ditch. All we need do is attack some other place that he will be obliged to relieve.

12. If we do not wish to fight, we can prevent the enemy from engaging us even though the lines of our encampment be merely traced out on the ground. All we need do is to throw something odd and unaccountable in his way.

13. By discovering the enemy's dispositions and remaining invisible ourselves, we can keep our forces concentrated, while the enemy's must be divided.

14. We can form a single united body, while the enemy must split up into fractions. Hence there will be a whole pitted against separate parts of a whole, which means that we shall be many to the enemy's few.

22. Though the enemy be stronger in numbers, we may prevent him from fighting. Scheme so as to discover his plans and the likelihood of their success.

24. Carefully compare the opposing army with your own, so that you may know where strength is superabundant and where it is deficient.

28. Do not repeat the tactics which have gained you one victory, but let your methods be regulated by the infinite variety of circumstances.

33. He who can modify his tactics in relation to his opponent and thereby succeed in winning, may be called a heaven-born captain.

#### Book VII. Maneuvering

5. Maneuvering with an army is advantageous; with an undisciplined multitude, most dangerous.

12. We cannot enter into alliances until we are acquainted with the designs of our neighbors.

13. We are not fit to lead an army on the march unless we are familiar with the face of the country—its mountains and forests, its pitfalls and precipices, its marshes and swamps.

14. We shall be unable to turn natural advantage to account unless we make use of local guides.

20. When you plunder a countryside, let the spoil be divided amongst your men; when you capture new territory, cut it up into allotments for the benefit of the soldiery.

21. Ponder and deliberate before you make a move.

27. A whole army may be robbed of its spirit; a commander-in-chief may be robbed of his presence of mind.

28. Now a soldier's spirit is keenest in the morning; by noonday it has begun to flag; and in the evening, his mind is bent only on returning to camp.

29. A clever general, therefore, avoids an army when its spirit is keen, but attacks it when it is sluggish and inclined to return. This is the art of studying moods.

30. Disciplined and calm, to await the appearance of disorder and hubbub amongst the enemy—this is the art of retaining self-possession.

36. When you surround an army, leave an outlet free. Do not press a desperate foe too hard.

#### Book VIII. Variation in Tactics

11. The art of war teaches us to rely not on the likelihood of the enemy's not coming, but on our own readiness to receive him; not on the chance of his not attacking, but rather on the fact that we have made our position unassailable.

12. There are five dangerous faults which may affect a general: (1) recklessness, which leads to destruction; (2) cowardice, which leads to capture; (3) a hasty temper, which can be provoked by insults; (4) a delicacy of honor which is sensitive to shame; (5) over-solicitude for his men, which exposes him to worry and trouble.

#### Book IX. The Army on the March

35. The sight of men whispering together in small knots or speaking in subdued tones points to disaffection amongst the rank and file.

36. Too frequent rewards signify that the enemy is at the end of his resources; too many punishments betray a condition of dire distress.

37. To begin by bluster, but afterwards to take fright at the enemy's numbers, shows a supreme lack of intelligence.

41. He who exercises no forethought but makes light of his opponents is sure to be captured by them.

Book X. Terrain

14. Now an army is exposed to six various calamities, not arising from natural causes, but from faults for which the general is responsible. These are: (1) flight; (2) insubordination; (3) collapse; (4) ruin; (5) disorganization; (6) rout.

15. Other conditions being equal, if one force is hurled against another ten times its size, the result will be the flight of the former.

16. When the common soldiers are too strong and their officers too weak, the result is insubordination. When the officers are too strong and the common soldiers too weak, the result is collapse.

17. When the higher officers are angry and insubordinate, and on meeting the enemy give battle on their own account from a feeling of resentment, before the commander-in-chief can tell whether or not he is in a position to fight, the result is ruin.

18. When the general is weak and without authority; when his orders are not clear and distinct; when there are no fixed duties assigned to officers and men, and the ranks are formed in a slovenly haphazard manner, the result is utter disorganization.

19. When a general, unable to estimate the enemy's strength, allows an inferior force to engage a larger one, or hurls a weak detachment against a powerful one, and neglects to place picked soldiers in the front rank, the result must be rout.

23. If fighting is sure to result in victory, then you must fight, even though the ruler forbid it; if fighting will not result in victory, then you must not fight even at the ruler's bidding.

24. The general who advances without coveting fame and retreats without fearing disgrace, whose only thought is to protect his country and do good service for his sovereign, is the jewel of the kingdom.

25. Regard your soldiers as your children, and they will follow you into the deepest valleys; look upon them as your own beloved sons, and they will stand by you even unto death.

26. If, however, you are indulgent, but unable to make your authority felt; kind-hearted, but unable to enforce your commands; and incapable, moreover, of quelling disorder: then your soldiers must be likened to spoilt children; they are useless for any practical purpose.

27. If we know that our own men are in a condition to attack, but are unaware that the enemy is not open to attack, we have gone only halfway towards victory.

28. If we know that the enemy is open to attack, but are unaware that our own men are not in a condition to attack, we have gone only halfway towards victory.

29. If we know that the enemy is open to attack, and also know that our men are in a condition to attack, but are unaware that the nature of the ground makes fighting

impracticable, we have still gone only halfway towards victory.

30. Hence the experienced soldier, once in motion, is never bewildered; once he has broken camp, he is never at a loss.

#### Book XI. The Nine Situations

15. Those who were called skillful leaders of old knew how to drive a wedge between the enemy's front and rear; to prevent co-operation between his large and small divisions; to hinder the good troops from rescuing the bad, the officers from rallying their men.

16. When the enemy's men were united, they managed to keep them in disorder.

17. When it was to their advantage, they made a forward move; when otherwise, they stopped still.

24. Soldiers when in desperate straits lose the sense of fear. If there is no place of refuge, they will stand firm. If they are in hostile country, they will show a stubborn front. If there is no help for it, they will fight hard.

67. Walk in the path defined by rule, and accommodate yourself to the enemy until you can fight a decisive battle.

68. At first, then, exhibit the coyness of a maiden, until the enemy gives you an opening; afterwards emulate the rapidity of a running hare, and it will be too late for the enemy to oppose you.

#### Book XII. The Attack by Fire

17. Move not unless you see an advantage; use not your troops unless there is something to be gained; fight not unless the position is critical.

18. No ruler should put troops into the field merely to gratify his own spleen; no general should fight a battle simply out of pique.

#### Book XIII. The Use of Spies

4. Thus, what enables the wise sovereign and the good general to strike and conquer, and achieve things beyond the reach of ordinary men, is foreknowledge.

5. Now this foreknowledge cannot be elicited from spirits; it cannot be obtained inductively from experience, nor by any deductive calculation.

6. Knowledge of the enemy's dispositions can only be obtained from other men.

14. Hence it is that which none in the whole army are more intimate relations to be maintained than with spies. None should be more liberally rewarded. In no other business should greater secrecy be preserved.

15. Spies cannot be usefully employed without a certain intuitive sagacity.

16. They cannot be properly managed without benevolence and straightforwardness.

17. Without subtle ingenuity of mind, one cannot make certain of the truth of their reports.

### 12.3.2 Confucius

Confucius is the popular Western name for Kong Fu-Tzu, or “Teacher Kong” (551–479 B.C.). He served as a Chinese government official for parts of his career, and taught students when he was not in government office. Some of his advice to his students was preserved in writing as the *Analects of Confucius*. Over the course of the following centuries, an elaborate religion, Confucianism, grew up around the teachings of Confucius and later writers who were influenced by his writings. However, what Confucius actually taught as preserved in the *Analects* was not any particular religion (although it was compatible with religions), but rather pragmatic advice about government, management, academics, and real-world ethical situations. As such, the *Analects* are highly applicable to revolutionary scientific innovators as they think about what path to pursue in life, how best to interact with other people, what organizations or managers to work for, how to manage other researchers if given the opportunity, and other important considerations. Below are some especially relevant excerpts from the *Analects* (adapted from James Legge’s 1893 English translation):<sup>12</sup>

#### Book I. Hsio R

I. 3. ‘Is he not a man of complete virtue, who feels no discomposure though men may take no note of him?’

XVI. The Master said, ‘I will not be afflicted at men’s not knowing me; I will be afflicted that I do not know men.’

#### Book II. Wei Chang

III. 1. The Master said, ‘If the people be led by laws, and uniformity sought to be given them by punishments, they will try to avoid the punishment, but have no sense of shame. 2. ‘If they be led by virtue, and uniformity sought to be given them by the rules of propriety, they will have the sense of shame, and moreover will become good.’

X. 1. The Master said, ‘See what a man does. 2. ‘Mark his motives. 3. ‘Examine in what things he rests. 4. ‘How can a man conceal his character?’

XV. The Master said, ‘Learning without thought is labour lost; thought without learning is perilous.’

XVII. The Master said, ‘Yu, shall I teach you what knowledge is? When you know a thing, to hold that you know it; and when you do not know a thing, to allow that you do not know it—this is knowledge.’

XIX. The Duke Ai asked, saying, ‘What should be done in order to secure the submission of the people?’ Confucius replied, ‘Advance the upright and set aside the crooked, then the people will submit. Advance the crooked and set aside the upright, then the people will not submit.’

XX. Chi K’ang asked how to cause the people to reverence their ruler, to be faithful to him, and to go on to nerve themselves to virtue. The Master said, ‘Let him preside over them with gravity; then they will reverence him. Let him be filial and kind to all; then they will be faithful to him. Let him advance the good and teach the incompetent; then they will eagerly seek to be virtuous.’

<sup>12</sup>Read the whole book—it is great! <https://www.gutenberg.org/files/3330/3330.txt>  
<https://archive.org/details/chineseclassics01mencgoog/page/n186/mode/2up>



Book IV. Le Jin

V. 1. The Master said, 'Riches and honours are what men desire. If it cannot be obtained in the proper way, they should not be held. Poverty and meanness are what men dislike. If it cannot be avoided in the proper way, they should not be avoided.' 2. 'If a superior man abandon virtue, how can he fulfill the requirements of that name?' 3. 'The superior man does not, even for the space of a single meal, act contrary to virtue. In moments of haste, he cleaves to it. In seasons of danger, he cleaves to it.'

IX. The Master said, 'A scholar, whose mind is set on truth, and who is ashamed of bad clothes and bad food, is not fit to be discoursed with.'

X. The Master said, 'The superior man, in the world, does not set his mind either for anything, or against anything; what is right he will follow.'

XI. The Master said, 'The superior man thinks of virtue; the small man thinks of comfort. The superior man thinks of the sanctions of law; the small man thinks of favours which he may receive.'

XII. The Master said: 'He who acts with a constant view to his own advantage will be much murmured against.'

XIV. The Master said, 'A man should say, I am not concerned that I have no place, I am concerned how I may fit myself for one. I am not concerned that I am not known, I seek to be worthy to be known.'

XVI. The Master said, 'The mind of the superior man is conversant with righteousness; the mind of the mean man is conversant with gain.'

XVII. The Master said, 'When we see men of worth, we should think of equalling them; when we see men of a contrary character, we should turn inwards and examine ourselves.'

XXIII. The Master said, 'The cautious seldom err.'

XXIV. The Master said, 'The superior man wishes to be slow in his speech and earnest in his conduct.'

XXV. The Master said, 'Virtue is not left to stand alone. He who practises it will have neighbors.'

Book V. Kung-Ye Ch'ang

XXIV. The Master said, 'Fine words, an insinuating appearance, and excessive respect—Tso Ch'iu-ming was ashamed of them. I also am ashamed of them. To conceal resentment against a person, and appear friendly with him—Tso Ch'iu-ming was ashamed of such conduct. I also am ashamed of it.'

XXV. 4. Tsze-lu then said, 'I should like, sir, to hear your wishes.' The Master said, 'They are, in regard to the aged, to give them rest; in regard to friends, to show them sincerity; in regard to the young, to treat them tenderly.'

Book VI. Yung Yey

XXIV. Tsai Wo asked, saying, 'A benevolent man, though it be told him, 'There is a man in the well' will go in after him, I suppose.' Confucius said, 'Why should he do so?'

A superior man may be made to go to the well, but he cannot be made to go down into it. He may be imposed upon, but he cannot be fooled.'

XXVIII. 2. 'Now the man of perfect virtue, wishing to be established himself, seeks also to establish others; wishing to be enlarged himself, he seeks also to enlarge others.'

Book VII. Shu R

X. 2. Tsze-lu said, 'If you had the conduct of the armies of a great State, whom would you have to act with you?' 3. The Master said, 'I would not have him to act with me, who will unarmed attack a tiger, or cross a river without a boat, dying without any regret. My associate must be the man who proceeds to action full of solicitude, who is fond of adjusting his plans, and then carries them into execution.'

XVIII. 1. The Duke of Sheh asked Tsze-lu about Confucius, and Tsze-lu did not answer him. 2. The Master said, 'Why did you not say to him, he is simply a man, who in his eager pursuit (of knowledge) forgets his food, who in the joy of its attainment forgets his sorrows, and who does not perceive that old age is coming on?'

XIX. The Master said, 'I am not one who was born in the possession of knowledge; I am one who is fond of antiquity, and earnest in seeking it there.'

XXI. The Master said, 'When I walk along with two others, they may serve me as my teachers. I will select their good qualities and follow them, their bad qualities and avoid them.'

Book VIII. T'ai-Po

II. 1. The Master said, 'Respectfulness, without the rules of propriety, becomes laborious bustle; carefulness, without the rules of propriety, becomes timidity; boldness, without the rules of propriety, becomes insubordination; straightforwardness, without the rules of propriety, becomes rudeness.'

XI. The Master said, 'Though a man have abilities as admirable as those of the Duke of Chau, yet if he be proud and stingy, those other things are really not worth being looked at.'

XIII. 3. 'When a country is well-governed, poverty and a mean condition are things to be ashamed of. When a country is ill-governed, riches and honour are things to be ashamed of.'

XVII. The Master said, 'Learn as if you could not reach your object, and were always fearing also lest you should lose it.'

Book IX. Tsze Han

IV. There were four things from which the Master was entirely free. He had no foregone conclusions, no arbitrary predeterminations, no obstinacy, and no egoism.

Book XII. Yen Yuan

I. 1. Yen Yuan asked about perfect virtue. The Master said, [...] 'Look not at what is contrary to propriety; listen not to what is contrary to propriety; speak not what is contrary to propriety; make no movement which is contrary to propriety.' Yen Yuan

then said, 'Though I am deficient in intelligence and vigour, I will make it my business to practise this lesson.'

II. Chung-kung asked about perfect virtue. The Master said, 'It is, when you go abroad, to behave to every one as if you were receiving a great guest; to employ the people as if you were assisting at a great sacrifice; not to do to others as you would not wish done to yourself; to have no murmuring against you in the country, and none in the family.' Chung-kung said, 'Though I am deficient in intelligence and vigour, I will make it my business to practise this lesson.'

III. 1. Sze-ma Niu asked about perfect virtue. 2. The Master said, 'The man of perfect virtue is cautious and slow in his speech.'

VI. Tsze-chang asked what constituted intelligence. The Master said, 'He with whom neither slander that gradually soaks into the mind, nor statements that startle like a wound in the flesh, are successful, may be called intelligent indeed. Yea, he with whom neither soaking slander, nor startling statements, are successful, may be called farseeing.'

VII. 1. Tsze-kung asked about government. The Master said, 'The requisites of government are that there be sufficiency of food, sufficiency of military equipment, and the confidence of the people in their ruler.' 2. Tsze-kung said, 'If it cannot be helped, and one of these must be dispensed with, which of the three should be foregone first?' 'The military equipment,' said the Master.

XIII. The Master said, 'In hearing lawsuits, I am like any other judge. What is best, however, is to prevent the need for a lawsuit.'

XVI. The Master said, 'The superior man seeks to perfect the admirable qualities of men, and does not seek to perfect their bad qualities. The mean man does the opposite of this.'

XVII. Chi K'ang asked Confucius about government. Confucius replied, 'To govern means to rectify. If you lead on the people with correctness, who will dare not to be correct?'

XVIII. Chi K'ang, distressed about the number of thieves in the state, inquired of Confucius how to do away with them. Confucius said, 'If you, sir, were not covetous, although you should reward them to do it, they would not steal.'

XX. 1. Tsze-chang asked, 'What must the officer be, who may be said to be distinguished?' 2. The Master said, 'What is it you call being distinguished?' 3. Tsze-chang replied, 'It is to be heard of through the State, to be heard of throughout his clan.' 4. The Master said, 'That is notoriety, not distinction. 5. 'Now the man of distinction is solid and straightforward, and loves righteousness. He examines people's words, and looks at their countenances. He is anxious to humble himself to others. Such a man will be distinguished in the country; he will be distinguished in his clan. 6. 'As to the man of notoriety, he assumes the appearance of virtue, but his actions are opposed to it, and he rests in this character without any doubts about himself. Such a man will be heard of in the country; he will be heard of in the clan.'

XXI. 1. Fan Ch'ih rambling with the Master under the trees about the rain altars, said, 'I venture to ask how to exalt virtue, to correct cherished evil, and to discover delusions.'

2. The Master said, 'Truly a good question! 3. 'If doing what is to be done be made the first business, and success a secondary consideration—is not this the way to exalt virtue? To assail one's own wickedness and not assail that of others—is not this the way to correct cherished evil? For a morning's anger to disregard one's own life, and involve that of his parents—is not this a case of delusion?'

XXII. 1. Fan Ch'ih asked about benevolence. The Master said, 'It is to love all men.' He asked about knowledge. The Master said, 'It is to know all men.' 2. Fan Ch'ih did not immediately understand these answers. 3. The Master said, 'Employ the upright and put aside all the crooked—in this way the crooked can be made to be upright.'

Book XIII. Tsze-Lu

II. 1. Chung-kung, being chief minister to the Head of the Chi family, asked about government. The Master said, 'Employ first the services of your various officers, pardon small faults, and raise to office men of virtue and talents.' 2. Chung-kung said, 'How shall I know the men of virtue and talent, so that I may raise them to office?' He was answered, 'Raise to office those whom you know. As to those whom you do not know, will others neglect them?'

VI. The Master said, 'When a prince's personal conduct is correct, his government is effective without the issuing of orders. If his personal conduct is not correct, he may issue orders, but they will not be followed.'

IX. 1. When the Master went to Wei, Zan Yu acted as driver of his carriage. 2. The Master observed, 'How numerous are the people!' 3. Yu said, 'Since they are thus numerous, what more shall be done for them?' 'Enrich them,' was the reply. 4. 'And when they have been enriched, what more shall be done?' The Master said, 'Teach them.'

XVI. 1. The Duke of Sheh asked about government. 2. The Master said, 'Good government obtains, when those who are near are made happy, and those who are far off are attracted.'

XVII. Tsze-hsia, being governor of Chu-fu, asked about government. The Master said, 'Do not be desirous to have things done quickly; do not look at small advantages. Desire to have things done quickly prevents their being done thoroughly. Looking at small advantages prevents great affairs from being accomplished.'

XIX. Fan Ch'ih asked about perfect virtue. The Master said, 'It is, in retirement, to be sedately grave; in the management of business, to be reverently attentive; in intercourse with others, to be strictly sincere. Though a man go among rude, uncultivated tribes, these qualities may not be neglected.'

XXIII. The Master said, 'The superior man is affable, but not adulatory; the mean man is adulatory, but not affable.'

XXIV. Tsze-kung asked, saying, 'What do you say of a man who is loved by all the people of his neighborhood?' The Master replied, 'We may not for that accord our approval of him.' 'And what do you say of him who is hated by all the people of his neighborhood?' The Master said, 'We may not for that conclude that he is bad. It is better than either of these cases that the good in the neighborhood love him, and the bad hate him.'

XXV. The Master said, 'The superior man is easy to serve and difficult to please. If you try to please him in any way which is not accordant with right, he will not be pleased. But in his employment of men, he uses them according to their capacity. The mean man is difficult to serve, and easy to please. If you try to please him, though it be in a way which is not accordant with right, he may be pleased. But in his employment of men, he wishes them to be equal to everything.'

XXVI. The Master said, 'The superior man has a dignified ease without pride. The mean man has pride without a dignified ease.'

Book XIV. Hsien Wan

I. Hsien asked what was shameful. The Master said, 'When good government prevails in a state, to be thinking only of salary; and, when bad government prevails, to be thinking, in the same way, only of salary—this is shameful.'

II. 1. 'When the love of superiority, boasting, resentments, and covetousness are repressed, this may be deemed perfect virtue.' 2. The Master said, 'This may be regarded as the achievement of what is difficult. But I do not know that it is to be deemed perfect virtue.'

III. The Master said, 'The scholar who cherishes the love of comfort is not fit to be deemed a scholar.'

V. The Master said, 'The virtuous will be sure to speak correctly, but those whose speech is good may not always be virtuous. Men of principle are sure to be bold, but those who are bold may not always be men of principle.'

XIII. 1. Tsze-lu asked what constituted a COMPLETE man. The Master said, 'Suppose a man with the knowledge of Tsang Wu-chung, the freedom from covetousness of Kung-ch'o, the bravery of Chwang of Pien, and the varied talents of Zan Ch'iu; add to these the accomplishments of the rules of propriety and music—such a one might be reckoned a COMPLETE man.' 2. He then added, 'But what is the necessity for a complete man of the present day to have all these things? The man, who in the view of gain, thinks of righteousness; who in the view of danger is prepared to give up his life; and who does not forget an old agreement however far back it extends—such a man may be reckoned a COMPLETE man.'

XXI. The Master said, 'He who speaks without modesty will find it difficult to make his words good.'

XXIII. Tsze-lu asked how a ruler should be served. The Master said, 'Do not impose on him, and, moreover, withstand him to his face.'

XXIV. The Master said, 'The progress of the superior man is upwards; the progress of the mean man is downwards.'

XXV. The Master said, 'In ancient times, men learned with a view to their own improvement. Nowadays, men learn with a view to the approbation of others.'

XXIX. The Master said, 'The superior man is modest in his speech, but exceeds in his actions.'

XXXII. The Master said, 'I will not be concerned at men's not knowing me; I will be concerned at my own want of ability.'

XXXIII. The Master said, 'He who does not anticipate attempts to deceive him, nor expect beforehand that people will doubt his word, and yet realizes these things immediately when they occur—is he not a man of superior worth?'

Book XV. Wei Ling Kung

V. 1. Tsze-chang asked how a man should conduct himself, so as to be everywhere appreciated. 2. The Master said, 'Let his words be sincere and truthful, and his actions honourable and careful; such conduct may be practised among the rude tribes of the South or the North. If his words be not sincere and truthful and his actions not honourable and careful, will he, with such conduct, be appreciated, even in his neighborhood?'

VIII. The Master said, 'The determined scholar and the man of virtue will not seek to live at the expense of injuring their virtue. They will even sacrifice their lives to preserve their virtue complete.'

XI. The Master said, 'If a man take no thought about what is [now] distant, he will [later] find sorrow near at hand.'

XIV. The Master said, 'He who requires much from himself and little from others, will keep himself from being the object of resentment.'

XV. The Master said, 'When a man is not in the habit of saying—"What shall I think of this? What shall I think of this?" I can indeed do nothing with him!'

XX. The Master said, 'What the superior man seeks, is in himself. What the mean man seeks, is in others.'

XXI. The Master said, 'The superior man is dignified, but does not wrangle. He is sociable, but not a partisan.'

XXII. The Master said, 'The superior man does not promote a man simply on account of his words, nor does he put aside good words because of the man.'

XXIII. Tsze-kung asked, saying, 'Is there one word which may serve as a rule of practice for all one's life?' The Master said, 'Is not RECIPROCITY such a word? What you do not want done to yourself, do not do to others.'

XXVI. The Master said, 'Specious words confound virtue. Want of forbearance in small matters confounds great plans.'

XXVII. The Master said, 'When the multitude hate a man, it is necessary to examine into the case. When the multitude like a man, it is necessary to examine into the case.'

XXIX. The Master said, 'To have faults and not to reform them—this, indeed, should be pronounced having faults.'

XXXI. The Master said, 'The object of the superior man is truth. Food is not his object. There is plowing; even in that there is sometimes want. So with learning—emolument

may be found in it. The superior man is anxious lest he should not get truth; he is not anxious lest poverty should come upon him.'

XXXVI. The Master said, 'The superior man is correctly firm, and not firm merely.'

XXXVIII. The Master said, 'In teaching there should be no distinction of classes.'

XXXIX. The Master said, 'Those whose courses are different cannot lay plans for one another.'

XL. The Master said, 'In language it is simply required that it convey the meaning.'

#### Book XVI. Ke She

IV. Confucius said, 'There are three friendships which are advantageous, and three which are injurious. Friendship with the upright; friendship with the sincere; and friendship with the man of much observation: these are advantageous. Friendship with the man of specious airs; friendship with the insinuatingly soft; and friendship with the glib-tongued: these are injurious.'

X. Confucius said, 'The superior man has nine things which are subjects with him of thoughtful consideration. In regard to the use of his eyes, he is anxious to see clearly. In regard to the use of his ears, he is anxious to hear distinctly. In regard to his countenance, he is anxious that it should be benign. In regard to his demeanor, he is anxious that it should be respectful. In regard to his speech, he is anxious that it should be sincere. In regard to his doing of business, he is anxious that it should be reverently careful. In regard to what he doubts about, he is anxious to question others. When he is angry, he thinks of the difficulties (his anger may involve him in). When he sees gain to be got, he thinks of righteousness.'

#### Book XVII. Yang Ho

II. The Master said, 'By nature, men are nearly alike; by practice, they get to be far apart.'

III. The Master said, 'There are only the wise of the highest class, and the stupid of the lowest class, who cannot be changed.'

VI. Tsze-chang asked Confucius about perfect virtue. Confucius said, 'To be able to practice five things everywhere under heaven constitutes perfect virtue.' He begged to ask what they were, and was told, 'Gravity, generosity of soul, sincerity, earnestness, and kindness. If you are grave, you will not be treated with disrespect. If you are generous, you will win all. If you are sincere, people will repose trust in you. If you are earnest, you will accomplish much. If you are kind, this will enable you to employ the services of others.'

VIII. 1. The Master said, 'Yu, have you heard the six words to which are attached six becloudings?' Yu replied, 'I have not.' 2. 'Sit down, and I will tell them to you. 3. 'There is the love of being benevolent without the love of learning; the beclouding here leads to a foolish simplicity. There is the love of knowing without the love of learning; the beclouding here leads to dissipation of mind. There is the love of being sincere without the love of learning; the beclouding here leads to an injurious disregard of consequences. There is the love of straightforwardness without the love of learning;

the beclouding here leads to rudeness. There is the love of boldness without the love of learning; the beclouding here leads to insubordination. There is the love of firmness without the love of learning; the beclouding here leads to extravagant conduct.'

XVIII. The Master said, '[...] I hate those who with their poisonous tongues overthrow kingdoms and families.'

XXIV. 1. Tsze-kung said, 'Has the superior man his hatreds also?' The Master said, 'He has his hatreds. He hates those who proclaim the evil of others. He hates the man who, being in a low station, slanders his superiors. He hates those who have valor merely, and are unobservant of propriety. He hates those who are forward and determined, and, at the same time, of contracted understanding.' 2. The Master then inquired, 'Ts'ze, have you also your hatreds?' Tsze-kung replied, 'I hate those who pry out matters, and ascribe the knowledge to their wisdom. I hate those who are merely not modest, and think that they are valorous. I hate those who make known secrets, and think that they are straightforward.'

#### Book XIX. Tsze-Chang

I. Tsze-chang said, 'The scholar, trained for public duty, seeing threatening danger, is prepared to sacrifice his life. When the opportunity of gain is presented to him, he thinks of righteousness. In sacrificing, his thoughts are reverential. In mourning, his thoughts are about the grief which he should feel. Such a man commands our approbation indeed.'

III. The disciples of Tsze-hsia asked Tsze-chang about the principles that should characterize mutual intercourse. Tsze-chang asked, 'What does Tsze-hsia say on the subject?' They replied, 'Tsze-hsia says: "Associate with those who can advantage you. Put away from you those who cannot do so."' Tsze-chang observed, 'This is different from what I have learned. The superior man honours the talented and virtuous, and bears with all. He praises the good, and pities the incompetent. Am I possessed of great talents and virtue?— who is there among men whom I will not bear with? Am I devoid of talents and virtue?—men will put me away from them. What have we to do with the putting away of others?'

V. Tsze-hsia said, 'He, who from day to day recognizes what he has not yet learned, and from month to month does not forget what he has learned, may be said indeed to love to learn.'

VII. Tsze-hsia said, 'Mechanics have their shops to dwell in, in order to accomplish their works. The superior man learns, in order to reach to the utmost of his principles.'

VIII. Tsze-hsia said, 'The mean man is sure to gloss his faults.'

X. Tsze-hsia said, 'The superior man, having obtained their confidence, may then impose labours on his people. If he has not gained their confidence, they will think that he is oppressing them. Having obtained the confidence of his prince, one may then remonstrate with him. If he has not gained his confidence, the prince will think that he is vilifying him.'

XXI. Tsze-kung said, 'The faults of the superior man are like the eclipses of the sun and moon. He has his faults, and all men see them; he changes again, and all men look up to him.'



XXV. 2. Tsze-kung said to him, ‘For one word a man is often deemed to be wise, and for one word he is often deemed to be foolish. We ought to be careful indeed in what we say. [...] 4. ‘Were our Master in the position of the ruler of a State or the chief of a Family, we should find verified the description which has been given of a sage’s rule: he would plant the people, and forthwith they would be established; he would lead them on, and forthwith they would follow him; he would make them happy, and forthwith multitudes would resort to his dominions; he would stimulate them, and forthwith they would be harmonious. While he lived, he would be glorious. When he died, he would be bitterly lamented. How can one attain this goal?’

Book XX. Yao Yueh

II. 1. Tsze-chang asked Confucius, saying, ‘In what way should a person in authority act in order that he may conduct government properly?’ The Master replied, ‘Let him honour the five excellent, and banish away the four bad, things; then may he conduct government properly.’ Tsze-chang said, ‘What are meant by the five excellent things?’ The Master said, ‘When the person in authority is beneficent without great expenditure; when he lays tasks on the people without their repining; when he pursues what he desires without being covetous; when he maintains a dignified ease without being proud; when he is majestic without being fierce.’

2. Tsze-chang said, ‘What is meant by being beneficent without great expenditure?’ The Master replied, ‘When the person in authority makes more beneficial to the people the things from which they naturally derive benefit—is not this being beneficent without great expenditure? When he chooses the labours which are proper, and makes them labour on them, who will repine? When his desires are set on benevolent government, and he secures it, who will accuse him of covetousness? Whether he has to do with many people or few, or with things great or small, he does not dare to indicate any disrespect—is not this to maintain a dignified ease without any pride? He adjusts his clothes and cap, and throws a dignity into his looks, so that, thus dignified, he is looked at with awe—is not this to be majestic without being fierce?’

3. Tsze-chang then asked, ‘What are meant by the four bad things?’ The Master said, ‘To put the people to death without having instructed them—this is called cruelty. To require from them, suddenly, the full tale of work, without having given them warning—this is called oppression. To issue orders as if without urgency, at first, and, when the time comes, to insist on them with severity—this is called injury. And, generally, in the giving pay or rewards to men, to do it in a stingy way—this is called acting the part of a mere official.’

*The Great Learning* (Legge translation) has further insight from Confucius and his followers:

The Text of Confucius

[...] The ancients who wished to illustrate illustrious virtue throughout the kingdom, first ordered well their own states. Wishing to order well their states, they first regulated their families. Wishing to regulate their families, they first cultivated their persons. Wishing to cultivate their persons, they first rectified their hearts. Wishing to rectify their hearts, they first sought to be sincere in their thoughts. Wishing to be sincere in their thoughts, they first extended to the utmost their knowledge. Such extension of knowledge lay in the investigation of things.

Things being investigated, knowledge became complete. Their knowledge being complete, their thoughts were sincere. Their thoughts being sincere, their hearts were then rectified. Their hearts being rectified, their persons were cultivated. Their persons being cultivated, their families were regulated. Their families being regulated, their states were rightly governed. Their states being rightly governed, the whole kingdom was made tranquil and happy. [...]

Commentary of the Philosopher Ts'ang

Men are partial where they feel affection and love; partial where they despise and dislike; partial where they stand in awe and reverence; partial where they feel sorrow and compassion; partial where they are arrogant and rude. Thus it is that there are few men in the world who love and at the same time know the bad qualities of the object of their love, or who hate and yet know the excellences of the object of their hatred. [...]

What a man dislikes in his superiors, let him not display in the treatment of his inferiors; what he dislikes in inferiors, let him not display in the service of his superiors; what he hates in those who are before him, let him not therewith precede those who are behind him; what he hates in those who are behind him, let him not bestow on the left; what he hates to receive on the left, let him not bestow on the right—this is what is called “The principle with which, as with a measuring square, to regulate one’s conduct.” [...]

Virtue is the root; wealth is the result. If he make the root his secondary object, and the result his primary, he will only wrangle with his people, and teach them rapine. Hence, the accumulation of wealth is the way to scatter the people; and the letting it be scattered among them is the way to collect the people. [...] In the Book of Ch’u, it is said, “The kingdom of Ch’u does not consider that to be valuable. It values, instead, its good men.” Duke Wan’s uncle, Fan, said, “Our fugitive does not account that to be precious. What he considers precious is the affection due to his parent.”

In the Declaration of the Duke of Ch’in, it is said, “Let me have but one minister, plain and sincere, not pretending to other abilities, but with a simple, upright, mind; and possessed of generosity, regarding the talents of others as though he himself possessed them, and, where he finds accomplished and perspicacious men, loving them in his heart more than his mouth expresses, and really showing himself able to bear them and employ them—such a minister will be able to preserve my sons and grandsons and young people, and benefits likewise to the kingdom may well be looked for from him. But if it be his character, when he finds men of ability, to be jealous and hate them; and, when he finds accomplished and perspicacious men, to oppose them and not allow their advancement, showing himself really not able to bear them: such a minister will not be able to protect my sons and grandsons and people; and may he not also be pronounced dangerous to the state?”

It is only the truly virtuous man who can send away such a man and banish him, driving him out among the barbarous tribes around, determined not to dwell along with him in the Middle Kingdom. This is in accordance with the saying, “It is only the truly virtuous man who can love or who can hate others.”

To see men of worth and not to raise them to office; to raise them to office, but not to do so quickly—this is disrespectful. To see bad men and not to remove them; to remove them, but not to do so to a distance—this is weakness.

### 12.3.3 The Bible

Christians were explicitly named as such for being followers of the teachings and life of Jesus Christ (Acts 11:26). Yet for the two millennia since that origin, many of those who call themselves Christians have behaved and spoken quite differently from their namesake, causing great harm to countless millions of people, both Christians and non-Christians. Recorded history and the modern world show examples of the resulting wars, genocides, dictatorships, inquisitions, persecutions, deprivations, plunder and accumulation of wealth, exploitation, slavery, forced conversions, repression, ignorance, disinformation, prejudice, hatred, sexual abuse, fraud, crass commercialism, and other violations of human rights and human dignity.

I would encourage both non-Christians and people who consider themselves Christians to take a really close look at Christ—not what you think you know about him, or what Christians have said and done since then, or what academic scholars say, but Jesus Christ himself as recorded in the best surviving primary source documents we have. Based on that model, how should people live, and act, and speak?<sup>13</sup>

Below are some of my favorite excerpts from the book of Matthew. There is plenty of other good stuff in the Christian New Testament and the Old Testament or Hebrew Bible.

It seems as if there are almost as many different English translations of the Bible as there are religious sects that follow it. Perhaps the closest thing to common ground is the New Revised Standard Version (2021 updated edition, NRSVue), so I have used that here.

[5:1–16] When Jesus saw the crowds, he went up the mountain, and after he sat down, his disciples came to him. And he began to speak and taught them, saying:

“Blessed are the poor in spirit, for theirs is the kingdom of heaven.

“Blessed are those who mourn, for they will be comforted.

“Blessed are the meek, for they will inherit the earth.

“Blessed are those who hunger and thirst for righteousness, for they will be filled.

“Blessed are the merciful, for they will receive mercy.

“Blessed are the pure in heart, for they will see God.

“Blessed are the peacemakers, for they will be called children of God.

“Blessed are those who are persecuted for the sake of righteousness, for theirs is the kingdom of heaven.

“Blessed are you when people revile you and persecute you and utter all kinds of evil against you falsely on my account. Rejoice and be glad, for your reward is great in heaven, for in the same way they persecuted the prophets who were before you.

“You are the salt of the earth, but if salt has lost its taste, how can its saltiness be restored? It is no longer good for anything but is thrown out and trampled under foot.

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<sup>13</sup>Elsewhere in this book, I have discussed some people who have drawn inspiration from that model, such as Dietrich Bonhoeffer, Jimmy Carter, Fred Rogers, Martin Luther King Jr., and others.

“You are the light of the world. A city built on a hill cannot be hid. People do not light a lamp and put it under the bushel basket; rather, they put it on the lampstand, and it gives light to all in the house. In the same way, let your light shine before others, so that they may see your good works and give glory to your Father in heaven.

[5:21–26] “You have heard that it was said to those of ancient times, ‘You shall not murder,’ and ‘whoever murders shall be liable to judgment.’ But I say to you that if you are angry with a brother or sister, you will be liable to judgment, and if you insult a brother or sister, you will be liable to the council, and if you say, ‘You fool,’ you will be liable to the hell of fire. So when you are offering your gift at the altar, if you remember that your brother or sister has something against you, leave your gift there before the altar and go; first be reconciled to your brother or sister, and then come and offer your gift. Come to terms quickly with your accuser while you are on the way to court with him, or your accuser may hand you over to the judge and the judge to the guard, and you will be thrown into prison. Truly I tell you, you will never get out until you have paid the last penny.

[5:38–48] “You have heard that it was said, ‘An eye for an eye and a tooth for a tooth.’ But I say to you: Do not resist an evildoer. But if anyone strikes you on the right cheek, turn the other also, and if anyone wants to sue you and take your shirt, give your coat as well, and if anyone forces you to go one mile, go also the second mile. Give to the one who asks of you, and do not refuse anyone who wants to borrow from you.

“You have heard that it was said, ‘You shall love your neighbor and hate your enemy.’ But I say to you: Love your enemies and pray for those who persecute you, so that you may be children of your Father in heaven, for he makes his sun rise on the evil and on the good and sends rain on the righteous and on the unrighteous. For if you love those who love you, what reward do you have? Do not even the tax collectors do the same? And if you greet only your brothers and sisters, what more are you doing than others? Do not even the gentiles do the same? Be perfect, therefore, as your heavenly Father is perfect.

[6:1–8] “Beware of practicing your righteousness before others in order to be seen by them, for then you have no reward from your Father in heaven. So whenever you give alms, do not sound a trumpet before you, as the hypocrites do in the synagogues and in the streets, so that they may be praised by others. Truly I tell you, they have received their reward. But when you give alms, do not let your left hand know what your right hand is doing, so that your alms may be done in secret, and your Father who sees in secret will reward you.

“And whenever you pray, do not be like the hypocrites, for they love to stand and pray in the synagogues and at the street corners, so that they may be seen by others. Truly I tell you, they have received their reward. But whenever you pray, go into your room and shut the door and pray to your Father who is in secret, and your Father who sees in secret will reward you. When you are praying, do not heap up empty phrases as the gentiles do, for they think that they will be heard because of their many words. Do not be like them, for your Father knows what you need before you ask him.”

[6:19–24, 27, 34] “Do not store up for yourselves treasures on earth, where moth and rust consume and where thieves break in and steal, but store up for yourselves treasures

in heaven, where neither moth nor rust consumes and where thieves do not break in and steal. For where your treasure is, there your heart will be also.

“The eye is the lamp of the body. So if your eye is healthy, your whole body will be full of light, but if your eye is unhealthy, your whole body will be full of darkness. If, then, the light in you is darkness, how great is the darkness!

“No one can serve two masters, for a slave will either hate the one and love the other or be devoted to the one and despise the other. You cannot serve God and wealth. [...]

“And which of you by worrying can add a single hour to your span of life? [...] So do not worry about tomorrow, for tomorrow will bring worries of its own. Today’s trouble is enough for today.”

[7:1–20] “Do not judge, so that you may not be judged. For the judgment you give will be the judgment you get, and the measure you give will be the measure you get. Why do you see the speck in your neighbor’s eye but do not notice the log in your own eye? Or how can you say to your neighbor, ‘Let me take the speck out of your eye,’ while the log is in your own eye? You hypocrite, first take the log out of your own eye, and then you will see clearly to take the speck out of your neighbor’s eye.

“Do not give what is holy to dogs, and do not throw your pearls before swine, or they will trample them under foot and turn and maul you.

“Ask, and it will be given to you; search, and you will find; knock, and the door will be opened for you. For everyone who asks receives, and everyone who searches finds, and for everyone who knocks, the door will be opened. Is there anyone among you who, if your child asked for bread, would give a stone? Or if the child asked for a fish, would give a snake? If you, then, who are evil, know how to give good gifts to your children, how much more will your Father in heaven give good things to those who ask him!

“In everything do to others as you would have them do to you, for this is the Law and the Prophets.

“Enter through the narrow gate, for the gate is wide and the road is easy that leads to destruction, and there are many who take it. For the gate is narrow and the road is hard that leads to life, and there are few who find it.

“Beware of false prophets, who come to you in sheep’s clothing but inwardly are ravenous wolves. You will know them by their fruits. Are grapes gathered from thorns or figs from thistles? In the same way, every good tree bears good fruit, but the bad tree bears bad fruit. A good tree cannot bear bad fruit, nor can a bad tree bear good fruit. Every tree that does not bear good fruit will be cut down and thrown into the fire. Thus you will know them by their fruits.”

[9:10–13] And as he sat at dinner in the house, many tax collectors and sinners came and were sitting with Jesus and his disciples. When the Pharisees saw this, they said to his disciples, “Why does your teacher eat with tax collectors and sinners?” But when he heard this, he said, “Those who are well have no need of a physician, but those who are sick. Go and learn what this means, ‘I desire mercy, not sacrifice.’ For I have not come to call the righteous but sinners.”

[12:33–37] “Either make the tree good and its fruit good, or make the tree bad and its fruit bad, for the tree is known by its fruit. You brood of vipers! How can you speak good things when you are evil? For out of the abundance of the heart the mouth speaks. The good person brings good things out of a good treasure, and the evil person brings evil things out of an evil treasure. I tell you, on the day of judgment you will have to give an account for every careless word you utter, for by your words you will be justified, and by your words you will be condemned.”

[20:25–28] But Jesus called them to him and said, “You know that the rulers of the gentiles lord it over them, and their great ones are tyrants over them. It will not be so among you, but whoever wishes to be great among you must be your servant, and whoever wishes to be first among you must be your slave, just as the Son of Man came not to be served but to serve and to give his life a ransom for many.”

[23:1–8, 11–12] Then Jesus said to the crowds and to his disciples, “The scribes and the Pharisees sit on Moses’s seat; therefore, do whatever they teach you and follow it, but do not do as they do, for they do not practice what they teach. They tie up heavy burdens, hard to bear, and lay them on the shoulders of others, but they themselves are unwilling to lift a finger to move them. They do all their deeds to be seen by others, for they make their phylacteries broad and their fringes long. They love to have the place of honor at banquets and the best seats in the synagogues and to be greeted with respect in the marketplaces and to have people call them rabbi. But you are not to be called rabbi, for you have one teacher, and you are all brothers and sisters. [...] The greatest among you will be your servant. All who exalt themselves will be humbled, and all who humble themselves will be exalted.”

[24:4–14] Jesus answered them, “Beware that no one leads you astray. For many will come in my name, saying, ‘I am the Messiah!’ and they will lead many astray. And you will hear of wars and rumors of wars; see that you are not alarmed, for this must take place, but the end is not yet. For nation will rise against nation and kingdom against kingdom, and there will be famines and earthquakes in various places: all this is but the beginning of the birth pangs. Then they will hand you over to be tortured and will put you to death, and you will be hated by all nations because of my name. Then many will fall away, and they will betray one another and hate one another. And many false prophets will arise and lead many astray. And because of the increase of lawlessness, the love of many will grow cold. But the one who endures to the end will be saved. And this good news of the kingdom will be proclaimed throughout the world, as a testimony to all the nations, and then the end will come.”

[25:14–46] “For it is as if a man, going on a journey, summoned his slaves and entrusted his property to them; to one he gave five talents, to another two, to another one, to each according to his ability. Then he went away. At once the one who had received the five talents went off and traded with them and made five more talents. In the same way, the one who had the two talents made two more talents. But the one who had received the one talent went off and dug a hole in the ground and hid his master’s money. After a long time the master of those slaves came and settled accounts with them. Then the one who had received the five talents came forward, bringing five more talents, saying, ‘Master, you handed over to me five talents; see, I have made five more talents.’ His master said to him, ‘Well done, good and trustworthy slave; you have been

trustworthy in a few things; I will put you in charge of many things; enter into the joy of your master.’ And the one with the two talents also came forward, saying, ‘Master, you handed over to me two talents; see, I have made two more talents.’ His master said to him, ‘Well done, good and trustworthy slave; you have been trustworthy in a few things; I will put you in charge of many things; enter into the joy of your master.’ Then the one who had received the one talent also came forward, saying, ‘Master, I knew that you were a harsh man, reaping where you did not sow and gathering where you did not scatter, so I was afraid, and I went and hid your talent in the ground. Here you have what is yours.’ But his master replied, ‘You wicked and lazy slave! You knew, did you, that I reap where I did not sow and gather where I did not scatter? Then you ought to have invested my money with the bankers, and on my return I would have received what was my own with interest. So take the talent from him, and give it to the one with the ten talents. For to all those who have, more will be given, and they will have an abundance, but from those who have nothing, even what they have will be taken away. As for this worthless slave, throw him into the outer darkness, where there will be weeping and gnashing of teeth.’

“When the Son of Man comes in his glory and all the angels with him, then he will sit on the throne of his glory. All the nations will be gathered before him, and he will separate people one from another as a shepherd separates the sheep from the goats, and he will put the sheep at his right hand and the goats at the left. Then the king will say to those at his right hand, ‘Come, you who are blessed by my Father, inherit the kingdom prepared for you from the foundation of the world, for I was hungry and you gave me food, I was thirsty and you gave me something to drink, I was a stranger and you welcomed me, I was naked and you gave me clothing, I was sick and you took care of me, I was in prison and you visited me.’ Then the righteous will answer him, ‘Lord, when was it that we saw you hungry and gave you food or thirsty and gave you something to drink? And when was it that we saw you a stranger and welcomed you or naked and gave you clothing? And when was it that we saw you sick or in prison and visited you?’ And the king will answer them, ‘Truly I tell you, just as you did it to one of the least of these brothers and sisters of mine, you did it to me.’ Then he will say to those at his left hand, ‘You who are accursed, depart from me into the eternal fire prepared for the devil and his angels, for I was hungry and you gave me no food, I was thirsty and you gave me nothing to drink, I was a stranger and you did not welcome me, naked and you did not give me clothing, sick and in prison and you did not visit me.’ Then they also will answer, ‘Lord, when was it that we saw you hungry or thirsty or a stranger or naked or sick or in prison and did not take care of you?’ Then he will answer them, ‘Truly I tell you, just as you did not do it to one of the least of these, you did not do it to me.’ And these will go away into eternal punishment but the righteous into eternal life.”

[26:50b–52] Then they came and laid hands on Jesus and arrested him. Suddenly one of those with Jesus put his hand on his sword, drew it, and struck the slave of the high priest, cutting off his ear. Then Jesus said to him, “Put your sword back into its place, for all who take the sword will die by the sword.”



### 12.3.4 Marcus Aurelius

Marcus Aurelius (121–180 AD) was generally regarded as one of the most effective Roman emperors. He wrote notes and advice for himself, never intended for a broader audience, which came to be known posthumously as *Meditations*. In view of his extensive political and military experience, the widespread stability that he maintained despite countless challenges, and his intent only to write notes to himself, the idealism that appears throughout his book cannot be dismissed as naive or for show. In fact, his views (and presumably the career experiences that honed them) are remarkably similar to those of Confucius. The entire book is well worth reading; make sure you read a good modern translation such as that by Gregory Hays Aurelius 2002. Below are some excerpts that I have adapted and updated from the antiquated-sounding translation of George Long:

#### Book I

[Marcus Aurelius made and regularly remembered a detailed list of the people and things in his life for which he was thankful, which is an excellent practice.]

9. From [my teacher] Sextus, a benevolent disposition, and the example of a family governed in a fatherly manner, and the idea of living conformably to nature; and gravity without affectation, and to look carefully after the interests of friends, and to tolerate ignorant persons, and those who form opinions without consideration. He had the power of readily accommodating himself to all, so that intercourse with him was more agreeable than any flattery. At the same time he was most highly venerated by those who associated with him. He had the faculty of both discovering and arranging, in an intelligent and methodical way, the principles necessary for life. He never showed anger or any other passion, but was entirely free from passion, and also most affectionate. He could express approbation without noisy display, and he possessed much knowledge without ostentation.

14. From my brother Severus, to love my kin, and to love truth, and to love justice. [...] From him I received the idea of a society in which there is the same law for all, a society administered with regard to equal rights and equal freedom of speech, and the idea of a kingly government which respects most of all the freedom of the governed. I learned from him also consistency and undeviating steadiness in my regard for philosophy, and a disposition to do good, and to give to others readily, and to cherish good hopes, and to believe that I am loved by my friends. In him I observed no concealment of his opinions with respect to those whom he condemned; his friends had no need to conjecture what he wished or did not wish, but it was quite plain.

16. In my [adopted] father [the preceding emperor, Antoninus Pius], I observed mildness of temper, and unchangeable resolution in the things which he had determined after due deliberation; and no vainglory in those things which men call honors; and a love of labor and perseverance; and a readiness to listen to those who had anything to propose for the common good; and undeviating firmness in giving to every man according to his deserts; and a knowledge derived from experience of the occasions for vigorous action and for remission. [...]

And he considered himself no more than any other citizen; and he released his friends from all obligation to dine with him or to accompany him when he went abroad, and those who had failed to accompany him, by reason of any urgent circumstances, always found him the same. I observed too his habit of careful inquiry in all matters of



deliberation, and his persistence, and that he never stopped his investigation through being satisfied with appearances which first present themselves; and that his disposition was to keep his friends, and not to be soon tired of them, nor yet to be extravagant in his affection; and to be satisfied on all occasions, and cheerful; and to foresee things a long way off, and to provide for the smallest without display; and to stop immediately popular applause and all flattery; and to be ever watchful over the things which were necessary for the administration of the empire, and to be a good manager of the expenditure, and patiently to endure the blame which he got for such conduct; and he was neither superstitious with respect to the gods, nor did he court men by gifts or by trying to please them, or by flattering the populace; but he showed sobriety in all things and firmness, and never any mean thoughts or action, nor love of novelty. [...]

Every one acknowledged him to be a man ripe, perfect, above flattery, able to manage his own and other men's affairs. Besides this, he honored those who were true philosophers, and he did not reproach those who pretended to be philosophers, nor yet was he easily led by them. He was also easy in conversation, and he made himself agreeable without any offensive affectation. He took a reasonable care of his body's health, not as one who was greatly attached to life, nor out of regard to personal appearance, nor yet in a careless way, but so that, through his own attention, he very seldom stood in need of the physician's art or of medicine or external applications. He was most ready to give way without envy to those who possessed any particular skill, such as that of eloquence or knowledge of the law or of morals, or of anything else; and he gave them his help, that each might enjoy reputation according to his deserts; and he always acted conformably to the institutions of his country, without showing any affectation of doing so. [...]

His secrets were not but very few and very rare, and these only about public matters; and he showed prudence and economy in the exhibition of the public spectacles and the construction of public buildings, his donations to the people, and in such things, for he was a man who looked to what ought to be done, not to the reputation which is got by a man's acts. [...] He was not fond of building houses, nor curious about what he ate, nor about the texture and color of his clothes, nor about the beauty of his slaves. [...] There was in him nothing harsh, nor implacable, nor violent, nor, as one may say, anything carried to the sweating point; but he examined all things severally, as if he had abundance of time, and without confusion, in an orderly way, vigorously and consistently. [...]

## Book II

1. Begin the morning by saying to yourself, I shall meet with the meddler, the ungrateful, arrogant, deceitful, envious, unsocial. All these things happen to them by reason of their ignorance of what is good and evil. But I who have seen the nature of the good that it is beautiful, and of the bad that it is ugly, and the nature of him who does wrong, that it is akin to me, not only of the same blood or seed, but that it participates in the same intelligence and the same portion of the divinity, I can neither be injured by any of them, for no one can fix on me what is ugly, nor can I be angry with my kinsman, nor hate him. For we are made for cooperation, like feet, like hands, like eyelids, like the rows of the upper and lower teeth. To act against one another then is contrary to nature; and it is acting against one another to be vexed and to turn away.

5. Every moment think steadily as a Roman and a man to do what you have in hand

with perfect and simple dignity, and feeling of affection, and freedom, and justice; and to give yourself relief from all other thoughts. And you will give yourself relief, if you do every act of your life as if it were the last, laying aside all carelessness and passionate aversion from the commands of reason, and all hypocrisy, and self-love, and discontent with the portion which has been given to you. You see how few are the things, which if a man lays hold of, he is able to live a life which flows in quiet, and is like the existence of the gods; for the gods on their part will require nothing more from him who observes these things.

### Book III

4. Do not waste the remainder of your life worrying what others think, instead of focusing your thoughts on doing things that help people. For you lose the opportunity of doing something else when you have such thoughts as these: What is such a person doing, and why, and what is he saying, and what is he thinking of, and what is he contriving, and whatever else of the kind makes us wander away from the observation of our own ruling power. We ought then to check in the series of our thoughts everything that is without a purpose and useless, but most of all the over-curious feeling and the malignant; and a man should use himself to think of those things only about which if one should suddenly ask, What do you have now in your thoughts? With perfect openness you might immediately answer, [...] so that from your words it should be plain that everything in you is simple and benevolent, [...] nor has any rivalry or envy and suspicion[...] And he remembers also that every rational animal is his kinsman, and that to care for all men is according to man's nature; and a man should hold on to the opinion not of all, but of those only who confessedly live according to nature. But as to those who live not so, he always bears in mind what kind of men they are both at home and from home, both by night and by day, and what they are, and with what men they live an impure life. Accordingly, he does not value at all the praise which comes from such men, since they are not even satisfied with themselves.

7. Never consider anything advantageous to yourself if it would compel you to break your promise, to lose your self-respect, to hate any man, to suspect, to curse, to act the hypocrite, to desire anything which needs walls and curtains [...]; taking care of this only all through life, that his thoughts turn not away from anything which belongs to an intelligent animal and a member of a civil community.

11. To the aids which have been mentioned let this one still be added: Make for yourself a definition or description of the thing which is presented to you, so as to see distinctly what kind of a thing it is in its substance, in its bare form, in its complete entirety, and tell yourself its proper name, and the names of the things of which it has been compounded, and into which it will be resolved. For nothing is so effective at elevating your mind as to be able to examine systematically and truly everything that you encounter in life, and always to look at things so as to see at the same time what kind of universe this is, and what kind of use everything performs in it, and what value everything has with reference to the whole, and what with reference to man[...] At the same time however in things indifferent I attempt to ascertain the value of each.

13. As physicians have always their instruments and knives ready for cases which suddenly require their skill, so do you have principles ready for the understanding of things divine and human, and for doing everything, even the smallest, with a recollection of

the bond which unites the divine and human to one another. For neither will you do anything well which pertains to man without at the same time having a reference to things divine; nor the contrary.

14. No longer wander at random; for neither will you read your own memoirs, nor the acts of the ancient Romans and Greeks, and the selections from books which you were saving for your old age. Hasten then to the end which you have before you, and throwing away idle hopes, come to your own aid, if you care at all for yourself, while it is in your power.

#### Book IV

3. Men seek retreats for themselves, houses in the country, beaches, and mountains; you too desire such things very much. Everyone has that desire, but you have the power to retreat into yourself whenever you want. There is no place quieter or more peaceful to retreat to than within your own soul, particularly when you focus on whatever thoughts make you feel most tranquil. And the greatest tranquility is having a well-ordered mind. Make this retreat frequently but for brief periods of time to feel renewed, cleanse your soul, and then return to your life free of discontent. [...]

7. If you take away your attitude, the feeling that you have been harmed is taken away. If you take away the feeling that you have been harmed, the harm is taken away.

11. Do not see or feel about things the way one who wants to harm you sees them, or the way he wants you to see them. See things as they truly are.

12. You should always be ready: first, to do only what rational thought indicates is best to help other people, and second, to change your mind, if anyone can convince you of a better course of action. But if you change your mind, it must be because the new course is right and helps people and so forth, not because it is more enjoyable or more popular.

17. Do not act as if you were going to live ten thousand years. Death hangs over you. While you live, while it is within your power, do as much good as you can.

18. You can avoid so much trouble by not looking around to see what others do or say or think, but only making sure that what you do and say and think is the right thing. As Agathon says, do not look around at the depraved morals of others, but run straight along the correct path without deviating from it.

20. [...] That which is truly beautiful is not dependent on being praised; neither is that which is truly right, or honest, or helpful, or humble. Do any objects become beautiful simply from being praised, or ugly simply from being criticized? Does an emerald become worse than it was if it is not praised? Or gold, ivory, purple, a lyre, a pocket knife, a flower, a bush?

22. Do not be tossed around, but in every situation do what is right and understand correctly what is going on.

24. Philosophers say to focus on doing fewer things in order to be more tranquil. But it is better to say to focus on doing what is most necessary and most helpful for others. That brings not only the tranquility which comes from helping people, but also that which comes from doing fewer things. Most of what we say and do and think is actually unnecessary; if you eliminate that, you will have more time and more tranquility. [...]

25. Try out living the life of a good man, the life of one who is content with what he has, and who makes certain that his own actions and thoughts are benevolent.

32. [...] Think about all of those you have known who have died, who while they were alive distracted themselves with meaningless things, neglecting to do what they should have, and to stick to that and be content with that. Remember to pay the proper amount of attention to each thing, in proportion with its true importance.

35. Everything exists only for a moment, both the famous and their fame.

38. Examine men's governing principles, especially those of the wise, what kind of things they avoid doing, and what kind they do.

49. [...] Can any misfortune prevent you from being just, generous, restrained, prudent, secure against those who are rude or dishonest; can it prevent you from having humility, freedom, and other good qualities? Remember this principle whenever something happens that bothers you: that this situation occurred is not a misfortune, but to handle the situation well is good fortune.

51. Always take to the most direct and natural path, and accordingly make the most rational choices in everything you say and do. By doing that, you will avoid much trouble, argument, deceit, and pretense.

#### Book V

6. One man, when he has done a service to another, is ready to set it down to his account as a favor conferred. Another is not ready to do this, but still in his own mind he thinks of the man as his debtor, and he knows what he has done. A third in a manner does not even think about what he has done, but he is like a vine which has produced grapes, and seeks for nothing more after it has once produced its proper fruit. As a horse when he has run, a dog when he has tracked the game, a bee when it has made the honey, so a man when he has done a good act, does not call out for others to come and see, but he goes on to another act, as a vine goes on to produce again the grapes in season. [...]

9. Do not be not disgusted, nor discouraged, nor dissatisfied, if you do not succeed in doing everything according to right principles; but when you have failed, return back again, and be content if the greater part of what you do is consistent with man's nature, and love this to which you return[....]

16. Such as are your habitual thoughts, such also will be the character of your mind; for the soul is dyed by the thoughts. Dye it then with a continuous series of suitable thoughts[....]

20. In one respect humanity is the most important to me, so far as I must do good to men and endure them. But so far as some men make themselves obstacles to my proper acts, man becomes to me one of the things which are indifferent, no less than the sun or wind or a wild beast. Now it is true that these may impede my action, but they are no impediments to my feelings and disposition, which have the power of acting conditionally and changing: for the mind converts and changes every hindrance to its activity into an aid; and so that which is a hindrance is made a furtherance to an act; and that which is an obstacle on the road helps us on this road.

34. You can live your life in an equable flow of happiness, if you can advance by the right way, and think and act in the right way. These two things are common both to the soul of God and to the soul of man, and to the soul of every rational being: not to be hindered by others; and to consider goodness to consist in the disposition to justice and the practice of it, and in this to let your desire find its destination.

37. [...] Fortunate means that a man has assigned to himself a good fortune: and a good fortune is good disposition of the soul, good emotions, good actions.

#### Book VI

3. Look beyond the surface of things. Let neither the true nature of anything nor its value escape you.

6. The best way of avenging yourself is not to become like the wrongdoer.

7. Take pleasure in one thing and rest in it, in going from one unselfish action to another unselfish action, thinking of God.

11. When circumstances have forcibly disturbed your state of mind, return to a composed state of mind as quickly as possible. You will gain a greater mastery by continually returning to a composed state of mind.

19. If something is difficult for you to do, do not think that it is completely impossible for anyone. And if something is humanly possible, think that you can accomplish it too.

20. In a wrestling competition, suppose that a man has injured you[...] Well, you are not angered or offended, nor do you suspect him of being a treacherous fellow afterwards. You are simply on your guard against him in future competitions, without treating him as an enemy or with suspicion, but just quietly being careful. Let your behavior be like this in other parts of life; overlook many deeds by those who are like opponents in the gymnasium. For it is within our power to simply be careful, and to feel no suspicion or hatred toward them.

21. If anyone is able to convince me and show me that I what I think or do is not correct, I will gladly change; for I want to find the truth, and the truth has never harmed anyone. But continuing in error and ignorance does harm a person.

30. Be careful that you do not become a dictator, that you are not covered with that stain, for it could happen to you. Make sure you remain straightforward, good, pure, serious, unpretentious, committed to justice, spiritual, kind, affectionate, strenuous in always doing the right thing. Strive to live up to the ideals of your beliefs. Honor God and help people. Life is short. There is only one fruit of this life, a good character and acts that help others. Always follow the example of Antoninus [the previous “good emperor”]. Remember how he always did whatever made the most sense; and his steadiness in all matters; and his piety; and his composure; and his benevolence; and his modesty; and his determination to understand things, studying everything very carefully until he truly understood it; and how he was patient with those who blamed him unjustly without blaming them in return; how he took his time with everything; and how he ignored backbiters; and how good a judge of character and actions he was; and not inclined to attack people, nor cowardly, nor suspicious, nor fond of intellectual pretense; and how he was satisfied with just the essentials in terms of lodging, bed, dress, food, servants; and

how hardworking and patient; [...] and his reliability and constancy in his friendships; and how he allowed those who disagreed with him to speak freely; and the pleasure that he had when any man had a better idea or talent than he did; and how he was religious but not superstitious. Do all of this also so that when your last hour comes, you may have as good a conscience as he had.

44. [...] I was created to be rational and helpful. I am a citizen of Rome, but also of the world. Only actions that are truly helpful for Rome and helpful for the world are good for me to do.

47. Think continually that all kinds of men of all kinds of pursuits and of all nations are dead[...] The only thing that is worthwhile is to live your life honestly and justly, with a benevolent disposition even to liars and unjust men.

48. When you want to encourage yourself, think of the virtues of those around you—for example, the energy of one, and the modesty of another, and the generosity of a third, and some other good quality of a fourth. For nothing is as encouraging as the positive examples of people we know[....]

53. Always listen carefully to what another person says, and get inside the speaker's mind as much as possible.

54. That which is not good for the swarm is also not good for the bee.

59. What kind of people are those whom men wish to please, and for what purposes, and by what kind of acts? How soon time will erase all things, and how many it has erased already.

### Book VII

5. Do I know how to accomplish an important task correctly? If so, then it is my responsibility to apply my abilities to accomplish the task. If not, then I should let someone who is more capable do the task, unless no one else is available. In that case, I should do the best I can, making use of any assistance from others, in order to accomplish tasks that are important and help the world. Whatever I work on by myself or with others must be something that will be useful and helpful to society.

7. Do not be ashamed to let others help you when needed, just as an injured soldier is helped over a barricade by other soldiers.

8. Do not worry about future things with your current mind. Your future mind will deal with them if necessary.

15. Regardless of what anyone else does or says, I can be good, just as regardless of what anyone does or says, gold, emeralds, and purple fabric keep their colors.

26. When a man has tried to harm you, immediately consider what beliefs about good and evil he had that led to his actions. When you have understood that, you will pity him instead of being confused or angry. He may have the same beliefs about good and evil that you do, in which case you should pardon him for acting based on a misunderstanding. Or he may have different beliefs about good and evil, in which case you should be more understanding of his mistakes.

27. Do not think about things you do not have, but rather the things you do have. Enjoy what you have; imagine how much you would want it if you did not have it. At the same time, though, do not value what you have so much that you live in fear of losing it.

29. Stop daydreaming or being yanked around by events. Focus your thoughts on the present. Develop a good understanding of what is happening to you or to others. Divide up the problem and consider the causes and the components. Keep in mind what will matter most at the end of your life. If someone else has done something wrong, leave it.

30. Pay close attention to what is said. Gain an understanding of what happens and what makes it happen.

31. Equip yourself with simplicity and humility, and ignore everything but right and wrong. Help humanity. Follow God. [...]

34. About fame: Examine the minds of those who seek fame; observe what they are, and what kind of things they avoid, and what kind of things they pursue. What they seek is like shifting sand dunes that bury earlier sand dunes; in life, famed accomplishments are quickly buried by later events.

36. As Antisthenes said, helping people and being criticized for that is all part of the job.

38. Do not bother being angry at the world, for the world will not notice.

54. Everywhere and at all times it is within your power to accept your current circumstances with humility, to treat those you interact with properly, and to make sure you examine all of your present thoughts carefully and rationally.

56. Imagine if you were dead, if your life had just ended now. Now live the rest of the life that you do have in the best way.

61. The art of living is more like wrestling than dancing, in so far as it stands ready against the accidental and the unforeseen, and is not apt to fall.

62. Constantly observe the people whose approval you vainly hope to gain, and see what they are really like. When you consider how flawed their thinking is, you will not be angry that they disapprove of you, nor will you want their approval.

67. You cannot choose most of the circumstances of your life. It is very possible to be a good man and never to receive any recognition for it; do it anyway. Very little is actually required to live a happy life. And whatever limits your personal abilities and knowledge may have, you always can and should be free, humble, helpful to others, and obedient to God.

71. It is silly for a man not try to escape from his own faults, which is indeed possible, but to expect to escape from other men's faults, which is impossible.

73. When you have helped someone else, why do you expect anything in return, as fools do, either to receive recognition for your good deed or to obtain something in return?

13. Always evaluate everything you encounter using the principles of science, ethics, and logic.
16. Remember that to change your mind and to follow one who corrects you is to be no less a free agent than you were before. [...]
22. Focus on what you need to do right now, whether it is thoughts or actions or words.
32. It is your duty to conduct every part of your life as well as possible; if you have done as well as you can in each part, be satisfied. No one can stop you from attempting to do your duty, even though they may stop you from succeeding. No one can stop you from behaving with justice, self-control, and consideration, even though they may hinder your external actions. If there are insurmountable obstacles to something you want to accomplish, focus on whatever other useful things you can do.
33. Accept fortune or success without arrogance, and be ready to let it go without complaint.
35. [...] Just as the flow of the universe takes whatever happens or whatever tries to oppose it and makes it part of its flow, so also a person can adopt and make good use of every hindrance in life.
36. Do not stress yourself out by thinking about the rest of your life. Do not spend time thinking about all the various problems that might happen to you. In every situation you are currently experiencing, ask yourself whether it is so intolerable that you cannot bear it for a moment, and you will realize that it is bearable. Then remember that you cannot really be hurt right now by either the future or the past, but only by the present. But the present is only a tiny fraction of your life, and is all that you need to worry about and to endure.
44. Give yourself the gift of living in the present. Those who would rather dream about achieving posthumous fame should consider that the people of the future will be exactly like the people whom they cannot stand now, and will all die anyway. And how does it affect you in any way if people of the future should say this or that about you, or have this or that opinion about you?
47. If you are bothered by any external thing, it is not really the thing that bothers you, but rather your own thoughts about it. And it is within your power to wipe out those thoughts right now. But if anything in your own mind bothers you, who is stopping you from correcting your mind? And if you are bothered because you are not doing some particular thing that you feel is right, why not just do it instead of being bothered? But if you try to do the right thing but are prevented by some external insurmountable obstacle, do not be bothered, for you are not at fault. Can you live peacefully without having done what you could not do? Live and leave your life fully satisfied that you did everything you could.
51. Suppose that men kill you, cut you into pieces, curse you. What then can these things do to prevent your mind from remaining pure, wise, sober, and just? For instance, if a man should stand by a clear pure spring and curse it, the spring does not cease sending up drinkable water; and if he should toss dirt or waste into the spring, it will rapidly disperse them and wash them out, and will not be permanently polluted at all. How then



can you possess a perpetual fountain and not a mere well? By working every present moment to keep your mind free, contented, straightforward, and humble.

52. He who does not know what the world truly is, does not know where he is. And he who does not know for what purpose the world exists, does not know who he is, nor what the world is. He who has failed to consider these things could not even say for what purpose he himself exists. Why would anyone seek the praise of such people who do not know where they are or who they are?

53. Do you really expect the praise of people who cannot go 20 minutes without cursing themselves? Would you want to please the sort of person who is incapable of even pleasing himself? [...]

59. People exist for the sake of each other. Therefore teach them or at least be patient with them.

61. Get a clear understanding of other people's minds, and let them get a clear understanding of yours.

#### Book IX

2. It would be a person's happiest lot to depart from life without ever having encountered dishonesty and hypocrisy and greed and pride. However to depart one's life when one has had enough of these things is the next best voyage, as the saying goes. Or have you decided to live with evil, and have your experiences not yet persuaded you to flee from this pestilence? For the corruption of the mind is a pestilence, much more indeed than any actual disease in the natural world. [...]

3. [...] You will most easily be made content to die by considering the things from which you are going to escape, and the evils of the people you will no longer have to deal with. You should not be angry at men, since it is your duty to care for them and to bear with them gently. Yet remember that the men you are leaving behind do not share your same principles. [...]

4. He who does wrong does wrong to himself. He who acts unjustly acts unjustly to himself, because he makes himself bad.

5. Often acting unjustly is failing to do a certain right thing, not only doing a certain wrong thing.

6. It is sufficient that always at the current moment your opinions are based on correct understanding, your actions are directed to helping people, and your attitude is acceptance of everything that is happening.

13. Today I have gotten out of all anxiety, or rather I have gotten all anxiety out of me, for it came not from outside, but from within me and in my perceptions.

16. The happiness and unhappiness of a rational, social being depends not on what he feels but on what he does, just as his virtue and vice consist not in feeling, but in doing.

20. It is your duty to leave another man's wrongful act there where it is.

27. When another blames you or hates you, or when men say anything injurious about you, consider their poor souls, look within them, and see what kind of men they are.

You will discover that there is no reason to worry that these men may have this or that opinion about you. Nonetheless, you must be benevolent towards them, for by nature they are fellow humans. [...]

29. [...] How worthless are all those foolish people who engage in political squabbles or merely pretend to be philosophers, producing only drivel. Instead, you should do what the world truly needs. Set yourself in motion, if it is within your power, and do not look around you to see if anyone is watching, nor expect an ideal situation like Plato's Republic. Be content if you can make even small improvements to the world, and consider that to be important. It is important to change men's minds. If you do not change their minds, even the best you could get would be something like the slavery of men who groan while they pretend to obey. [...] The work of philosophy is simple and modest. Do not get sidetracked by laziness or pride.

31. Be unaffected by things which come from external causes; be committed to justice in the things you do based on your internal causes. That is, let your motions and actions all be to help people, for this is what you were created to do.

32. You can eliminate most of the useless things which disturb you, for they lie entirely in your perceptions; and you will then gain for yourself ample space by comprehending the whole universe in your mind, and by contemplating the eternity of time, and observing the rapid change of everything, how short is the time from birth to dissolution, and the infinite time before birth as well as the equally boundless time after death.

41. [...] Never abandon philosophy no matter what happens. Do not waste time debating with an ignorant man or a fool[...] Focus only on what you are doing now and on the means by which you do it.

42. When you are angered at any man's shameless conduct, immediately ask yourself how it could be possible that there would be no shameless men in the world. It is not possible. Do not, then, expect what is impossible. This man you encountered just happens to be one of those shameless men who must exist in the world. Remember the same considerations with regard to the vicious man, the untrustworthy man, and every man who does wrong in any way. If you remind yourself that it is impossible that such kinds of men should not exist, you will be more tolerant of the individual examples you encounter. [...] For the fault is manifestly your own, why did you believe that a man who had such a disposition would keep his promise, or [...] would repay you? [...] Just remember that you yourself should be benevolent and act for the common good regardless, and be content with that.

### Book X

8. When you have adopted these traits—good, modest, true, rational, a man of equanimity, and magnanimous—take care that you do not change these traits; and if you should lose them, quickly return to them. [...] It will greatly help you, if you remember that the gods do not wish to be flattered, but wish all reasonable beings to be made like themselves; and if you remember that what fulfills the job of a fig-tree is a fig-tree, and that what fulfills the job of a dog is a dog, and that what fulfills the job of a bee is a bee, and that what fulfills the job of a man is a man.

9. Operatics, war, shock, torpor, slavery, will daily wipe out those holy principles of yours. [...]

11. [...] But as to what any man shall say or think about him or do against him, he never even thinks of it, being himself contented with these two things, with acting justly in what he does right now, and being satisfied with what is currently assigned to him; and he lays aside all distracting and busy pursuits, and desires nothing else than to accomplish the straight course through the law, and by accomplishing the straight course to follow God.

12. What need is there of suspicious fear, since it is in your power to inquire what ought to be done? And if you see clearly, go by this way content, without turning back: but if you do not see clearly, stop and take the best advisers. But if any other things oppose you, go on according to your powers with due consideration, keeping to that which appears to be right. For it is best to reach this object, and if you fail, let your failure be in attempting this. [...]

13. Inquire of yourself as soon as you wake from sleep, whether it will make any difference to you, if another blames you for doing what is just and right. It will make no difference.

30. When you are offended at any man's fault, immediately turn to yourself and reflect in what similar manner you err yourself; for example, in thinking that money is a good thing, or pleasure, or a bit of reputation, and the like. For by attending to this you will quickly forget your anger, if this consideration also is added, that the man was compelled: for what else could he do? Or if you are able, remove what compelled him [to err].

32. Let no man be able to say truthfully that you are not straightforward or that you are not good; but let him be a liar whoever shall think anything of this kind about you; and this is altogether within your power. [...]

35. The healthy eye ought to see all visible things and not to say, "I wish for green things," for this is the condition of a diseased eye. And the healthy hearing and smelling ought to be ready to perceive all that can be heard and smelled. And the healthy stomach ought to treat all food just as the mill treats all things which it is formed to grind. And accordingly the healthy mind ought to be prepared for everything which happens. But a mind that says, "Let my dear children live, and let all men praise whatever I may do," is an eye which seeks for green things, or teeth which seek for soft things.

36. There is no man so fortunate that there shall not be by him when he is dying some who are pleased with what is going to happen. [...]

37. Accustom yourself as much as possible when anyone does anything to ask yourself, "Why is this person doing this?" But begin with yourself, and examine yourself first.

#### Book XI

4. Have I done something for the common good? Well then I have had my reward. Let this always be present in your mind, and never stop doing such good.

5. What is your job? To do good. And how is this accomplished well except by knowledge of general principles, some about the nature of the universe, and others about the proper constitution of man?

9. As those who try to stand in your way, when you are proceeding according to right reason, will not be able to divert you from your proper action, so neither let them drive

you from your benevolent feelings towards them, but be on your guard equally in both matters, not only in the matter of steady judgment and action, but also in the matter of gentleness towards those who try to hinder or otherwise trouble you. For this also is a weakness, to be vexed at them, as well as to be diverted from your course of action and to give way through fear; for both are equally deserters from their post, the man who does it through fear, and the man who is angered with him who is by nature a kinsman and a friend.

13. Suppose any man shall despise me. Let him attend to that himself. But I will focus on ensuring that I am not discovered doing or saying anything deserving of contempt. Shall any man hate me? Let him attend to it. But I will be mild and benevolent towards every man, and ready to show even him his mistake, not reproachfully, nor yet as making a display of my endurance, but nobly and honestly[...] For what harm is it to you, if you are now doing what is proper for your own nature, and are satisfied with that which at this moment is suitable to the nature of the universe? You are a human being placed at your post in order to help humanity in some way.

15. How unsound and insincere is he who says, “I have determined to deal with you in a fair way.” What is he doing? One should never say this. Honesty will soon show itself by acts. The voice ought to be plainly written on the forehead. Such as a man’s character is, he immediately shows it in his eyes, just as he who is beloved immediately reads everything in the eyes of lovers. The man who is honest and good ought to be exactly like a man with a strong scent, so that the bystander as soon as he comes near him must smell whether he chooses or not. But the pretense of straightforwardness is like a crooked stick. Nothing is more disgraceful than a false friendship. Avoid this most of all. The good and straightforward and benevolent show all these things in the eyes, and there is no mistaking.

18. If any have offended you, consider:

First, what is my relation to men—we are made for one another; and in another respect, I was made to watch over them[...]

Second, consider what kind of men they are in everyday life, and particularly under what strong beliefs they act. As to their acts, consider how their pride affects their actions.

Third, that if men are right in what they do, we ought not to be displeased; but if they are not right, it is plain that they act involuntarily and in ignorance. For as every soul is unwillingly deprived of the truth, so also is it unwillingly deprived of the power of behaving to each man as he deserves. Accordingly men are pained when they are called unjust, ungrateful, and greedy, and in a word wrong-doers to their neighbors.

Fourth, consider that you also do many things wrong, and that you are a man like others; and even if you refrain from certain wrongs, you still have the natural inclination to commit them, even if you refrain from such wrongs due to fearfulness, or concern about reputation, or some such impure motive.

Fifth, consider that you do not even know for certain whether men are doing wrong or not, for many things depend on the specific circumstances. And in short, a man must learn a great deal to enable him to pass a correct judgment on another man’s acts.

Sixth, consider when you are greatly angered or grieved, that man's life is only a moment, and after a short time we are all laid out dead.

Seventh, that it is not men's acts which harm us, for those acts have their foundation in their own decisions, but it is our own feelings which harm us. Take away these feelings then, and resolve to dismiss your judgment about an act as if it were something grievous, and your anger is gone. How then shall you take away these feelings? By reflecting that no wrongful act of another brings shame on you. [...]

Eighth, consider how much more pain is brought on us by the anger and vexation caused by such acts than by the acts themselves, at which we are angry and vexed.

Ninth, consider that a good attitude is invincible, if it is genuine, and not an affected smile and acting a part. For what can the most vicious man do to you, if you continue to be kind towards him, and if, as opportunity offers, you gently teach him and calmly correct his errors at the very time when he is trying to do you harm[...]

Remember these nine rules, as if they were a gift from the Muses, and begin at last to live like an adult. But you must equally avoid flattering men and being angered by them, for both are unsocial and lead to harm. And remember this truth in the excitement of anger: to be moved by passion is not adult, but mildness and gentleness, as they are more agreeable to human nature, are also more adult. One who possesses these qualities possesses strength, nerves, and courage, and not the man who is subject to fits of passion and discontent. For the closer a man's mind is to freedom from all passion, the closer it also is to strength; as the sense of pain is a characteristic of weakness, so also is anger. For he who yields to pain and he who yields to anger, both are wounded and both submit.

But if you will, receive also a tenth present from the leader of the Muses: [...] to expect bad men not to do wrong is madness, for he who expects this desires an impossibility.

### Book XII

3. There are three things of which you are composed: a little body, a little breath (life), intelligence. Of these the first two are yours, so far as it is your duty to take care of them; but only the third is truly yours. Therefore if you ignore whatever others do or say, and whatever you have done or said yourself, and whatever future things worry you because they may happen, and whatever happens in the body [...] or in the breath (life), [...] and whatever the surrounding vortex whirls round, [...] doing what is just and accepting what happens and saying the truth: [...] if you will strive to live only what is really your life—that is, the present—then you will be able to live the rest of your life unperturbed, nobly, and obedient to your own spirit[...]

4. I have often wondered how it is that every man loves himself more than all the rest of men, yet sets less value on his own opinion of himself than on the opinions of others. If then a god or a wise teacher should present himself to a man and compel him that whatever he thought or planned he must proclaim as soon as he conceived it, he could not endure it even for a single day. [\[Perhaps this is the fatal flaw with the internet and social media!\]](#) We care so much more about what our neighbors shall think of us than what we shall think of ourselves.

6. Practice doing even the things which seem impossible to accomplish. For even the

left hand, which is ineffectual for all other things for want of practice, holds the bridle better than the right hand; for it has practiced doing this.

16. When it appears that a man has done something wrong, say: How then do I know if this is a wrongful act? And even if he has done wrong, how do I know that he has not already condemned himself? [...] One who expects evil men not to do evil is like one who expects fig trees not to produce fig juice, and infants not to cry, and horses not to neigh, and other things that are bound to occur. For what will a man do who has such an evil character? If you are still angry, improve this man's character.

17. If it is not right, do not do it; if it is not true, do not say it. Let your efforts be just.

18. In everything always study closely whatever you encounter, and analyze it by dividing it into the cause, the composition, the purpose, and the timeline of its existence.

19. Perceive at last that you have within you something better and more divine than the things which cause your various feelings, and pull you by the strings like a puppet. What feeling is currently in your mind? Is it fear, or suspicion, or desire, or anything of the kind?

20. First, do nothing without consideration nor without purpose. Second, focus your actions only on helping people.

21. Consider that before long you will be nobody and nowhere, nor will any of the things exist which you now see, nor any of those who are now living. For all things are formed by nature to change and be transformed and to perish in order that other things may exist in continuous succession.

25. Throw away opinions and you will be fine. Who then is stopping you from throwing them away?

26. When you are troubled about anything, you have forgotten this: that all things happen according to the nature of the universe; [...] how close is the kinship between a man and the whole human race, for it is a community, not of a little blood or seed, but of intelligence.; [...] that nothing is a man's own, but that his child and his body and his very soul came from the deity; that everything is opinion; that every man lives in the present time only, and loses only this.

32. How small a part of the boundless and unfathomable time is assigned to every man, for it is very soon swallowed up in the eternal! And how small a part of the whole substance; and how small a part of the universal soul; and on what a small piece of the whole earth you crawl about! In view of all this, consider nothing to be important, except to act as you should, and to endure whatever nature brings you.

36. Man, you have been a citizen in this great state (the world); what difference does it make to you for how many years? The laws of life apply to everyone. Where is the hardship then, if no tyrant or unjust judge sends you away from the world, but nature, who brought you into it? It is the same as if a producer who has employed an actor dismisses him from the stage. "But I have not finished the five acts, but only three of them," you may well say. But in life the three acts are the whole drama; for what shall be a complete drama is determined by him who was the cause of its beginning, and now of its end; you have control over neither. Leave the world then satisfied, for he also who releases you is satisfied.

### 12.3.5 Niccolò Machiavelli

Niccolò Machiavelli (1469–1527) was a very shrewd Italian politician who closely observed how powerful people behaved in his world, and also carefully studied how powerful people had behaved in history back to antiquity. He distilled what he had learned into two major books, *The Prince* (1513) and *Discourses on Livy* (1517). While some other authors described how the world should be or how people should behave, Machiavelli described how things really were, even though much of the behavior he described was not ethical. Many readers have mistakenly believed that Machiavelli was advocating for such unethical behavior. (“Machiavellian” came to be used as an adjective to describe unscrupulous or duplicitous behavior.) In fact, he was simply and accurately describing unethical political behavior—how it worked and why so many people resorted to it. It is vital to understand unethical political behavior if one wants to prevent it, to avoid being defeated by it, or to combat it successfully.

Machiavelli was an important non-scientific innovator, one of the founders of political science, and therefore well worth studying for that reason. Yet at a deeper level, many of the political strategies and evils he described in Italian politics from centuries ago are still widespread in the modern world, including the scientific research world.

As I mentioned in discussing Sun Tzu, one should try very hard not to create enemies, yet it is almost inevitable that just the presence of a (scientific) innovator will trigger some people to declare themselves implacable enemies of the innovator and their innovations. As with Sun Tzu, reading Machiavelli in the right context can help innovators to better anticipate and defend against such enemies. Moreover, many of Machiavelli’s strategies can be followed quite ethically and effectively by an innovator who is trying to make wise choices.

I recommend reading all of *The Prince* and *Discourses on Livy* in a good modern translation.

Here are some excerpts from Machiavelli’s *The Prince*, translated by Luigi Ricci and E. R. P. Vincent [Machiavelli 1950]:

[Ch. 3:] [I]t must be noted, that men must either be caressed or else annihilated; they will revenge themselves for small injuries, but cannot do so for great ones; the injury therefore that we do to a man must be such that we need not fear his vengeance.

[Ch. 6:] [A] prudent man should always follow in the path trodden by great men and imitate those who are most excellent, so that if he does not attain to their greatness, at any rate he will get some tinge of it. He will do like prudent archers, who when the place they wish to hit is too far off, knowing how far their bow will carry, aim at a spot much higher than the one they wish to hit, not in order to reach this height with their arrow, but by help of this high aim to hit the spot they wish to. [...]

It must be considered that there is nothing more difficult to carry out, nor more doubtful of success, nor more dangerous to handle, than to initiate a new order of things. For the reformer has enemies in all those who profit by the old order, and only lukewarm defenders in all those who would profit by the new order, this lukewarmness arising partly from fear of their adversaries, who have the laws in their favour; and partly from the incredulity of mankind, who do not truly believe in anything new until they have had actual experience of it. Thus it arises that on every opportunity for attacking the reformer, his opponents do so with the zeal of partisans, the others only defend him half-heartedly, so that between them he runs great danger.

[Ch. 15:] It now remains to be seen what are the methods and rules for a prince as regards his subjects and friends. And as I know that many have written of this, I fear that my writing about it may be deemed presumptuous, differing as I do, especially in this matter, from the opinions of others. But my intention being to write something of use to those who understand, it appears to me more proper to go to the real truth of the matter than to its imagination; and many have imagined republics and principalities which have never been seen or known to exist in reality; for how we live is so far removed from how we ought to live, that he who abandons what is done for what ought to be done, will rather learn to bring about his own ruin than his preservation. A man who wishes to make a profession of goodness in every thing must necessarily come to grief among so many who are not good. Therefore it is necessary for a prince, who wishes to maintain himself, to learn how not to be good, and to use this knowledge and not use it, according to the necessity of the case.

[Ch. 17:] [H]e must be cautious in believing and acting and must not be afraid of his own shadow, and must proceed in a temperate manner with prudence and humanity, so that too much confidence does not render him incautious, and too much diffidence does not render him intolerant.

From this arises the question whether it is better to be loved more than feared, or feared more than loved. The reply is, that one ought to be both feared and loved, but as it is difficult for the two to go together, it is much safer to be feared than loved, if one of the two has to be wanting. For it may be said of men in general that they are ungrateful, voluble, dissemblers, anxious to avoid danger, and covetous of gain; as long as you benefit them, they are entirely yours; they offer you their blood, their goods, their life, and their children, as I have before said, when the necessity is remote; but when it approaches, they revolt. And the prince who has relied solely on their words, without making other preparations, is ruined; for the friendship which is gained by purchase and not through grandeur and nobility of spirit is bought but not secured, and at a pinch is not to be expended in your service. And men have less scruple in offending one who makes himself loved than one who makes himself feared; for love is held by a chain of obligation which, men being selfish, is broken whenever it serves their purpose; but fear is maintained by a dread of punishment which never fails.

Still, a prince should make himself feared in such a way that if he does not gain love, he at any rate avoids hatred; for fear and the absence of hatred may well go together

[Ch. 18:] Everybody sees what you appear to be, few feel what you are, and those few will not dare to oppose themselves to the many, who have the majesty of the state to defend them; and in the actions of men, and especially of princes, from which there is no appeal, the end justifies the means. Let a prince therefore aim at conquering and maintaining the state, and the means will always be judged honourable and praised by every one, for the vulgar is always taken by appearances and the issue of the event; and the world consists only of the vulgar, and the few who are not vulgar are isolated when the many have a rallying point in the prince. A certain prince of the present time, whom it is well not to name, never does anything but preach peace and good faith, but he is really a great enemy to both[....]

[Ch. 19:] From these causes it resulted that Marcus, Pertinax, and Alexander, being all



of modest life, lovers of justice, enemies of cruelty, humane and benign, all came to a sad end except Marcus. [...]

Whence it may be seen that hatred is gained as much by good works as by evil[....]

[Ch. 21:] [I]t will always happen that the one who is not your friend will want you to remain neutral, and the one who is your friend will require you to declare yourself by taking arms. Irresolute princes, to avoid present dangers, usually follow the way of neutrality and are mostly ruined by it. But when the prince declares himself frankly in favour of one side, if the one to whom you adhere conquers, even if he is powerful and you remain at his discretion, he is under an obligation to you and friendship has been established, and men are never so dishonest as to oppress you with such a patent ingratitude. Moreover, victories are never so prosperous that the victor does not need to have some scruples, especially as to justice. But if your ally loses, you are sheltered by him, and so long as he can, he will assist you; you become the companion of a fortune which may rise again. In the second case, when those who fight are such that you have nothing to fear from the victor, it is still more prudent on your part to adhere to one; for you go to the ruin of one with the help of him who ought to save him if he were wise, and if he conquers he rests at your discretion, and it is impossible that he should not conquer with your help. [...]

Let no state believe that it can always follow a safe policy, rather let it think that all are doubtful. This is found in the nature of things, that one never tries to avoid one difficulty without running into another, but prudence consists in being able to know the nature of the difficulties, and taking the least harmful as good.

A prince must also show himself a lover of merit, give preferment to the able, and honour those who excel in every art. Moreover he must encourage his citizens to follow their callings quietly, whether in commerce, or agriculture, or any other trade that men follow, so that this one shall not refrain from improving his possessions through fear that they may be taken from him, and that one from starting a trade for fear of taxes; but he should offer rewards to whoever does these things, and to whoever seeks in any way to improve his city or state.

[Ch. 22:] The choice of a prince's ministers is a matter of no little importance; they are either good or not according to the prudence of the prince. The first impression that one gets of a ruler and of his brains is from seeing the men that he has about him. When they are competent and faithful one can always consider him wise, as he has been able to recognise their ability and keep them faithful. But when they are the reverse, one can always form an unfavourable opinion of him, because the first mistake that he makes is in making this choice. [...]

There are three different kinds of brains, the one understands things unassisted, the other understands things when shown by others, the third understands neither alone nor with the explanations of others. The first kind is most excellent, the second also excellent, but the third useless. [...] For every time the prince has the judgment to know the good and evil that any one does or says, even if he has no originality of intellect, yet he can recognise the bad and good works of his minister and correct the one and encourage the other; and the minister cannot hope to deceive him and therefore remains good.

For a prince to be able to know a minister there is this method which never fails. When you see the minister think more of himself than of you, and in all his actions seek his own profit, such a man will never be a good minister, and you can never rely on him; for whoever has in hand the state of another must never think of himself but of the prince, and not mind anything but what relates to him. And, on the other hand, the prince, in order to retain his fidelity ought to think of his minister, honouring and enriching him, doing him kindnesses, and conferring on him honours and giving him responsible tasks, so that the great honours and riches bestowed on him cause him not to desire other honours and riches, and the offices he holds make him fearful of changes. When princes and their ministers stand in this relation to each other, they can rely the one upon the other; when it is otherwise, the result is always injurious either for one or the other of them.

[Ch. 23:] [T]here is no other way of guarding one's self against flattery than by letting men understand that they will not offend you by speaking the truth; but when every one can tell you the truth, you lose their respect. A prudent prince must therefore take a third course, by choosing for his council wise men, and giving these alone full liberty to speak the truth to him[....]

Likewise, here are examples of insights from Machiavelli's *Discourses on Livy*, translated by Christian E. Detmold [Machiavelli 1950]:

[Book 1, Ch. 3:] All those who have written upon civil institutions demonstrate (and history is full of examples to support them) that whoever desires to found a state and give it laws, must start with assuming that all men are bad and ever ready to display their vicious nature, whenever they may find occasion for it. If their evil disposition remains concealed for a time, it must be attributed to some unknown reason; and we must assume that it lacked occasion to show itself; but time, which has been said to be the father of all truth, does not fail to bring it to light.

[M]en act right only upon compulsion; but from the moment that they have the option and liberty to commit wrong with impunity, then they never fail to carry confusion and disorder everywhere. It is this that has caused it to be said that poverty and hunger make men industrious, and that the law makes men good; and if fortunate circumstances cause good to be done without constraint, the law may be dispensed with. But when such happy influence is lacking, then the law immediately becomes necessary.

[Book 1, Ch. 37:] It was a saying of ancient writers, that men afflict themselves in evil, and become weary of the good, and that both these dispositions produce the same effects. For when men are no longer obliged to fight from necessity, they fight from ambition, which passion is so powerful in the hearts of men that it never leaves them, no matter to what height they may rise. The reason of this is that nature has created men so that they desire everything, but are unable to attain it; desire being thus always greater than the faculty of acquiring, discontent with what they have and dissatisfaction with themselves result from it. This causes the changes in their fortunes; for as some men desire to have more, whilst others fear to lose what they have, enmities and war are the consequences; and this brings about the ruin of one province and the elevation of another.

[T]he ambition of the nobles is so great, that, if it is not repressed by various ways and means in any city, it will quickly bring that city to ruin. So that if the contentions about the agrarian law needed three hundred years to bring Rome to a state of servitude, she would have been brought there much quicker if the people, by these laws and other means, had not for so great a length of time kept the ambition of the nobles in check. This shows us also how much more people value riches than honors; for the Roman nobility always yielded to the people without serious difficulties in the matter of honors, but when it came to a question of property, then they resisted with so much pertinacity that the people, to satisfy their thirst for riches, resorted to the above-described extraordinary proceedings. The chief promoters of these disorders were the Gracchi, whose intentions in this matter were more praiseworthy than their prudence. For to attempt to eradicate an abuse that has grown up in a republic by the enactment of retrospective laws, is a most inconsiderate proceeding, and (as we have amply discussed above) only serves to accelerate the fatal results which the abuse tends to bring about; but by temporizing, the end will either be delayed, or the evil will exhaust itself before it attains that end.

[Book 1, Chapter 39:] Whoever considers the past and the present will readily observe that all cities and all peoples are and ever have been animated by the same desires and the same passions; so that it is easy, by diligent study of the past, to foresee what is likely to happen in the future in any republic, and to apply those remedies that were used by the ancients, or, not finding any that were employed by them, to devise new ones from the similarity of the events. But as such considerations are neglected or not understood by most of those who read, or, if understood by these, are unknown by those who govern, it follows that the same troubles generally recur in all republics.

[Book 2, Ch. 29:] [M]en who habitually live in great adversity or prosperity deserve less praise or less blame. For it will generally be found that they have been brought to their ruin or their greatness by some great occasion offered by Heaven, which gives them the opportunity, or deprives them of the power, to conduct themselves with courage and wisdom. It certainly is the course of Fortune, when she wishes to effect some great result, to select for her instrument a man of such spirit and ability that he will recognize the opportunity which is afforded him. And thus, in the same way, when she wishes to effect the ruin and destruction of states, she places men at the head who contribute to and hasten such ruin; and if there be any one powerful enough to resist her, she has him killed, or deprives him of all means of doing any good. [...]

I might cite some modern examples in confirmation of the views I have advanced, but do not deem it necessary, as that of the Romans suffices. I repeat, then, as an incontrovertible truth, proved by all history, that men may second Fortune, but cannot oppose her; they may develop her designs, but cannot defeat them. But men should never despair on that account; for, not knowing the aims of Fortune, which she pursues by dark and devious ways, men should always be hopeful, and never yield to despair, whatever troubles or ill fortune may befall them.

[Book 3, Ch. 21:] [M]en are so restless that the slightest opening for their ambition causes them quickly to forget all the affection for him with which the humanity of the prince had inspired them.

### 12.3.6 United States Declaration of Independence and Constitution

I have chosen to present here the U.S. Declaration of Independence (1776) and Constitution (1787 onward) because they were models for many other national constitutions and documents that came later, and also because they are most relevant for me as I have lived my life in the United States.<sup>14</sup> Other people are perfectly entitled to prefer other similar documents.

Probably the most important thing about these documents is their emphasis (which was novel for the time) that the government of a country should entirely come from and serve the people of that country—everyone, equal, all together—not rulers, politicians, family dynasties, wealthy individuals or corporations, other countries, etc. The Declaration states that “all men are created equal” with “unalienable Rights” and that “Governments are instituted among Men, deriving their just powers from the consent of the governed.” The Constitution begins with a giant, stylishly written “We the People” from which everything else proceeds. Moreover, while these are imperfect texts created by imperfect humans (and initially focused only on white men), readers can see how the codified tenets of the country have been steadily improved by amendments for over two centuries to protect more people and more human rights.

Of course, even a perfectly worded document would be useless if it were ignored or distorted by the people and government, so one must consider not only the text but the implementation of the text. The country has always found it unfortunately quite challenging to live up to these texts, now more than ever. But that is why it is so important to pay attention to these documents.

In these documents, I see historic advances in how societies can organize themselves in a manner beneficial to their members, and a foundation for further improvements in the future. You should read the whole Declaration of Independence, Constitution, and Amendments; below I have just picked out a few passages that I wanted to emphasize.

Declaration of Independence:<sup>15</sup>

In Congress, July 4, 1776

The unanimous Declaration of the thirteen united States of America,

When in the Course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature’s God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. —That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed,

<sup>14</sup>Besides, the U.S. Constitution was good enough to impress Carl Sagan (pp. 203–207) and even Captain Kirk (“The Omega Glory” episode of the original *Star Trek* television series).

<sup>15</sup><https://guides.loc.gov/declaration-of-independence>

<https://www.archives.gov/founding-docs/declaration>

–That whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness. Prudence, indeed, will dictate that Governments long established should not be changed for light and transient causes; and accordingly all experience hath shewn, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same Object evinces a design to reduce them under absolute Despotism, it is their right, it is their duty, to throw off such Government, and to provide new Guards for their future security. –Such has been the patient sufferance of these Colonies; and such is now the necessity which constrains them to alter their former Systems of Government. The history of the present King of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute Tyranny over these States. To prove this, let Facts be submitted to a candid world.

[There is a long list of human rights abuses that had prompted the Declaration of Independence, including examples of government officials exploiting their citizens or failing to protect them from exploitation.]

In every stage of these Oppressions We have Petitioned for Redress in the most humble terms: Our repeated Petitions have been answered only by repeated injury. A Prince whose character is thus marked by every act which may define a Tyrant, is unfit to be the ruler of a free people.

Nor have We been wanting in attentions to our Brittish brethren. We have warned them from time to time of attempts by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity, and we have conjured them by the ties of our common kindred to disavow these usurpations, which, would inevitably interrupt our connections and correspondence. They too have been deaf to the voice of justice and of consanguinity. We must, therefore, acquiesce in the necessity, which denounces our Separation, and hold them, as we hold the rest of mankind, Enemies in War, in Peace Friends.

We, therefore, the Representatives of the united States of America, in General Congress, Assembled, appealing to the Supreme Judge of the world for the rectitude of our intentions, do, in the Name, and by Authority of the good People of these Colonies, solemnly publish and declare, That these United Colonies are, and of Right ought to be Free and Independent States; that they are Absolved from all Allegiance to the British Crown, and that all political connection between them and the State of Great Britain, is and ought to be totally dissolved; and that as Free and Independent States, they have full Power to levy War, conclude Peace, contract Alliances, establish Commerce, and to do all other Acts and Things which Independent States may of right do. And for the support of this Declaration, with a firm reliance on the protection of divine Providence, we mutually pledge to each other our Lives, our Fortunes and our sacred Honor.

Constitution:<sup>16</sup>

## We the People

of the United States, in Order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this Constitution for the United States of America.

[There are seven interesting but lengthy Articles describing in detail the legislative, executive, and judicial branches of government. Then there follow the Amendments, the first ten of which are collectively called the Bill of Rights.]

Amendment 1 [1791]. Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances.

Amendment 2 [1791]. A well regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed.<sup>17</sup>

Amendment 3 [1791]. No Soldier shall, in time of peace be quartered in any house, without the consent of the Owner, nor in time of war, but in a manner to be prescribed by law.

Amendment 4 [1791]. The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

Amendment 5 [1791]. No person shall be held to answer for a capital, or otherwise infamous crime, unless on a presentment or indictment of a Grand Jury, except in cases arising in the land or naval forces, or in the Militia, when in actual service in time of War or public danger; nor shall any person be subject for the same offence to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a

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<sup>16</sup><https://constitution.congress.gov/constitution/> <https://www.archives.gov/founding-docs/constitution>  
<https://www.archives.gov/founding-docs/bill-of-rights> <https://www.archives.gov/founding-docs/amendments-11-27>

<sup>17</sup>Because of the awkward wording of this amendment and the very different times in which it was written, modern interpretations of this amendment have led to much chaos. The true meaning of this amendment is clarified by the contemporary writings of the Founding Fathers who debated and approved it. Federalist Paper 29: “The power of regulating the militia, and of commanding its services in times of insurrection and invasion are natural incidents to the duties of superintending the common defense, and of watching over the internal peace of the Confederacy.” Antifederalist Paper 28: “The Congress under the new Constitution have the power ‘of organizing, arming and disciplining the militia, and of governing them when in the service of the United States, giving to the separate States the appointment of the officers and the authority of training the militia according to the discipline prescribed by Congress.’” Thus the amendment describes arming members of the government-run military. At that time, the U.S. military was a National-Guard-like system of summoning members for government military service when the need arose and for periodic training, since there was no standing military of full-time professional soldiers until later. Moreover, the arms in question were single-shot flintlock muskets.

witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.

Amendment 6 [1791]. In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the Assistance of Counsel for his defence.

Amendment 7 [1791]. In Suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury, shall be otherwise re-examined in any Court of the United States, than according to the rules of the common law.

Amendment 8 [1791]. Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

Amendment 9 [1791]. The enumeration in the Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people.

Amendment 10 [1791]. The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.

Amendment 11 [1795/1798]. The Judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by Citizens of another State, or by Citizens or Subjects of any Foreign State.

Amendment 12 [1804]. The Electors shall meet in their respective states and vote by ballot for President and Vice-President, one of whom, at least, shall not be an inhabitant of the same state with themselves; they shall name in their ballots the person voted for as President, and in distinct ballots the person voted for as Vice-President, and they shall make distinct lists of all persons voted for as President, and of all persons voted for as Vice-President, and of the number of votes for each, which lists they shall sign and certify, and transmit sealed to the seat of the government of the United States, directed to the President of the Senate;—The President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates and the votes shall then be counted;—The person having the greatest Number of votes for President, shall be the President, if such number be a majority of the whole number of Electors appointed; and if no person have such majority, then from the persons having the highest numbers not exceeding three on the list of those voted for as President, the House of Representatives shall choose immediately, by ballot, the President. But in choosing the President, the votes shall be taken by states, the representation from each state having one vote; a quorum for this purpose shall consist of a member or members from two-thirds of the states, and a majority of all the states shall be necessary to a choice. And if the House of Representatives shall not choose a President whenever the right of choice shall devolve upon them, before the fourth day of March next following, then the Vice-President



shall act as President, as in the case of the death or other constitutional disability of the President—The person having the greatest number of votes as Vice-President, shall be the Vice-President, if such number be a majority of the whole number of Electors appointed, and if no person have a majority, then from the two highest numbers on the list, the Senate shall choose the Vice-President; a quorum for the purpose shall consist of two-thirds of the whole number of Senators, and a majority of the whole number shall be necessary to a choice. But no person constitutionally ineligible to the office of President shall be eligible to that of Vice-President of the United States.

Amendment 13 [1865]. [...] Neither slavery nor involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

Amendment 14 [1868].

Section 1. All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside. No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws.

Section 2. Representatives shall be apportioned among the several States according to their respective numbers, counting the whole number of persons in each State, excluding Indians not taxed. But when the right to vote at any election for the choice of electors for President and Vice President of the United States, Representatives in Congress, the Executive and Judicial officers of a State, or the members of the Legislature thereof, is denied to any of the male inhabitants of such State, being twenty-one years of age, and citizens of the United States, or in any way abridged, except for participation in rebellion, or other crime, the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in such State.

Section 3. No person shall be a Senator or Representative in Congress, or elector of President and Vice President, or hold any office, civil or military, under the United States, or under any State, who, having previously taken an oath, as a member of Congress, or as an officer of the United States, or as a member of any State legislature, or as an executive or judicial officer of any State, to support the Constitution of the United States, shall have engaged in insurrection or rebellion against the same, or given aid or comfort to the enemies thereof. But Congress may by a vote of two-thirds of each House, remove such disability.

Section 4. The validity of the public debt of the United States, authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion, shall not be questioned. But neither the United States nor any State shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any



claim for the loss or emancipation of any slave; but all such debts, obligations and claims shall be held illegal and void.

Section 5. The Congress shall have power to enforce, by appropriate legislation, the provisions of this article.

Amendment 15 [1870]. [...] The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of race, color, or previous condition of servitude. [...]

Amendment 16 [1913]. The Congress shall have power to lay and collect taxes on incomes, from whatever source derived, without apportionment among the several States, and without regard to any census or enumeration.

Amendment 17 [1913]. The Senate of the United States shall be composed of two Senators from each State, elected by the people thereof, for six years; and each Senator shall have one vote. [...]

Amendment 18 [1919]. [...] After one year from the ratification of this article the manufacture, sale, or transportation of intoxicating liquors within, the importation thereof into, or the exportation thereof from the United States and all territory subject to the jurisdiction thereof for beverage purposes is hereby prohibited. [...]

Amendment 19 [1920]. The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of sex. [...]

Amendment 20 [1933]. [...] The terms of the President and Vice President shall end at noon on the 20th day of January, and the terms of Senators and Representatives at noon on the 3d day of January, of the years in which such terms would have ended if this article had not been ratified; and the terms of their successors shall then begin. [...]

Amendment 21 [1933]. [...] The eighteenth article of amendment to the Constitution of the United States is hereby repealed. [...]

Amendment 22 [1951]. [...] No person shall be elected to the office of the President more than twice, and no person who has held the office of President, or acted as President, for more than two years of a term to which some other person was elected President shall be elected to the office of the President more than once. [...]

Amendment 23 [1961]. [...] The District constituting the seat of Government of the United States shall appoint in such manner as the Congress may direct: A number of electors of President and Vice President equal to the whole number of Senators and Representatives in Congress to which the District would be entitled if it were a State, but in no event more than the least populous State[...]

Amendment 24 [1964]. [...] The right of citizens of the United States to vote in any primary or other election for President or Vice President for electors for President or Vice President, or for Senator or Representative in Congress, shall not be denied or abridged by the United States or any State by reason of failure to pay any poll tax or other tax. [...]

Amendment 25 [1967]. [...] In case of the removal of the President from office or of his death or resignation, the Vice President shall become President. [...]

Amendment 26 [1971]. [...] The right of citizens of the United States, who are eighteen years of age or older, to vote shall not be denied or abridged by the United States or by any State on account of age. [...]

Amendment 27 [1992]. No law varying the compensation for the services of the Senators and Representatives shall take effect, until an election of Representatives shall have intervened.

How well is the United States living up to these principles now? How well are other countries living up to their official principles? How could the codified principles be further improved or better enforced? What can you do to help with any of that?

### 12.3.7 Louisa May Alcott

A major part of a scientist's life is submitting research proposals to be considered for funding, or submitting papers on the final results to be considered for publication in a journal, and receiving written feedback or "peer review" from scientific reviewers, editors, or committees. If the scientist's work is truly revolutionary, it is unlikely that a large majority of common reviewers will have an immediate, proper understanding of the work and be supportive of the work. Thus revolutionary innovators receive a great deal of written feedback that is frustratingly incorrect and sometimes downright oppressive. (Of course, if innovators receive feedback that makes valid points that the innovators have overlooked or that would further improve the work, the innovators should certainly act on that feedback.) This negative feedback creates not only practical obstacles to funding and publication, but less tangible yet equally important emotional obstacles to innovators' self-motivation and self-worth.

It can be therapeutic, and sometimes even instructive, to learn about unreasonably negative feedback that other innovators have received. Even non-scientific innovators have received such feedback, so scientists can learn much from them. Many literary authors have written about their frustrations in trying to get their works published.

An excellent example is Louisa May Alcott (1832–1888). She grew up in a large and very literate family in Massachusetts, and later wrote about her early life in a series of thinly fictionalized novels. In *Little Women*, Alcott's fictional avatar Jo March described her experiences writing and publishing stories and novels; the description may sound familiar to many scientists [Alcott 1869, Part 2, Chapter 27]:

Every few weeks she would shut herself up in her room, put on her scribbling suit, and "fall into a vortex," as she expressed it, writing away at her novel with all her heart and soul, for till that was finished she could find no peace. [...]

She did not think herself a genius by any means; but when the writing fit came on, she gave herself up to it with entire abandon, and led a blissful life, unconscious of want, care, or bad weather, while she sat safe and happy in an imaginary world, full of friends almost as real and dear to her as any in the flesh. Sleep forsook her eyes, meals stood untasted, day and night were all too short to enjoy the happiness which blessed her only at such times, and made these hours worth living, even if they bore no other fruit. The divine afflatus usually lasted a week or two, and then she emerged from her "vortex," hungry, sleepy, cross, or despondent. [...]

Having copied her novel for the fourth time, read it to all her confidential friends, and submitted it with fear and trembling to three publishers, she at last disposed of it, on condition that she would cut it down one-third, and omit all the parts which she particularly admired. [...]

"You said, mother, that criticism would help me; but how can it, when it's so contradictory that I don't know whether I've written a promising book or broken all the ten commandments?" cried poor Jo, turning over a heap of notices, the perusal of which filled her with pride and joy one minute, wrath and dire dismay the next. "This man says, 'An exquisite book, full of truth, beauty, and earnestness; all is sweet, pure, and healthy,'" continued the perplexed authoress. "The next, 'The theory of the book is bad, full of morbid fancies, spiritualistic ideas, and unnatural characters.' Now, as I had no theory of any kind, don't believe in Spiritualism, and copied my characters from life,

I don't see how this critic can be right. Another says, 'It's one of the best American novels which has appeared for years' (I know better than that); and the next asserts that 'though it is original, and written with great force and feeling, it is a dangerous book.'" [...]

"Not being a genius, like Keats, it won't kill me," she said stoutly; "and I've got the joke on my side, after all; for all the parts that were taken straight out of real life are denounced as impossible and absurd, and the scenes that I made up out of my own silly head are pronounced 'charmingly natural, tender, and true.'" So I'll comfort myself with that, and when I'm ready, I'll up again and take another.

As a corresponding example of a scientist's experience with unreasonably negative feedback, I highly recommend reading the colorful recollections of Sydney Brenner (1927–2019). Brenner was originally from South Africa, conducted genetic research around the world during his long career, and won the Nobel Prize in Physiology or Medicine in 2002. In an immensely entertaining fashion, he recounted some of his experiences with irrational feedback both on research proposals he had submitted for funding and on papers he had submitted for publication (and he also offered many other great stories and pieces of advice that you should read [Brenner 2019]):

[pp. 209–211:] Thus, the picture I received of the NIH study sections was of groups who had managed to combine inanity with iniquity laced with ignorance. As this came from people who had been turned down by one or other of these study sections I thought there was a certain amount of exaggeration but, now that I have direct experience of the 'NIH system', I can confirm that everything I have been told is absolutely true.

A few months ago, against my better judgement, I applied for a relatively small grant to support some work on the pufferfish genome that might have some relevance to one of the many diseases that NIH is determined to cure. [...]

After several months I received a notice that my priority had been assigned as 272, which I was told was dismal. Some weeks later I received a bulky document called a summary review detailing the proceedings and the result of the peer review by the study section and enclosing a list of the members many of whose names were not familiar to me. Roughly speaking, they had come to the conclusion that although I had done a few things in the past I was out of my depth in the particular area chosen and although they admitted that I had some scientific expertise they felt that I should seek some help[....]

I have seen guidelines on what such committees should look for in applications suitable for acceptance, and I now offer some convenient guidelines for rejection. If it is novel and nobody knows whether it will work or not, call it "over ambitious and superficial"; if it offers a better way of approaching a problem, protect all established plans by calling it "unnecessary and redundant"; and if you find that the applicant has never done an experiment on the 8th base of tRNA, say he lacks the "necessary experience to conduct these notoriously difficult experiments". And turn it down. [...]

[pp. 51–52:] I have spent many hours these past few months listening sympathetically to complaints by quite a few young scientists about their treatment by editors and referees of well-known journals. Since their future careers—jobs, grants, recognition—turns on the issue of publishing in the right journals, they have all the right to be worried and even angry.

I can tell several stories which outdo anything I have heard recently, and I will recount one, which seems to reveal the most serious defect with the present system. [...] One referee had no complaints, but the other said we should do genetic experiments to prove our point. The Editor's letter urged us to pay attention only to this referee's comments and said the manuscript was seriously defective and could not be published without the genetic experiments. The following telephone conversation then took place:

*S.B.:* (after introducing the matter):

Did you read the paper yourself?

*Editor:* No, I cannot be expected to read everything that crosses my desk.

*S.B.:* Are you aware that the referee you selected either can't read English or, more likely, is a total moron? The experiments he asks for were done and published a few years ago. They are clearly referred to in the paper, and the physical evidence supports them.

*Editor:* (silence)

*S.B.:* Who is the referee?

*Editor:* I can't tell you that.

*S.B.:* You should now accept responsibility for your bad choice and since his comment is both groundless and worthless, I assume you will now accept the paper.

*Editor:* No, we cannot go back on our original decision; there is no appeal.

[...] For the innocent among you, here are two examples from S.B.'s glossary of referee's comments and their true meanings:

*Referee:* The treatment of the literature was cursory.

*Meaning:* The author has failed to quote my papers.

*Referee:* I am concerned about the interpretation of the experiment; the author should repeat these twenty times with different conditions of pH and temperature and wearing yellow socks.

*Meaning:* If I can slow him down I can get my own paper on the subject into print before him. [...]

[p. vi] In my opinion the worst of these is the impact factor assigned both to journals and to the author's papers published in such journals. There is some abstruse calculation which provides a number and I am still not sure whether it is better for this number to be small or big. Some time ago, I attended a selection committee which had been renamed the Disappointments Committee. Hardly anybody had read the papers of the candidates but they carefully examined the impact factor of the papers and commented adversely on some of the journals in which they had been published. [...] All the time I wonder what has happened to critical scientific judgment? Why have people left it to the capricious judgment of editors of journals who are anyway, mostly, scientists with very little impact.

### 12.3.8 Statue of Liberty

In the 1870s, Frédéric Auguste Bartholdi (1834–1904), Gustave Eiffel (1832–1923), and others in France began the design and construction of *Liberty Enlightening the World*, better known as the Statue of Liberty, to donate to the United States in order to commemorate the shared history of the two countries in striving toward and promoting the ideals of liberty and human rights.

To raise funding in the United States for the construction of a pedestal strong enough to support the statue, in 1883 Emma Lazarus (1849–1887), a poet in New York, wrote “The New Colossus.” A bronze plaque with the poem was ultimately mounted inside the pedestal for all visitors to see:

Not like the brazen giant of Greek fame,  
With conquering limbs astride from land to land;  
Here at our sea-washed, sunset gates shall stand  
A mighty woman with a torch, whose flame  
Is the imprisoned lightning, and her name  
Mother of Exiles. From her beacon-hand  
Glows world-wide welcome; her mild eyes command  
The air-bridged harbor that twin cities frame.

“Keep, ancient lands, your storied pomp!” cries she  
With silent lips. “Give me your tired, your poor,  
Your huddled masses yearning to breathe free,  
The wretched refuse of your teeming shore.  
Send these, the homeless, tempest-tost to me,  
I lift my lamp beside the golden door!”

U.S. President Grover Cleveland echoed those themes in his dedication speech for the completed Statue of Liberty on 28 October 1886:

We aren’t here today to bow before the representation of a fierce warlike god, filled with wrath and vengeance, but we joyously contemplate instead our own deity keeping watch and ward before the open gates of America and greater than all that have been celebrated in ancient song. Instead of grasping in her hand thunderbolts of terror and of death, she holds aloft the light which illumines the way to man’s enfranchisement. We will not forget that Liberty has here made her home, nor shall her chosen altar be neglected. Willing votaries will constantly keep alive its fires and these shall gleam upon the shores of our sister Republic thence, and joined with answering rays a stream of light shall pierce the darkness of ignorance and man’s oppression, until Liberty enlightens the world.

The Statue of Liberty, its poem, and the president’s dedication demonstrate the principles that the United States and France espoused, strove to better practice, and promoted to the rest of the world. They have drawn the attention and respect of political leaders, citizens, schoolchildren, immigrants, tourists, and filmmakers over the many decades since 1886. These were foundational ideals.

How well does the United States (or other countries) live up to these ideals now? What can you do to improve your country?

In addition, on a more individual level, do you do all that you could and should do to welcome and help other people you encounter in your life, who may be very different than you or not as fortunate as you?

### 12.3.9 Anton Chekhov

Anton Chekhov (1860–1904) practiced as a medical doctor in Russia but is far better known for his fiction, so he is included in this section. His stories and plays presented many deep and diverse realizations about human psychology, personalities, and tendencies. I highly recommend reading his stories and plays and comparing their scenarios with the habits of mind of yourself and of other people with whom you interact; that can be helpful in identifying personal weaknesses to work on or at least to be cognizant of.

In Chekhov's 1889 novella, *A Dreary Story from the Notebook of an Old Man*, he put some rather striking insights into the mouth of the main character, Nikolay Stepanovitch, a professor of medicine near the end of his career [Chekhov 1992]:

[Chapter 1:]

Pyotr Ignatyevitch [...] works from morning to night, reads a lot [...]; in all else he is a carthorse or, in other words, a learned dullard. The carthorse characteristics that show his lack of talent are these: his outlook is narrow and sharply limited by his specialty; outside his special branch he is simple as a child. [...]

Another characteristic is his fanatical faith in the infallibility of science[...] He has a slavish reverence for authorities and a complete lack of any desire for independent thought. To change his convictions is difficult, to argue with him impossible. [...]

I have a clear picture in my mind of his future. In the course of his life he will prepare many hundreds of chemicals of exceptional purity; he will write a number of dry and very accurate memoranda, will make some dozen conscientious translations, but he won't do anything striking. To do that one must have imagination, inventiveness, the gift of insight, and Pyotr Ignatyevitch has nothing of the kind. In short, he is not a master in science, but a journeyman.

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I know what I am going to lecture about, but I don't know how I am going to lecture, where I am going to begin, or with what I am going to end. I haven't a single sentence ready in my head. But I have only to look round the lecture-hall (it is built in the form of an amphitheatre) and utter the stereotyped phrase, 'Last lecture we stopped at...' when sentences spring up from my soul in a long string, and I am carried away by my own eloquence. I speak with irresistible rapidity and passion, and it seems as though there were no force which could check the flow of my words. To lecture well—that is, with profit to the listeners and without boring them—one must have, besides talent, experience and a special knack; one must possess a clear conception of one's own powers, of the audience to which one is lecturing, and of the subject of one's lecture. Moreover, one must be a man who knows what he is doing; one must keep a sharp lookout, and not for one second lose sight of what lies before one.

A good conductor, interpreting the thought of the composer, does twenty things at once: reads the score, waves his baton, watches the singer, makes a motion sideways, first to the drum then to the wind-instruments, and so on. I do just the same when I

lecture. Before me a hundred and fifty faces, all unlike one another; three hundred eyes all looking straight into my face. My object is to dominate this many-headed monster. If every moment as I lecture I have a clear vision of the degree of its attention and its power of comprehension, it is in my power. The other foe I have to overcome is in myself. It is the infinite variety of forms, phenomena, laws, and the multitude of ideas of my own and other people's conditioned by them. Every moment I must have the skill to snatch out of that vast mass of material what is most important and necessary, and, as rapidly as my words flow, clothe my thought in a form in which it can be grasped by the monster's intelligence, and may arouse its attention, and at the same time one must keep a sharp lookout that one's thoughts are conveyed, not just as they come, but in a certain order, essential for the correct composition of the picture I wish to sketch. Further, I endeavor to make my diction literary, my definitions brief and precise, my wording, as far as possible, simple and eloquent. [...] In short, one has one's work cut out. At one and the same minute one has to play the part of savant and teacher and orator, and it's a bad thing if the orator gets the upper hand of the savant or of the teacher in one, or *vice versa*. [...]

No kind of sport, no kind of game or diversion, has ever given me such enjoyment as lecturing. Only at lectures have I been able to abandon myself entirely to passion, and have understood that inspiration is not an invention of the poets, but exists in real life, and I imagine Hercules after the most piquant of his exploits felt just such voluptuous exhaustion as I experience after every lecture.

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[Chapter 2:]

[T]he young devotee of science begins telling me that he has passed his examination as a doctor of medicine, and that he has now only to write his dissertation. He would like to work with me under my guidance, and he would be greatly obliged to me if I would give him a subject for his dissertation.

"Very glad to be of use to you, colleague," I say, "but just let us come to an understanding as to the meaning of a dissertation. That word is taken to mean a composition which is a product of independent creative effort. Is that not so? A work written on another man's subject and under another man's guidance is called something different...."

"Why don't you want to be independent? Why have you such a distaste for independence?"

I say a great deal, but he still remains silent. By degrees I calm down, and of course give in. The doctor gets a subject from me for his theme not worth a halfpenny, writes under my supervision a dissertation of no use to anyone, with dignity defends it in a dreary discussion, and receives a degree of no use to him.

Through his character of Professor Stepanovitch, Chekhov contrasted the importance of the relatively few innovators who take the initiative to do important, original research with the far larger number of colleagues and students who do not. He also aptly described the joy that a talented teacher finds in helping students to learn.



### 12.3.10 Rudyard Kipling

The British author Rudyard Kipling (1865–1936) wrote immensely entertaining short stories, novels, and poems. One of his poems, “If—” (written around 1895 but published in 1910 in *Rewards and Fairies*), gave remarkably good advice about obstacles in life; it was worded for a boy but could be applied to absolutely anyone. It is unfortunate that this poem’s popularity in certain circles has led it to be unfairly derided by some, and unjustly claimed by others who try to cloak themselves in the poem’s honor without even remotely living up to the personal standards that the poem dictates.

I would urge readers to forget any previous uses or misuses they have heard of this poem. Read “If—” as if you have never seen it before, consider its points in detail, and do your best to live up to the very high bar that it sets:

If you can keep your head when all about you  
 Are losing theirs and blaming it on you,  
 If you can trust yourself when all men doubt you,  
 But make allowance for their doubting too;  
 If you can wait and not be tired by waiting,  
 Or being lied about, don’t deal in lies,  
 Or being hated, don’t give way to hating,  
 And yet don’t look too good, nor talk too wise:

If you can dream—and not make dreams your master;  
 If you can think—and not make thoughts your aim;  
 If you can meet with Triumph and Disaster  
 And treat those two imposters just the same;  
 If you can bear to hear the truth you’ve spoken  
 Twisted by knaves to make a trap for fools,  
 Or watch the things you gave your life to, broken,  
 And stoop and build ’em up with worn-out tools:

If you can make one heap of all your winnings  
 And risk it on one turn of pitch-and-toss,  
 And lose, and start again at your beginnings  
 And never breathe a word about your loss;  
 If you can force your heart and nerve and sinew  
 To serve your turn long after they are gone,  
 And so hold on when there is nothing in you  
 Except the Will which says to them: “Hold on!”

If you can talk with crowds and keep your virtue,  
 Or walk with Kings—nor lose the common touch,  
 If neither foes nor loving friends can hurt you,  
 If all men count with you, but none too much;  
 If you can fill the unforgiving minute  
 With sixty seconds’ worth of distance run,  
 Yours is the Earth and everything that’s in it,  
 And—which is more—you’ll be a Man, my son!

### 12.3.11 Rainer Maria Rilke

Rainer Maria Rilke (1875–1926) was a German poet who combined profound psychological insights with explosive verbal creativity. Scientific innovators can learn much from how Rilke achieved his non-scientific innovations. They may also recognize some of the feelings that Rilke expressed when he wrote in either poetry or prose about creativity, introspection, searching, doubts, fears, and difficulties. I highly recommend reading as many of his works as possible, either in the original German or in translation [Rilke 1982, 1984].

As an example of Rilke’s poetry, here is the beginning of his 1923 *Duino Elegies* [Rilke 1982]:

Who, if I cried out, would hear me among the angels’  
hierarchies? and even if one of them pressed me  
suddenly against his heart: I would be consumed  
in that overwhelming existence. For beauty is nothing  
but the beginning of terror, which we still are just able to endure,  
and we are so awed because it serenely disdains  
to annihilate us. Every angel is terrifying.

And so I hold myself back and swallow the call-note  
of my dark sobbing. Ah, whom can we ever turn to  
in our need? Not angels, not humans,  
and already the knowing animals are aware  
that we are not really at home in  
our interpreted world. Perhaps there remains for us  
some tree on a hillside, which every day we can take  
into our vision; there remains for us yesterday’s street  
and the loyalty of a habit so much at ease  
when it stayed with us that it moved in and never left.

Oh and night: there is night, when a wind full of infinite space  
gnaws at our faces. Whom would it not remain for—that longed-after,  
mildly disillusioning presence, which the solitary heart  
so painfully meets. Is it any less difficult for lovers?  
But they keep on using each other to hide their own fate.

One of the best examples of Rilke’s prose is a series of ten letters he wrote to a younger author, Franz Kappus, during the period 1902–1908. Rilke’s prose is possibly even more densely packed than his poetry, yet virtually every passage can be mined for inspiration and consolation. Here is Letter 8 from *Letters to a Young Poet* [Rilke 1984]:

I want to talk to you again for a little while, dear Mr. Kappus, although there is almost nothing I can say that will help you, and I can hardly find one useful word. You have had many sadnesses, large ones, which passed. And you say that even this passing was difficult and upsetting for you. But please, ask yourself whether these large sadnesses haven’t rather gone right through you. Perhaps many things inside you have been transformed; perhaps somewhere, someplace deep inside your being, you have undergone important changes while you were sad. The only sadnesses that are dangerous and unhealthy are the ones that we carry around in public in order to drown them

out with the noise; like diseases that are treated superficially and foolishly, they just withdraw and after a short interval break out again all the more terribly; and gather inside us and are life, are life that is un-lived, rejected, lost, life that we can die of. If only it were possible for us to see farther than our knowledge reaches, and even a little beyond the outworks of our presentiment, perhaps we would bear our sadnesses with greater trust than we have in our joys. For they are the moments when something new has entered us, something unknown; our feelings grow mute in shy embarrassment, everything in us withdraws, a silence arises, and the new experience, which no one knows, stands in the midst of it all and says nothing.

It seems to me that almost all our sadnesses are moments of tension, which we feel as paralysis because we no longer hear our astonished emotions living. Because we are alone with the unfamiliar presence that has entered us; because everything we trust and are used to is for a moment taken away from us; because we stand in the midst of a transition where we cannot remain standing. That is why the sadness passes: the new presence inside us, the presence that has been added, has entered our heart, has gone into its innermost chamber and is no longer even there, is already in our bloodstream. And we don't know what it was. We could easily be made to believe that nothing happened, and yet we have changed, as a house that a guest has entered changes. We can't say who has come, perhaps we will never know, but many signs indicate that the future enters us in this way in order to be transformed in us, long before it happens. And that is why it is so important to be solitary and attentive when one is sad: because the seemingly uneventful and motionless moment when our future steps into us is so much closer to life than that other loud and accidental point of time when it happens to us as if from outside. The quieter we are, the more patient and open we are in our sadnesses, the more deeply and serenely the new presence can enter us, and the more we can make it our own, the more it becomes *our* fate; and later on, when it "happens" (that is, steps forth out of us to other people), we will feel related and close to it in our innermost being. And that is necessary. It is necessary—and toward this point our development will move, little by little—that nothing alien happen to us, but only what has long been our own. People have already had to rethink so many concepts of motion; and they will also gradually come to realize that what we call fate does not come into us from the outside, but emerges *from* us. It is only because so many people have not absorbed and transformed their fates while they were living in them that they have not realized what was emerging from them; it was so alien to them that, in their confusion and fear, they thought it must have entered them at the very moment they became aware of it, for they swore they had never before found anything like that inside them. Just as people for a long time had a wrong idea about the sun's motion, they are even now wrong about the motion of what is to come. The future stands still, dear Mr. Kappus, but we move in infinite space.

How could it not be difficult for us?

And to speak of solitude again, it becomes clearer and clearer that fundamentally this is nothing that one can choose or refrain from. We *are* solitary. We can delude ourselves about this and act as if it were not true. That is all. But how much better it is to recognize that we are alone; yes, even to begin from this realization. It will, of course, make us dizzy; for all points that our eyes used to rest on are taken away from us, there

is no longer anything near us, and everything far away is infinitely far. A man taken out of his room and, almost without preparation or transition, placed on the heights of a great mountain range, would feel something like that: an unequalled insecurity, an abandonment to the nameless, would almost annihilate him. He would feel he was falling or think he was being catapulted out into space or exploded into a thousand pieces: what a colossal lie his brain would have to invent in order to catch up with and explain the situation of his senses. That is how all distances, all measures, change for the person who becomes solitary; many of these changes occur suddenly and then, as with the man on the mountaintop, unusual fantasies and strange feelings arise, which seem to grow out beyond all that is bearable. But it is necessary for us to experience *that* too. We must accept our reality as *vastly* as we possibly can; everything, even the unprecedented, must be possible within it. This is in the end the only kind of courage that is required of us: the courage to face the strangest, most unusual, most inexplicable experiences that can meet us. The fact that people have in this sense been cowardly has done infinite harm to life; the experiences that are called "apparitions," the whole so-called "spirit world," death, all these Things that are so closely related to us, have through our daily defensiveness been so entirely pushed out of life that the senses with which we might have been able to grasp them have atrophied. To say nothing of God. But the fear of the inexplicable has not only impoverished the reality of the individual; it has also narrowed the relationship between one human being and another, which has as it were been lifted out of the riverbed of infinite possibilities and set down in a fallow place on the bank, where nothing happens. For it is not only indolence that causes human relationships to be repeated from case to case with such unspeakable monotony and boredom; it is timidity before any new, inconceivable experience, which we don't think we can deal with. But only someone who is ready for everything, who doesn't exclude any experience, even the most incomprehensible, will live the relationship with another person as something alive and will himself sound the depths of his own being. For if we imagine this being of the individual as a larger or smaller room, it is obvious that most people come to know only one corner of their room, one spot near the window, one narrow strip on which they keep walking back and forth. In this way they have a certain security. And yet how much more human is the dangerous insecurity that drives those prisoners in Poe's stories to feel out the shapes of their horrible dungeons and not be strangers to the unspeakable terror of their cells. We, however, are not prisoners. No traps or snares have been set around us, and there is nothing that should frighten or upset us. We have been put into life as into the element we most accord with, and we have, moreover, through thousands of years of adaptation, come to resemble this life so greatly that when we hold still, through a fortunate mimicry we can hardly be differentiated from everything around us. We have no reason to harbor any mistrust against our world, for it is not against *us*. If it has terrors, they are *our* terrors; if it has abysses, these abysses belong to us; if there are dangers, we must try to love them. And if only we arrange our life in accordance with the principle which tells us that we must always trust in the difficult, then what now appears to us as the most alien will become our most intimate and trusted experience. How could we forget those ancient myths that stand at the beginning of all races, the myths about dragons that at the last moment are transformed into princesses? Perhaps all the dragons in our lives are princesses who are only waiting to see us act, just once, with beauty and courage. Perhaps everything that frightens us is, in its deepest essence, something helpless that wants our love.

So you mustn't be frightened, dear Mr. Kappus, if a sadness rises in front of you, larger than any you have ever seen; if an anxiety, like light and cloud-shadows, moves over your hands and over everything you do. You must realize that something is happening to you, that life has not forgotten you, that it holds you in its hand and will not let you fall. Why do you want to shut out of your life any uneasiness, any misery, any depression, since after all you don't know what work these conditions are doing inside you? Why do you want to persecute yourself with the question of where all this is coming from and where it is going? Since you know, after all, that you are in the midst of transitions and you wished for nothing so much as to change. If there is anything unhealthy in your reactions, just bear in mind that sickness is the means by which an organism frees itself from what is alien; so one must simply help it to be sick, to have its whole sickness and to break out with it, since that is the way it gets better. In you, dear Mr. Kappus, so much is happening now; you must be patient like someone who is sick, and confident like some one who is recovering; for perhaps you are both. And more: you are also the doctor, who has to watch over himself. But in every sickness there are many days when the doctor can do nothing but wait. And that is what you, insofar as you are your own doctor, must now do, more than anything else.

Don't observe yourself too closely. Don't be too quick to draw conclusions from what happens to you; simply let it happen. Otherwise it will be too easy for you to look with blame (that is: morally) at your past, which naturally has a share in everything that now meets you. But whatever errors, wishes, and yearnings of your boyhood are operating in you now are not what you remember and condemn. The extraordinary circumstances of a solitary and helpless childhood are so difficult, so complicated, surrendered to so many influences and at the same time so cut off from all real connection with life that, where a vice enters it, one may not simply call it a vice. One must be so careful with names anyway; it is so often the *name* of an offense that a life shatters upon, not the nameless and personal action itself, which was perhaps a quite definite necessity of that life and could have been absorbed by it without any trouble. And the expenditure of energy seems to you so great only because you overvalue victory; it is not the "great thing" that you think you have achieved, although you are right about your feeling; the great thing is that there was already something there which you could replace that deception with, something true and real. Without this even your victory would have been just a moral reaction of no great significance; but in fact it has become a part of your life. Your life, dear Mr. Kappus, which I think of with so many good wishes. Do you remember how that life yearned out of childhood toward the "great thing"? I see that it is now yearning forth beyond the great thing toward the greater one. That is why it does not cease to be difficult, but that is also why it will not cease to grow.

And if there is one more thing that I must say to you, it is this: Don't think that the person who is trying to comfort you now lives untroubled among the simple and quiet words that sometimes give you pleasure. His life has much trouble and sadness, and remains far behind yours. If it were otherwise, he would never have been able to find those words.

### 12.3.12 C. P. Snow

C. P. Snow (1905–1980) was a physical chemist and novelist who also served in the British government. Having worn several different hats, he is best remembered for his writings in which he lamented how narrow the knowledge of even most highly educated people was, and how that lack of overlap in the expertise and interests of leading individuals was harmful to society in many different ways [Snow 1934, 1961, 1964].

Snow criticized not only the divide between those educated in the sciences and those educated in the humanities, but also the divides among those educated in different scientific disciplines. He believed that the most effective scientists had a deep understanding and appreciation of many fields of science and also the humanities, and that the most productive professionals who were not scientists should at least demonstrate a proper knowledge of and support for science.

In his 1934 novel, *The Search*, Snow expressed his views through his fictional characters [Snow 1934, Part III, Chapter IV]:

“...it does look as though there is a method for making proteins just waiting to be used. Properly making them, synthesising them, I mean: it sounds fantastic, and the method’s more fantastic than you can possibly believe. Not because it is complicated, but because it’s easy.” [...]

“Where are the results?” I asked. “Can I see them?”

“Everything’s at the lab,” he said. “I’ve been living there for the last fortnight. Literally living there, and sleeping beside the apparatus.” He laughed. “It hasn’t given me much extra time, but it’s kept people away.” [...]

“The physicists won’t like me because I’m a renegade from physics,” said Constantine, with his smile of humorous humility. “And the chemists won’t like me because I am a physicist. And the biologists won’t like me because I do biology. And the mathematicians won’t know about me because I don’t do mathematics.”

In *The Two Cultures: and A Second Look*, Snow gave the best explanation of his views on the importance of multidisciplinary/interdisciplinary education and organizational work [Snow 1964:

[pp. 4–5:] I believe the intellectual life of the whole of western society is increasingly being split into two polar groups. When I say the intellectual life, I mean to include also a large part of our practical life, because I should be the last person to suggest the two can at the deepest level be distinguished. [...]

Literary intellectuals at one pole—at the other scientists, and as the most representative, the physical scientists. Between the two a gulf of mutual incomprehension—sometimes (particularly among the young) hostility and dislike, but most of all lack of understanding. They have a curious distorted image of each other. Their attitudes are so different that, even on the level of emotion, they can’t find much common ground. [...]

The non-scientists have a rooted impression that the scientists are shallowly optimistic, unaware of man's condition. On the other hand, the scientists believe that the literary intellectuals are totally lacking in foresight, peculiarly unconcerned with their brother men, in a deep sense anti-intellectual, anxious to restrict both art and thought to the existential moment. And so on. Anyone with a mild talent for invective could produce plenty of this kind of subterranean back-chat. On each side there is some of it which is not entirely baseless. It is all destructive. Much of it rests on misinterpretations which are dangerous. [...]

[pp. 15–16:] A good many times I have been present at gatherings of people who, by the standards of the traditional culture, are thought highly educated and who have with considerable gusto been expressing their incredulity at the illiteracy of scientists. Once or twice I have been provoked and have asked the company how many of them could describe the Second Law of Thermodynamics. The response was cold: it was also negative. Yet I was asking something which is the scientific equivalent of: *Have you read a work of Shakespeare's?*

I now believe that if I had asked an even simpler question—such as, What do you mean by mass, or acceleration, which is the scientific equivalent of saying, *Can you read?*—not more than one in ten of the highly educated would have felt that I was speaking the same language. So the great edifice of modern physics goes up, and the majority of the cleverest people in the western world have about as much insight into it as their neolithic ancestors would have had. [...]

[pp. 60–61:] In our society (that is, advanced western society) we have lost even the pretence of a common culture. Persons educated with the greatest intensity we know can no longer communicate with each other on the plane of their major intellectual concern. This is serious for our creative, intellectual and, above all, our normal life. It is leading us to interpret the past wrongly, to misjudge the present, and to deny our hopes of the future. It is making it difficult or impossible for us to take good action. [...]

There is, of course, no complete solution. In the conditions of our age, or any age which we can foresee, Renaissance man is not possible. But we can do something. The chief means open to us is education—education mainly in primary and secondary schools, but also in colleges and universities. There is no excuse for letting another generation be as vastly ignorant, or as devoid of understanding and sympathy, as we are ourselves.

Snow also wrote an enlightening book, *Science and Government*, that analyzed the rivalry between the British government's top two scientific advisors during World War II (Henry Tizard and Frederick Lindemann) and general lessons that could be learned from that history [Snow 1961].

### 12.3.13 Dietrich Bonhoeffer

Dietrich Bonhoeffer (1906–1945) was a German Christian minister and theologian who strongly opposed Hitler and the policies of the Third Reich. Due to his opposition, he was imprisoned in April 1943 and ultimately executed on 9 April 1945 (only three weeks before Hitler died). From his time before and during imprisonment, Bonhoeffer left many thousands of pages of letters, sermons, theological treatises, and other writings [Bonhoeffer 2013, 16 volumes]. Bonhoeffer was a deep thinker and spent many years surrounded by the very worst and the very best aspects of humanity. As a result, his writings are a rich source of insights for future creators or anyone else who would like to consider the problems of humanity and the vital importance of doing everything possible to try to help humanity.

As just a small sample of Bonhoeffer’s thoughts, here are some excerpts from his collection of short essays that he produced after ten years of opposing Hitler, “An Account at the Turn of the Year 1942–1943: After Ten Years”.<sup>18</sup>

Ten years is a long time in the life of every human being. Because time is the most precious gift at our disposal, being of all gifts the most ir retrievable, the thought of time possibly lost disturbs us whenever we look back. Time is lost when we have not lived, experienced things, learned, worked, enjoyed, and suffered as human beings. Lost time is unfulfilled, empty time. Certainly that is not what the past years have been. We have lost much, things far beyond measure, but time was not lost. Indeed, the insights and experiences we have gained and of which we have subsequently become aware are only abstractions from reality, from life itself. Yet just as the ability to forget is a gift of grace, so similarly is memory, the repetition of received teachings, part of responsible life. In the following pages I want to try to give an accounting of some of the shared experience and insight that have been forced upon us in these times, not personal experiences, nothing systematically organized, not arguments and theories, but conclusions about human experience—lined up side by side, connected only by concrete experience—that have been reached together in a circle of like-minded people. None of this is new; rather, it is something we have long been familiar with in times gone by, something given to us to experience and understand anew. One cannot write about these things without every word being accompanied by the feeling of gratitude for the community of spirit and of life that in all these years was preserved and shown to be worthwhile.

#### On Stupidity

Stupidity is a more dangerous enemy of the good than malice. One may protest against evil; it can be exposed and, if need be, prevented by use of force. Evil always carries within itself the germ of its own subversion in that it leaves behind in human beings at least a sense of unease. Against stupidity we are defenseless. Neither protests nor the use of force accomplish anything here; reasons fall on deaf ears; facts that contradict one’s prejudgment simply need not be believed—in such moments the stupid person even becomes critical—and when facts are irrefutable they are just pushed aside as inconsequential, as incidental. In all this the stupid person, in contrast to the malicious one, is utterly self-satisfied and, being easily irritated, becomes dangerous by going on

<sup>18</sup>Bonhoeffer 2013, Vol. 8, pp. 37–52; <https://ms.fortresspress.com/downloads/0800697030Prologue.pdf>



the attack. For that reason, greater caution is called for than with a malicious one. Never again will we try to persuade the stupid person with reasons, for it is senseless and dangerous.

If we want to know how to get the better of stupidity, we must seek to understand its nature. This much is certain, that it is in essence not an intellectual defect but a human one. There are human beings who are of remarkably agile intellect yet stupid, and others who are intellectually quite dull yet anything but stupid. We discover this to our surprise in particular situations. The impression one gains is not so much that stupidity is a congenital defect, but that, under certain circumstances, people are made stupid or that they allow this to happen to them. We note further that people who have isolated themselves from others or who lives in solitude manifest this defect less frequently than individuals or groups of people inclined or condemned to sociability. And so it would seem that stupidity is perhaps less a psychological than a sociological problem. It is a particular form of the impact of historical circumstances on human beings, a psychological concomitant of certain external conditions. Upon closer observation, it becomes apparent that every strong upsurge of power in the public sphere, be it of a political or of a religious nature, infects a large part of humankind with stupidity. It would even seem that this is virtually a sociological-psychological law. The power of the one needs the stupidity of the other. The process at work here is not that particular human capacities, for instance, the intellect, suddenly atrophy or fail. Instead, it seems that under the overwhelming impact of rising power, humans are deprived of their inner independence, and, more or less consciously, give up establishing an autonomous position toward the emerging circumstances. The fact that the stupid person is often stubborn must not blind us to the fact that he is not independent. In conversation with him, one virtually feels that one is dealing not at all with a person, but with slogans, catchwords and the like that have taken possession of him. He is under a spell, blinded, misused, and abused in his very being. Having thus become a mindless tool, the stupid person will also be capable of any evil and at the same time incapable of seeing that it is evil. This is where the danger of diabolical misuse lurks, for it is this that can once and for all destroy human beings.

Yet at this very point it becomes quite clear that only an act of liberation, not instruction, can overcome stupidity. Here we must come to terms with the fact that in most cases a genuine internal liberation becomes possible only when external liberation has preceded it. Until then we must abandon all attempts to convince the stupid person. This state of affairs explains why in such circumstances our attempts to know what ‘the people’ really think are in vain and why, under these circumstances, this question is so irrelevant for the person who is thinking and acting responsibly. The word of the Bible that the fear of God is the beginning of wisdom declares that the internal liberation of human beings to live the responsible life before God is the only genuine way to overcome stupidity.

But these thoughts about stupidity also offer consolation in that they utterly forbid us to consider the majority of people to be stupid in every circumstance. It really will depend on whether those in power expect more from people’s stupidity than from their inner independence and wisdom.

### Contempt for Humanity?

The danger of allowing ourselves to be driven to contempt for humanity is very real. We know very well that we have no right to let this happen and that it would lead us into the most unfruitful relation to human beings. The following thoughts may protect us against this temptation:

Through contempt for humanity we fall victim precisely to our opponents' chief errors.

Whoever despises another human being will never be able to make anything of him.

Nothing of what we despise in another is itself foreign to us.

How often do we expect more of the other than what we ourselves are willing to accomplish.

Why is it that we have hitherto thought with so little sobriety about the temptability and frailty of human beings?

We must learn to regard human beings less in terms of what they do and neglect to do and more in terms of what they suffer.

The only fruitful relation to human beings—particularly to the weak among them—is love, that is, the will to enter into and to keep community with them.

God did not hold human beings in contempt but became human for their sake.

### Trust

Few have been spared the experience of being betrayed. The figure of Judas, once so incomprehensible, is hardly strange to us. The air in which we live is so poisoned that we almost die from it. But where we broke through the layer of mistrust, we were allowed to experience a trust hitherto utterly undreamed of. There, where we trust, we have learned to place our lives in the hands of others; contrary to all the ambiguities in which our acts and lives must exist, we have learned to trust without reserve. We now know that one can truly live and work only in such trust, which is always a venture but one gladly affirmed. We know that to sow and to nourish mistrust is one of the most reprehensible things and that, instead, trust is to be strengthened and advanced wherever possible. For us trust will be one of the greatest, rarest, and most cheering gifts bestowed by the life we humans live in common, and yet it always emerges only against the dark background of a necessary mistrust. We have learned to commit our lives on no account into the hands of the mean but without reserve into the hands of the trustworthy.

### The Sense of Quality

[...] Nobility arises from and exists by sacrifice, courage, and a clear sense of what one owes oneself and others, by the self-evident expectation of the respect one is due, and by an equally self-evident observance of the same respect for those above and those below. At issue all along the line is the rediscovery of experiences of quality that have been buried under so much rubble. Of an order based on quality. Quality is the strongest foe of any form of bringing everything to the level of the masses. Socially this means abandoning the pursuit of position, breaking with the star cult, an opening out upward and downward, particularly in connection with the choice of one's friends, delight in private life, and courage for public life. Culturally the experience of quality signals a return from the newspaper and radio to the book, from haste to leisure and stillness, from distraction to composure, from the sensational to reflection, from the idol of virtuosity to art, from snobbery to modesty, from extravagance to moderation. Quantities compete for space; qualities complement one another.

### Optimism

It is more sensible to be pessimistic; disappointments are left behind, and one can face people unembarrassed. Hence, the clever frown upon optimism. In its essence optimism is not a way of looking at the present situation but a power of life, a power of hope when others resign, a power to hold our heads high when all seems to have come to naught, a power to tolerate setbacks, a power that never abandons the future to the opponents but lays claim to it. Certainly, there is a stupid, cowardly optimism that must be frowned upon. But no one ought to despise optimism as the will for the future, however many times it is mistaken. It is the health of life that the ill dare not infect. There are people who think it frivolous and Christians who think it impious to hope for a better future on earth and to prepare for it. They believe in chaos, disorder, and catastrophe, perceiving it in what is happening now. They withdraw in resignation or pious flight from the world, from the responsibility for ongoing life, for building anew, for the coming generations. It may be that the day of judgment will dawn tomorrow; only then and no earlier will we readily lay down our work for a better future.

### The View from Below

It remains an experience of incomparable value that we have for once learned to see the great events of world history from below, from the perspective of the outcasts, the suspects, the maltreated, the powerless, the oppressed and reviled, in short from the perspective of the suffering. If only during this time bitterness and envy have not corroded the heart; that we come to see matters great and small, happiness and misfortune, strength and weakness with new eyes; that our sense for greatness, humanness, justice, and mercy has grown clearer, freer, more incorruptible; that we learn, indeed, that personal suffering is a more useful key, a more fruitful principle than personal happiness for exploring the meaning of the world in contemplation and action. But this perspective from below must not lead us to become advocates for those who are perpetually dissatisfied. Rather, out of a higher satisfaction, which in its essence is grounded beyond what is below and above, we do justice to life in all its dimensions and in this way affirm it.

In “Thoughts on the Day of the Baptism of Dietrich Wilhelm Rüdiger Bethge, May 1944,” addressed to his new great-nephew, Bonhoeffer offered advice for future generations that sounds more relevant than ever in the twenty-first century.<sup>19</sup>

[...] We grew up with our parents’ and grandparents’ experience that each person can and must plan, develop, and shape his own life, that there is a life work on which one must decide, and that he can and must pursue this with all his might. But from our own experience we have learned that we cannot even plan for the next day, that what we have built up is destroyed overnight. Our lives, unlike our parents’ lives, have become formless or even fragmentary. Nevertheless, I can only say that I have not wanted to live in another time than ours, even though it tramples on our outward happiness. [...] If we come through the wreckage of a lifetime’s acquired goods with our living souls intact, let us be satisfied with that. [...] It will be the task of our generation, not to “seek great things,” but to save and preserve our souls out of the chaos, and to realize that this is the only thing we can carry as “booty” out of the burning house. “Keep your heart with all vigilance, for from it flows the springs of life” (Prov. 4:23) We shall have to bear our lives more than to shape them, to hope more than to plan, to hold out more than to stride ahead. But for you, the younger, newborn generation, we want to preserve that soul, which will empower you to plan and build up and give shape to a new and better life.

We have lived too much in our thoughts; we believed that by considering all the options of an action in advance we could ensure it, so that it would proceed of its own accord. We learned too late that it is not the thought but readiness to take responsibility that is the mainspring of action. Your generation will relate thought and action in a new way. You will only think about what you have to answer for in action. For us thought was in many ways a luxury afforded to onlookers; for you it will be entirely subordinated to action. [...]

For the greater part of our lives, pain was a stranger to us. Avoiding pain, as far as possible, was one of our subconscious guiding principles. Subtlety of feeling, intense awareness of one’s own pain and that of others, are both the strength and the weakness of our way of life. Your generation will begin early having to bear privations and pain and having your patience severely tested, so you will be tougher and more realistic. [...]

We believed we could make our way in life with reason and justice, and when both failed us, we no longer saw any way forward. We have also overestimated, time and again, the importance of reasonableness and justice in influencing the course of history. You who are growing up in the midst of a world war, which 90 percent of humankind doesn’t want but for which they are giving their lives and goods, will learn from childhood on that this world is ruled by forces against which reason can do nothing. Thus your generation will deal with these powers more soberly and successfully. [...]

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<sup>19</sup>Bonhoeffer 2013, Vol. 8, pp. 383–390.

### 12.3.14 United Nations Universal Declaration of Human Rights

Building upon the Declaration of Independence and the Constitution, the United States continued to lead in innovation regarding improved human rights conditions. Well before the United States had entered World War II, President Franklin Roosevelt used the occasion of his 6 January 1941 State of the Union address to Congress to lay out a vision for human rights standards in the United States and worldwide (sometimes called the “four freedoms speech”):<sup>20</sup>

For there is nothing mysterious about the foundations of a healthy and strong democracy. The basic things expected by our people of their political and economic systems are simple. They are:

Equality of opportunity for youth and for others.

Jobs for those who can work.

Security for those who need it.

The ending of special privilege for the few.

The preservation of civil liberties for all.

The enjoyment of the fruits of scientific progress in a wider and constantly rising standard of living.

These are the simple, basic things that must never be lost sight of in the turmoil and unbelievable complexity of our modern world. The inner and abiding strength of our economic and political systems is dependent upon the degree to which they fulfill these expectations.

Many subjects connected with our social economy call for immediate improvement. As examples:

We should bring more citizens under the coverage of old-age pensions and unemployment insurance.

We should widen the opportunities for adequate medical care.

We should plan a better system by which persons deserving or needing gainful employment may obtain it.

I have called for personal sacrifice. I am assured of the willingness of almost all Americans to respond to that call. [...]

In the future days, which we seek to make secure, we look forward to a world founded upon four essential human freedoms.

The first is freedom of speech and expression—everywhere in the world.

The second is freedom of every person to worship God in his own way—everywhere in the world.

The third is freedom from want—which, translated into world terms, means economic understandings which will secure to every nation a healthy peacetime life for its inhabitants—everywhere in the world.

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<sup>20</sup><https://www.presidency.ucsb.edu/documents/annual-message-congress-the-state-the-union>

The fourth is freedom from fear—which, translated into world terms, means a world-wide reduction of armaments to such a point and in such a thorough fashion that no nation will be in a position to commit an act of physical aggression against any neighbor—anywhere in the world.

That is no vision of a distant millennium. It is a definite basis for a kind of world attainable in our own time and generation. That kind of world is the very antithesis of the so-called new order of tyranny which the dictators seek to create with the crash of a bomb.

Roosevelt died in April 1945, but the vision he had articulated for worldwide human rights was taken up by many others. Within the first few decades of the twentieth century, the world had experienced two world wars, the advent of nuclear warfare, concentration camps in many countries, the Great Depression, pandemics of polio and an especially deadly influenza strain, and other struggles. The United Nations (formed in October 1945), with the guidance of Eleanor Roosevelt (Franklin Roosevelt's widow), created and approved the 1948 Universal Declaration of Human Rights [Glendon 2002; Morsink 1999]. The Declaration was passed by all countries that were then voting members of the U.N. except some authoritarian regimes: the Soviet Union and the puppet governments of its satellite countries, plus Honduras, Saudi Arabia, South Africa, and Yemen.

Of course, even the countries that wrote and voted for the resolution did not really live up to its ideals in 1948. Nonetheless, the declaration explicitly laid out clear objectives, as countries in 1948 supported human rights better than they had in earlier years, and committed to continuing to improve human rights conditions in future years. The full list of policies that were endorsed by almost all countries in the world in 1948 is truly astounding:

#### Preamble

Whereas recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice and peace in the world,

Whereas disregard and contempt for human rights have resulted in barbarous acts which have outraged the conscience of mankind, and the advent of a world in which human beings shall enjoy freedom of speech and belief and freedom from fear and want has been proclaimed as the highest aspiration of the common people,

Whereas it is essential, if man is not to be compelled to have recourse, as a last resort, to rebellion against tyranny and oppression, that human rights should be protected by the rule of law,

Whereas it is essential to promote the development of friendly relations between nations,

Whereas the peoples of the United Nations have in the Charter reaffirmed their faith in fundamental human rights, in the dignity and worth of the human person and in the equal rights of men and women and have determined to promote social progress and better standards of life in larger freedom,

Whereas Member States have pledged themselves to achieve, in cooperation with the United Nations, the promotion of universal respect for and observance of human rights and fundamental freedoms,

Whereas a common understanding of these rights and freedoms is of the greatest importance for the full realization of this pledge,

Now, therefore, the General Assembly proclaims this Universal Declaration of Human Rights as a common standard of achievement for all peoples and all nations, to the end that every individual and every organ of society, keeping this Declaration constantly in mind, shall strive by teaching and education to promote respect for these rights and freedoms and by progressive measures, national and international, to secure their universal and effective recognition and observance, both among the peoples of Member States themselves and among the peoples of territories under their jurisdiction.

Article 1. All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood.

Article 2. Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status. Furthermore, no distinction shall be made on the basis of the political, jurisdictional or international status of the country or territory to which a person belongs, whether it be independent, trust, non-self-governing or under any other limitation of sovereignty.

Article 3. Everyone has the right to life, liberty and the security of person.

Article 4. No one shall be held in slavery or servitude; slavery and the slave trade shall be prohibited in all their forms.

Article 5. No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment.

Article 6. Everyone has the right to recognition everywhere as a person before the law.

Article 7. All are equal before the law and are entitled without any discrimination to equal protection of the law. All are entitled to equal protection against any discrimination in violation of this Declaration and against any incitement to such discrimination.

Article 8. Everyone has the right to an effective remedy by the competent national tribunals for acts violating the fundamental rights granted him by the constitution or by law.

Article 9. No one shall be subjected to arbitrary arrest, detention or exile.

Article 10. Everyone is entitled in full equality to a fair and public hearing by an independent and impartial tribunal, in the determination of his rights and obligations and of any criminal charge against him.

Article 11. Everyone charged with a penal offence has the right to be presumed innocent until proved guilty according to law in a public trial at which he has had all the guarantees necessary for his defence. No one shall be held guilty of any penal offence on account of any act or omission which did not constitute a penal offence, under national or international law, at the time when it was committed. Nor shall a heavier penalty be imposed than the one that was applicable at the time the penal offence was committed.

Article 12. No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks.

Article 13. Everyone has the right to freedom of movement and residence within the borders of each State. Everyone has the right to leave any country, including his own, and to return to his country.

Article 14. Everyone has the right to seek and to enjoy in other countries asylum from persecution. This right may not be invoked in the case of prosecutions genuinely arising from non-political crimes or from acts contrary to the purposes and principles of the United Nations.

Article 15. Everyone has the right to a nationality. No one shall be arbitrarily deprived of his nationality nor denied the right to change his nationality.

Article 16. Men and women of full age, without any limitation due to race, nationality or religion, have the right to marry and to found a family. They are entitled to equal rights as to marriage, during marriage and at its dissolution. Marriage shall be entered into only with the free and full consent of the intending spouses. The family is the natural and fundamental group unit of society and is entitled to protection by society and the State.

Article 17. Everyone has the right to own property alone as well as in association with others. No one shall be arbitrarily deprived of his property.

Article 18. Everyone has the right to freedom of thought, conscience and religion; this right includes freedom to change his religion or belief, and freedom, either alone or in community with others and in public or private, to manifest his religion or belief in teaching, practice, worship and observance.

Article 19. Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.

Article 20. Everyone has the right to freedom of peaceful assembly and association. No one may be compelled to belong to an association.

Article 21. Everyone has the right to take part in the government of his country, directly or through freely chosen representatives. Everyone has the right to equal access to public service in his country. The will of the people shall be the basis of the authority of government; this will shall be expressed in periodic and genuine elections which shall be by universal and equal suffrage and shall be held by secret vote or by equivalent free voting procedures.

Article 22. Everyone, as a member of society, has the right to social security and is entitled to realization, through national effort and international co-operation and in accordance with the organization and resources of each State, of the economic, social and cultural rights indispensable for his dignity and the free development of his personality.

Article 23. Everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment. Everyone, with-



out any discrimination, has the right to equal pay for equal work. Everyone who works has the right to just and favourable remuneration ensuring for himself and his family an existence worthy of human dignity, and supplemented, if necessary, by other means of social protection. Everyone has the right to form and to join trade unions for the protection of his interests.

Article 24. Everyone has the right to rest and leisure, including reasonable limitation of working hours and periodic holidays with pay.

Article 25. Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control. Motherhood and childhood are entitled to special care and assistance. All children, whether born in or out of wedlock, shall enjoy the same social protection.

Article 26. Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit. Education shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms. It shall promote understanding, tolerance and friendship among all nations, racial or religious groups, and shall further the activities of the United Nations for the maintenance of peace. Parents have a prior right to choose the kind of education that shall be given to their children.

Article 27. Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits. Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.

Article 28. Everyone is entitled to a social and international order in which the rights and freedoms set forth in this Declaration can be fully realized.

Article 29. Everyone has duties to the community in which alone the free and full development of his personality is possible. In the exercise of his rights and freedoms, everyone shall be subject only to such limitations as are determined by law solely for the purpose of securing due recognition and respect for the rights and freedoms of others and of meeting the just requirements of morality, public order and the general welfare in a democratic society. These rights and freedoms may in no case be exercised contrary to the purposes and principles of the United Nations.

Article 30. Nothing in this Declaration may be interpreted as implying for any State, group or person any right to engage in any activity or to perform any act aimed at the destruction of any of the rights and freedoms set forth herein.

How well does your country live up to these human rights policies to which it (or its legal predecessors and allies) committed in 1948? Since 1948, has your country's behavior in these areas improved or worsened? If your country has fallen short, what can you and others in your country do about that?

### 12.3.15 Ferdinand Demara, Jr. and Frank Abagnale, Jr.

There have been several prominent impostors who effectively practiced specialized professions for which they had no formal qualifications, sometimes even several very different professions within the span of just a few years.<sup>21</sup> Two of the best known cases were Ferdinand Demara, Jr. (1921–1982), dubbed “The Great Impostor” in the 1959 book and 1961 film of the same title, and Frank Abagnale, Jr. (1948–), whose story was told in the 1980 book and 2002 film *Catch Me If You Can*. (These real cases also inspired at least two fictional television series, *The Pretender* in the 1990s and *White Collar* in the 2010s.) While one certainly cannot condone dishonesty or putting others at risk by practicing without qualifications, there are nonetheless some constructive lessons that one can learn from some of the impostors. Any scientific innovator who could productively enter new fields and deal with sudden obstacles—both work-related and interpersonal—as effectively as the impostors did would be quite formidable indeed.

Some of the impostors’ skills for avoiding, minimizing, or resolving personal obstacles are especially noteworthy. For example, Demara had excellent advice for deciding which directions to pursue and which to avoid [Crichton 1959, pp. 102–103]:

He had now had a wide range of experience behind him, and it was time, he felt, to begin to use what he had learned about institutions and people and how they function.

He had come to two beliefs. One was that in any organization there is always a lot of loose, unused power lying about which can be picked up without alienating anyone.

The second rule is, if you want power and want to expand, never encroach on anyone else’s domain; open up new ones.

“I call it ‘Expanding into the power vacuum,’” Demara proudly explains. “It works this way. If you come into a new situation (there’s a nice word for it) don’t join some other professor’s committee and try to make your mark by moving up in that committee. You’ll, one, have a long haul and two, make an enemy.”

Demara’s technique is to found your own committee.

“That way there’s no competition, no past standards to measure you by. How can anyone tell you aren’t running a top outfit? And then there’s no past laws or rules or precedents to hold you down or limit you. Make your own rules and interpretations. Nothing like it. Remember it—expand into the power vacuum!”

Demara’s advice can be applied to the choice of research topics: find something important that other good scientists are not already working on. It can also be applied to the choice of employers, or research sponsors, or ways to avoid bureaucratic obstacles or opponents, or methods of advancing your career. Look for good opportunities in less crowded or less defended areas. (That also ties into Sun Tzu’s advice in Section 12.3.1 about finding the least defended points at which to attack an enemy.)

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<sup>21</sup>See for example: Abagnale and Redding 1980; Burton 2000; Crichton 1959, 1961. Of course, the self-recounted histories of impostors should be taken with considerable salt, but at the very least they are inspirational. Furthermore, the very best impostors may never have been caught, and may therefore remain unknown to the public.

Likewise, Abagnale offered advice that is just as useful for legitimate scientific research as it was for his criminal capers [Abagnale and Redding 1980, pp. 113–114]:

Of course, as someone once observed, there is no right way to do something wrong, but the most successful check swindlers have three factors in their favor, and any one of the three, or the scantiest combination of the three, can pay off like three bars on a slot machine.

The first is personality, and I look on personal grooming as part of one's personality. Top con artists, whether they're pushing hot paper or hawking phony oil leases, are well dressed and exude an air of confidence and authority. They're usually, too, as charming, courteous and seemingly sincere as a politician seeking reelection, although they can, at times, effect the cool arrogance of a tycoon.

The second is observation. Observation is a skill that can be developed, but I was born blessed (or cursed) with the ability to pick up on details and items the average man overlooks. Observation, as I will illustrate later, is the only necessity for successful innovative larceny. [...]

The third factor is research, the big difference between the hard-nosed criminal and the super con man. A hood planning a bank holdup might case the treasury for rudimentary facts, but in the end he depends on his gun. A con artist's only weapon is his brain. A con man who decides to hit the same bank with a fictitious check or a sophisticated check swindle researches every facet of the caper. In my heyday as a hawker of hot paper, I knew as much about checks as any teller employed in any bank in the world and more than the majority. I'm not even sure a great many bankers possessed the knowledge I had of checks.

Applied to scientific innovators, Abagnale's three points could be translated as follows:

1. In all of your interactions with other people, whether planned or unplanned, and whether in person, electronically, or in writing, always be as well prepared as possible to present yourself and your project as skillfully and as favorably as you can. Whether it is a spontaneous conversation in a hallway or a published paper, you always want to do everything you can to ensure that people will think very highly of you and your work.
2. Without driving yourself to distraction, continually try to notice as many details around you as you possibly can. (This is also an excellent lesson from Arthur Conan Doyle's Sherlock Holmes stories.) You may pick up some scientific idea or discrepancy that everyone else has overlooked, and that might form the basis for a new project or show that an existing project has a serious problem. Carefully watch both the skills and the mistakes that others exhibit in dealing with scientific and non-scientific problems, and apply everything you learn from those to do better yourself. Constantly keep an eye out for scientific and political opportunities and dangers, for people whom you could help or who could help you, and for people whom you need to handle carefully or try to avoid.
3. Whatever research topic you pursue, do your background reading so thoroughly that you understand that whole scientific area at least as well as anyone else. That can help you to identify and avoid potential problems with your project, and to find the best ways to implement your project without duplicating previous work. It can also help you to quickly and effectively respond to anyone who questions or criticizes you or your project.

### 12.3.16 Walter M. Miller, Jr.

Walter M. Miller, Jr. (1923–1996) was a U.S. engineer, served in World War II, was haunted by the horrors of what he had experienced then, and became a devout Catholic. During the 1950s, he combined all of those things into a series of three stories set in the future after a global nuclear war has destroyed civilization, with science and engineering knowledge being preserved by a Catholic monastery. In 1959, he united those stories into the novel *A Canticle for Leibowitz* [Miller 1959]. Miller’s passionate novel has a great deal to say about the inherent flaws of human individuals and human societies, as well as the positive potential for improvement that is just within human reach, as shown for example by the following excerpts:

[Ch 6:] So it was that, after the Deluge, the Fallout, the plagues, the madness, the confusion of tongues, the rage, there began the bloodletting of the Simplification, when remnants of mankind had torn other remnants limb from limb, killing rulers, scientists, leaders, technicians, teachers, and whatever persons the leaders of the maddened mobs said deserved death for having helped to make the earth what it had become. Nothing had been so hateful in the sight of these mobs as the man of learning, at first because they had served the princes, but then later because they refused to join in the bloodletting and tried to oppose the mobs, calling the crowds “bloodthirsty simpletons.” [...]

The Simplification had ceased to have plan or purpose soon after it began, and became an insane frenzy of mass murder and destruction such as can occur only when the last traces of social order are gone. The madness was transmitted to the children, taught as they were—not merely to forget—but to hate, and surges of mob fury recurred sporadically even through the fourth generation after the Deluge. By then, the fury was directed not against the learned, for there were none, but against the merely literate.

[Ch. 16:] “The children of the world are consistent too—so I say they will soak up everything you can offer, take your job away from you, and then denounce you as a decrepit wreck. Finally, they’ll ignore you entirely.”

[Ch. 20:] Ignorance is king. Many would not profit by his abdication. Many enrich themselves by means of his dark monarchy. They are his Court, and in his name they defraud and govern, enrich themselves and perpetuate their power. Even literacy they fear, for the written word is another channel of communication that might cause their enemies to become united. Their weapons are keen-honed, and they use them with skill. They will press the battle upon the world when their interests are threatened, and the violence which follows will last until the structure of society as it now exists is leveled to rubble, and a new society emerges.

[Ch. 21:] “If you try to save wisdom until the world is wise, Father, the world will never have it.”

[Ch. 22:] Men must fumble awhile with error to separate it from truth, I think—as long as they don’t seize the error hungrily because it has a pleasanter taste.

[Ch. 22:] The old father of lies was clever at telling half-truths: How shall you “know” good and evil, until you shall have sampled a little? Taste and be as Gods. But neither

infinite power nor infinite wisdom could bestow godhood upon men. For that there would have to be infinite love as well.

[Ch. 24:] There were spaceships again in that century, and the ships were manned by fuzzy impossibilities that walked on two legs and sprouted tufts of hair in unlikely anatomical regions. They were a garrulous kind. They belonged to a race quite capable of admiring its own image in a mirror, and equally capable of cutting its own throat before the altar of some tribal god, such as the deity of Daily Shaving. It was a species which often considered itself to be, basically, a race of divinely inspired toolmakers; any intelligent entity from Arcturus would instantly have perceived them to be, basically, a race of impassioned after-dinner speechmakers.

It was inevitable, it was manifest destiny, they felt (and not for the first time) that such a race go forth to conquer stars. To conquer them several times, if need be, and certainly to make speeches about the conquest. But, too, it was inevitable that the race succumb again to the old maladies on new worlds, even as on Earth before, in the litany of life and in the special liturgy of Man[...]

[Ch. 26:] The abbot snapped off the set. “Where’s the truth”? he asked quietly. “What’s to be believed? Or does it matter at all? When mass murder’s been answered with mass murder, rape with rape, hate with hate, there’s no longer much meaning in asking whose ax is the bloodier. Evil, on evil, piled on evil. Was there any justification in our ‘police action’ in space? How can we know? Certainly there was no justification for what *they* did—or was there? We only know what *that* thing says, and *that* thing is a captive. The Asian radio has to say what will least displease its government; *ours* has to say what will least displease our fine patriotic opinionated rabble, which is what, coincidentally, the government wants it to say anyhow, so where’s the difference?”

[Ch. 26:] “Listen, none of us has been really able. But we’ve tried, and we’ve been tried. It tries you to destruction, but you’re here for that. This Order has had abbots of gold, abbots of cold tough steel, abbots of corroded lead, and none of them was able, although some were abler than others, some saints even. The gold got battered, the steel got brittle and broke, and the corroded lead got stamped into ashes by Heaven. Me, I’ve been lucky enough to be quicksilver; I spatter, but I run back together somehow. I feel another spattering coming on, though, Brother, and I think it’s for keeps this time. What are you made of, son?”

[Ch. 26:] The closer men came to perfecting for themselves a paradise, the more impatient they seemed to become with it, and with themselves as well. They made a garden of pleasure, and became progressively more miserable with it as it grew in richness and power and beauty; for then, perhaps, it was easier for them to see that something was missing in the garden, some tree or shrub that would not grow. When the world was in darkness and wretchedness, it could believe in perfection and yearn for it. But when the world became bright with reason and riches, it began to sense the narrowness of the needle’s eye, and that rankled for a world no longer willing to believe or yearn. Well, they were going to destroy it again, were they—this garden Earth, civilized and knowing, to be torn apart again that Man might hope again in wretched darkness.

[Ch. 26:] Speak up, destiny, speak up! Destiny always seems decades away, but suddenly

it's not decades away; it's right *now*. But maybe destiny is always right now, right here, right this very instant, maybe.

[Ch. 26:] Ask for an omen, then stone it when it comes—*de essentia hominum*.

[Ch. 26:] “Be for Man the memory of Earth and Origin. Remember this Earth. Never forget her, but—*never come back*. [...] If you ever come back, you might meet the Archangel at the east end of Earth, guarding her passes with a sword of flame. I feel it. Space is your home hereafter. It's a lonelier desert than ours. God bless you, and pray for us.”

[Ch. 27:] A few million corpses lying around might start a rebellion against those responsible.

[Ch. 29:] The trouble with being a priest was that you eventually had to take the advice you gave to others. *Nature imposes nothing on you that Nature hasn't prepared you to bear*.

[Ch. 29:] What did you do for them, Bone? Teach them to read and write? Help them rebuild, give them Christ, help restore a culture? Did you remember to warn them that it could never be Eden?

[...W]hy don't you forgive God for allowing pain? If He didn't allow it, human courage, bravery, nobility, and self-sacrifice would all be meaningless things. [...]

Maybe that's what we forgot to mention, Bone. Bombs and tantrums, when the world grew bitter because the world fell somehow short of half-remembered Eden. The bitterness was essentially against God. Listen, Man, you have to give up the bitterness [...] before anything; before love.

[Ch. 30:] They sang as they lifted the children into the ship. They sang old space chanteys and helped the children up the ladder one at a time and into the hands of the sisters. They sang heartily to dispel the fright of the little ones. When the horizon erupted, the singing stopped. They passed the last child into the ship.

The horizon came alive with flashes as the monks mounted the ladder. The horizons became a red glow. A distant cloudbank was born where no cloud had been. The monks on the ladder looked away from the flashes. When the flashes were gone, they looked back. [...]

The last monk, upon entering, paused in the lock. He stood in the open hatchway and took off his sandals. “*Sic transit mundus*,” he murmured, looking back at the glow. He slapped the soles of his sandals together, beating the dirt out of them. The glow was engulfing a third of the heavens. He scratched his beard, took one last look at the ocean, then stepped back and closed the hatch.

There came a blur, a glare of light, a high thin whining sound, and the starship thrust itself heavenward.

### 12.3.17 Jimmy Carter

Jimmy Carter (1924–) was a devout Christian, a nuclear engineer in the U.S. Navy, governor of Georgia 1971–1975, and President of the United States 1977–1981. He had by far the most productive post-presidency of any former U.S. president, spending the remaining 40+ years of his life negotiating international peace agreements, working to eliminate certain infectious diseases, and doing physical labor even into his 90s to build houses for poor people. Historians might conclude that Carter’s presidency was less successful since some of his domestic and foreign opponents perceived his niceness as a sign of weakness [Alter 2020], yet Carter publicly stated (and demonstrated) the necessity to make a forceful stand on important matters. His words and deeds are an instructive model of how to be a highly ethical and compassionate person in a deeply flawed world.

On 15 July 1979, Carter gave an especially noteworthy nationwide address on evening television (often called the “malaise” speech, even though Carter never used that word). While the immediate focus of the speech was an energy shortage that the United States was experiencing at that time, Carter made much more general observations about societal problems and potential solutions that seem amazingly prescient (and still relevant) many decades later [Carter 1979]:

I want to talk to you right now about a fundamental threat to American democracy. [...] The threat is nearly invisible in ordinary ways. It is a crisis of confidence.

It is a crisis that strikes at the very heart and soul and spirit of our national will. We can see this crisis in the growing doubt about the meaning of our own lives and in the loss of a unity of purpose for our nation. The erosion of our confidence in the future is threatening to destroy the social and the political fabric of America.

The confidence that we have always had as a people is not simply some romantic dream or a proverb in a dusty book that we read just on the Fourth of July. It is the idea which founded our nation and has guided our development as a people. Confidence in the future has supported everything else—public institutions and private enterprise, our own families, and the very Constitution of the United States. Confidence has defined our course and has served as a link between generations. We’ve always believed in something called progress. We’ve always had a faith that the days of our children would be better than our own.

Our people are losing that faith, not only in government itself but in the ability as citizens to serve as the ultimate rulers and shapers of our democracy. As a people we know our past and we are proud of it. Our progress has been part of the living history of America, even the world. We always believed that we were part of a great movement of humanity itself called democracy, involved in the search for freedom; and that belief has always strengthened us in our purpose. But just as we are losing our confidence in the future, we are also beginning to close the door on our past.

In a nation that was proud of hard work, strong families, close-knit communities, and our faith in God, too many of us now tend to worship self-indulgence and consumption. Human identity is no longer defined by what one does, but by what one owns. But we’ve discovered that owning things and consuming things does not satisfy our longing for meaning. We’ve learned that piling up material goods cannot fill the emptiness of lives which have no confidence or purpose.

The symptoms of this crisis of the American spirit are all around us. For the first time in the history of our country a majority of our people believe that the next five years

will be worse than the past five years. Two-thirds of our people do not even vote. The productivity of American workers is actually dropping, and the willingness of Americans to save for the future has fallen below that of all other people in the Western world.

As you know, there is a growing disrespect for government and for churches and for schools, the news media, and other institutions. This is not a message of happiness or reassurance, but it is the truth and it is a warning.

These changes did not happen overnight. They've come upon us gradually over the last generation, years that were filled with shocks and tragedy.

We were sure that ours was a nation of the ballot, not the bullet, until the murders of John Kennedy and Robert Kennedy and Martin Luther King, Jr. We were taught that our armies were always invincible and our causes were always just, only to suffer the agony of Vietnam. We respected the Presidency as a place of honor until the shock of Watergate.

We remember when the phrase "sound as a dollar" was an expression of absolute dependability, until ten years of inflation began to shrink our dollar and our savings. We believed that our nation's resources were limitless until 1973 when we had to face a growing dependence on foreign oil.

These wounds are still very deep. They have never been healed.

Looking for a way out of this crisis, our people have turned to the Federal Government and found it isolated from the mainstream of our nation's life. Washington, D.C., has become an island. The gap between our citizens and our government has never been so wide. The people are looking for honest answers, not easy answers; clear leadership, not false claims and evasiveness and politics as usual.

What you see too often in Washington and elsewhere around the country is a system of government that seems incapable of action. You see a Congress twisted and pulled in every direction by hundreds of well-financed and powerful special interests.

You see every extreme position defended to the last vote, almost to the last breath by one unyielding group or another. You often see a balanced and a fair approach that demands sacrifice, a little sacrifice from everyone, abandoned like an orphan without support and without friends.

Often you see paralysis and stagnation and drift. You don't like it, and neither do I. What can we do?

First of all, we must face the truth, and then we can change our course. We simply must have faith in each other, faith in our ability to govern ourselves, and faith in the future of this nation. Restoring that faith and that confidence to America is now the most important task we face. It is a true challenge of this generation of Americans.

One of the visitors to Camp David last week put it this way: "We've got to stop crying and start sweating, stop talking and start walking, stop cursing and start praying. The strength we need will not come from the White House, but from every house in America."



We know the strength of America. We are strong. We can regain our unity. We can regain our confidence. We are the heirs of generations who survived threats much more powerful and awesome than those that challenge us now. Our fathers and mothers were strong men and women who shaped a new society during the Great Depression, who fought world wars and who carved out a new charter of peace for the world.

We ourselves are the same Americans who just ten years ago put a man on the moon. We are the generation that dedicated our society to the pursuit of human rights and equality. [...]

We are at a turning point in our history. There are two paths to choose. One is a path I've warned about tonight, the path that leads to fragmentation and self-interest. Down that road lies a mistaken idea of freedom, the right to grasp for ourselves some advantage over others. That path would be one of constant conflict between narrow interests ending in chaos and immobility. It is a certain route to failure.

All the traditions of our past, all the lessons of our heritage, all the promises of our future point to another path—the path of common purpose and the restoration of American values. That path leads to true freedom for our nation and ourselves.

Carter's 14 January 1981 farewell address at the end of his presidency also had important advice for individuals and governments that is still widely applicable [Carter 1981]:

Within our system of government every American has a right and a duty to help shape the future course of the United States. Thoughtful criticism and close scrutiny of all government officials by the press and the public are an important part of our democratic society. Now, as in the past, only the understanding and involvement of the people through full and open debate can help to avoid serious mistakes and assure the continued dignity and safety of the Nation. [...]

Today, as people have become ever more doubtful of the ability of the Government to deal with our problems, we are increasingly drawn to single-issue groups and special interest organizations to ensure that whatever else happens, our own personal views and our own private interests are protected. This is a disturbing factor in American political life. It tends to distort our purposes, because the national interest is not always the sum of all our single or special interests. We are all Americans together, and we must not forget that the common good is our common interest and our individual responsibility. [...]

National weakness, real or perceived, can tempt aggression and thus cause war. That's why the United States can never neglect its military strength. We must and we will remain strong. But with equal determination, the United States and all countries must find ways to control and to reduce the horrifying danger that is posed by the enormous world stockpiles of nuclear arms. [...]

The same rocket technology that delivers nuclear warheads has also taken us peacefully into space. From that perspective, we see our Earth as it really is—a small and fragile and beautiful blue globe, the only home we have. We see no barriers of race or religion or country. We see the essential unity of our species and our planet. And with faith and common sense, that bright vision will ultimately prevail.

Another major challenge, therefore, is to protect the quality of this world within which we live. The shadows that fall across the future are cast not only by the kinds of weapons we've built, but by the kind of world we will either nourish or neglect. There are real and growing dangers to our simple and our most precious possessions: the air we breathe, the water we drink, and the land which sustains us. The rapid depletion of irreplaceable minerals, the erosion of topsoil, the destruction of beauty, the blight of pollution, the demands of increasing billions of people, all combine to create problems which are easy to observe and predict, but difficult to resolve. [...]

But there is no reason for despair. Acknowledging the physical realities of our planet does not mean a dismal future of endless sacrifice. In fact, acknowledging these realities is the first step in dealing with them. We can meet the resource problems of the world—water, food, minerals, farmlands, forests, overpopulation, pollution—if we tackle them with courage and foresight.

I've just been talking about forces of potential destruction that mankind has developed and how we might control them. It's equally important that we remember the beneficial forces that we have evolved over the ages and how to hold fast to them. One of those constructive forces is the enhancement of individual human freedoms through the strengthening of democracy and the fight against deprivation, torture, terrorism, and the persecution of people throughout the world. The struggle for human rights overrides all differences of color or nation or language. Those who hunger for freedom, who thirst for human dignity, and who suffer for the sake of justice, they are the patriots of this cause.

I believe with all my heart that America must always stand for these basic human rights at home and abroad. That is both our history and our destiny.

America did not invent human rights. In a very real sense, it's the other way around. Human rights invented America. Ours was the first nation in the history of the world to be founded explicitly on such an idea. Our social and political progress has been based on one fundamental principle: the value and importance of the individual. The fundamental force that unites us is not kinship or place of origin or religious preference. The love of liberty is the common blood that flows in our American veins.

The battle for human rights, at home and abroad, is far from over. We should never be surprised nor discouraged, because the impact of our efforts has had and will always have varied results. Rather, we should take pride that the ideals which gave birth to our Nation still inspire the hopes of oppressed people around the world. We have no cause for self-righteousness or complacency, but we have every reason to persevere, both within our own country and beyond our borders.

If we are to serve as a beacon for human rights, we must continue to perfect here at home the rights and the values which we espouse around the world: a decent education for our children, adequate medical care for all Americans, an end to discrimination against minorities and women, a job for all those able to work, and freedom from injustice and religious intolerance.

We live in a time of transition, an uneasy era which is likely to endure for the rest of this century. It will be a period of tensions, both within nations and between nations, of competition for scarce resources, of social, political, and economic stresses and strains.

During this period we may be tempted to abandon some of the time-honored principles and commitments which have been proven during the difficult times of past generations. We must never yield to this temptation. Our American values are not luxuries, but necessities—not the salt in our bread, but the bread itself. Our common vision of a free and just society is our greatest source of cohesion at home and strength abroad, greater even than the bounty of our material blessings.

Remember these words: “We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain inalienable Rights, that among these are Life, Liberty and the pursuit of Happiness.”

This vision still grips the imagination of the world. But we know that democracy is always an unfinished creation. Each generation must renew its foundations. Each generation must rediscover the meaning of this hallowed vision in the light of its own modern challenges.

Carter continued to work and teach along the same lines after leaving public office, as demonstrated in his 9 December 2002 Nobel Peace Prize lecture [Carter 2002]:

I thought often during my years in the White House of an admonition that we received in our small school in Plains, Georgia, from a beloved teacher, Miss Julia Coleman. She often said: “We must adjust to changing times but still hold to unchanging principles.”

When I was a young boy, this same teacher introduced me to Leo Tolstoy’s novel, *War and Peace*, a powerful narrative she interpreted as a reminder that the simple human attributes of goodness and truth can overcome great power. She also taught us that an individual is not swept along on a tide of inevitability but can influence even the greatest human events.

These premises have been proven by the lives of many heroes, some of whose names were little known outside their own regions until they became Nobel laureates: Albert John Lutuli, Norman Borlaug, Desmond Tutu, Elie Wiesel, Aung San Suu Kyi, Jody Williams, and even Albert Schweitzer and Mother Teresa. All of these and others have proven that even without government power—and often in opposition to it—individuals can enhance human rights and wage peace, actively and effectively.

The Nobel prize also profoundly magnified the inspiring global influence of Martin Luther King Jr., the greatest leader that my native state has ever produced. [...]

I am not here as a public official, but as a citizen of a troubled world who finds hope in a growing consensus that the generally accepted goals of society are peace, freedom, human rights, environmental quality, the alleviation of suffering, and the rule of law. [...]

The unchanging principles of life predate modern times. I worship Jesus Christ, whom we Christians consider to be the Prince of Peace. As a Jew, he taught us to cross religious boundaries, in service and in love. He repeatedly reached out and embraced Roman conquerors, other Gentiles, and even the more despised Samaritans.

Despite theological differences, all great religions share common commitments that define our ideal secular relationships. I am convinced that Christians, Muslims, Buddhists,

Hindus, Jews, and others can embrace each other in a common effort to alleviate human suffering and to espouse peace.

But the current era is a challenging and disturbing time for those whose lives are shaped by religious faith based on kindness toward each other. We have been reminded that cruel and inhuman acts can be derived from distorted theological beliefs[....]

In order for us human beings to commit ourselves personally to the inhumanity of war, we find it necessary first to dehumanize our opponents, which is in itself a violation of the beliefs of all religions. Once we characterize our adversaries as beyond the scope of God’s mercy and grace, their lives lose all value. [...]

[T]he most serious and universal problem is the growing chasm between the richest and poorest people on earth. [...] The results of this disparity are root causes of most of the world’s unresolved problems, including starvation, illiteracy, environmental degradation, violent conflict, and unnecessary illnesses that range from Guinea worm to HIV/AIDS. [...]

The bond of our common humanity is stronger than the divisiveness of our fears and prejudices. God gives us a capacity for choice. We can choose to alleviate suffering. We can choose to work together for peace. We can make these changes—and we must.

In his 2005 book, *Our Endangered Values*, Carter offered advice such as [Carter 2005]:

[p. 28:] I believe that anyone can be successful in life, regardless of natural talent or the environment within which we live. This is not based on measuring success by human competitiveness for wealth, possessions, influence, and fame, but adhering to God’s standards of truth, justice, humility, service, compassion, forgiveness, and love.

[p. 151:] For me personally and for most other Americans, this commitment to peace and diplomacy does not imply a blind or total pacifism. There are times when war is justified, and for many centuries the moral criteria for violence have been carefully delineated.

[p. 186:] “What can just one person do?” When combined, the small individual contributors of caring, friendship, forgiveness, and love, each of us different from our next-door neighbors, can form a phalanx, an army, with great capability.

Making the connection from individual people to an entire nation of people, Carter discussed the characteristics that a nation and its government—really any nation and any government—should possess in his 2011 editorial article, “What Is a Superpower?” [Carter 2011]:

It is also imperative that America remain vigilant against threats from terrorists. But the admirable characteristics of a nation are no more defined by its size and physical prowess than are those of a human being.

What are some of the other attributes of a superpower? Once again, they might very well mirror those of a person. These would include a demonstrable commitment to truth, justice, peace, freedom, humility, human rights, generosity, and the upholding of other moral values.

There is no inherent reason that our nation cannot be the international paragon of these virtues. Whenever a person in any nation faces a challenge or a problem, it would be good to have them look to Washington for assistance or as a sterling example.

Our government should be known, without question, as opposed to war, dedicated to the resolution of disputes by peaceful means, and, whenever possible, eager to exert our tremendous capability and influence to accomplish this goal.

We should be seen as the unswerving champion of freedom and human rights, both among our own citizens and within the global community.

America should be the focal point around which other nations of all kinds could marshal to combat threats of global warming and to enhance the quality of our common environment.

We should be in the forefront of providing humane assistance to people in need, willing to lead other industrialized nations in sharing some of our great wealth with those who are destitute.

In achieving all these goals, our great country should strive in every practical way to cooperate with other nations, most of which share these same fundamental ideals. We should also be willing to communicate with those who differ with us on some issues. There is an unprecedented opportunity as all nations face common challenges to use our unequaled influence wisely and with a generous spirit.

There would be no real sacrifice in exemplifying these traits. Instead, our own well-being would be enhanced by restoring the trust, admiration, and friendship that our nation formerly enjoyed among other peoples. At the same time, all Americans could be united at home in a common commitment to revive and nourish the religious faith and historic political and moral values that we have espoused and for which we have struggled during the past two and a half centuries.

Perhaps the best way to conclude this brief overview of Carter's views is with an early statement from his presidency. On 29 July 1977, Carter recorded a message to be placed onboard two spacecraft, Voyager 1 (launched 5 September 1977) and Voyager 2 (launched 20 August 1977), that subsequently toured our solar system and then headed out toward other star systems [Carter 1977]:

This Voyager spacecraft was constructed by the United States of America. We are a community of 240 million human beings among the more than 4 billion who inhabit the planet Earth. We human beings are still divided into nation states, but these states are rapidly becoming a single global civilization.

We cast this message into the cosmos. It is likely to survive a billion years into our future, when our civilization is profoundly altered and the surface of the Earth may be vastly changed. Of the 200 billion stars in the Milky Way galaxy, some—perhaps many—may have inhabited planets and spacefaring civilizations. If one such civilization intercepts Voyager and can understand these recorded contents, here is our message:

This is a present from a small distant world, a token of our sounds, our science, our images, our music, our thoughts, and our feelings. We are attempting to survive our time so we may live into yours. We hope someday, having solved the problems we face, to join a community of galactic civilizations. This record represents our hope and our determination, and our good will in a vast and awesome universe.

### 12.3.18 Daniel Keyes

Daniel Keyes (1927–2014) was a U.S. novelist and short story writer. His best known work by far was *Flowers for Algernon*, a 1966 novel about a young man, Charlie Gordon, whose intelligence is drastically but temporarily increased by a scientific experiment, with tragic consequences. Even though the story was fictional and Keyes only had a bachelor's degree in psychology, *Flowers for Algernon* is amazingly insightful about revolutionary scientific research and academia—their process, their potential, and their common dysfunctions. Along the way, Keyes also delivered a clear message about what things really matter most in how one lives.

Here are some representative quotes from Charlie Gordon in the novel [Keyes 1966]:

[Progress Report 11, May 15:]

Burt introduced me to an economics professor at the faculty cafeteria, one well known for his work on the economic factors affecting interest rates. I had long wanted to talk to an economist about some of the ideas I had come across in my reading. The moral aspects of the military blockade as a weapon in times of peace had been bothering me. [...] That, he explained apologetically, was outside his area of specialization. [...]

The same thing happened when I tried to discuss Chaucer with an American literature specialist, questioned an Orientalist about the Trobriand Islanders, and tried to focus on the problems of automation-caused unemployment with a social psychologist who specialized in public opinion polls on adolescent behavior. They would always find excuses to slip away, afraid to reveal the narrowness of their knowledge.

How different they seem to be now. And how foolish I was ever to have thought that professors were intellectual giants.

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[Progress Report 13, June 13:]

At first, I admit, I was in awe at the picture of an international convention of scientists and scholars, gathered for an exchange of ideas. Here, I thought, was where it all really happened. [...]

Some of the psychological papers delivered at the meeting were impressive. [...]

But there were other kinds of papers too—P.T. Zellerman's study on the difference in the length of time it took white rats to learn a maze when the corners were curved rather than angular, or Worfel's paper on the effect of intelligence level on the reaction-time of rhesus monkeys. Papers like these made me angry. Money, time, and energy squandered on the detailed analysis of the trivial. Burt was right when he praised Nemur and Strauss for devoting themselves to something important and uncertain rather than to something insignificant and safe.

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[Progress Report 14, June 24:]

Let me give something of myself to others. I've got to use my knowledge and skills to work in the field of increasing human intelligence. [...]

I have some ideas.

There is so much that can be done with this technique, if it is perfected. [...] What about the countless millions all over the the world, and those yet unborn destined to be retarded? What fantastic levels might be achieved by using this technique on normal people? On geniuses?

There are so many doors to open I am impatient to apply my own knowledge and skills to the problem.

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[Progress Report 16, July 31 and August 11:]

I'm on the edge of it. I sense it. They all think I'm killing myself at this pace, but what they don't understand is that I'm living at a peak of clarity and beauty I never knew existed. Every part of me is attuned to the work. I soak it up into my pores during the day, and at night—in the moments before I pass off into sleep—ideas explode into my head like fireworks. There is no greater joy than the burst of solution to a problem. [...]

This is beauty, love, and truth all rolled into one. This is joy. [...] I am in love with what I am doing, because the answer to this problem is right here in my mind, and soon—very soon—it will burst into consciousness. [...]

I've gone as far as I can on a conscious level, and now it's up to those mysterious operations below the level of awareness. It's one of those inexplicable things, how everything I've learned and experienced is brought to bear on the problem. Pushing too hard will only make things freeze up. How many great problems have gone unsolved because men didn't know enough, or have enough faith in the creative process and in themselves, to let go for the whole mind to work at it?

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[Progress Report 16, August 11:]

[...] I've learned that intelligence alone doesn't mean a damned thing. Here in your university, intelligence, education, knowledge, have all become great idols. But I know now there's one thing you've all overlooked: intelligence and education that hasn't been tempered by human affection isn't worth a damn.

### 12.3.19 Fred Rogers

Fred Rogers (1928–2003) hosted the long-running children’s television show, *Mister Rogers’ Neighborhood*, on the U.S. Public Broadcasting Service (PBS). While his show was aimed at very young children, it focused not on entertainment for its own sake, but rather on delivering positive psychological messages for how children should view themselves and others, and how they should deal with various emotions or difficulties. Over the course of his life Rogers, an ordained Christian minister, also offered a great deal of advice that can be helpful for people of any age.<sup>22</sup>

The Fred Rogers Center, which maintains a research archive of his writings and materials, has put some of his advice online [<https://www.fredrogerscenter.org/about-fred/Fred-Quotes>]:

Taking care is one way to show your love. Another way is letting people take good care of you when you need it.

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Mutually caring relationships require kindness and patience, tolerance, optimism, joy in the other’s achievements, confidence in oneself, and the ability to give without undue thought of gain.

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Often when you think you’re at the end of something, you’re at the beginning of something else.

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Where would any of us be without teachers—without people who have passion for their art or their science or their craft and love it right in front of us? What would any of us do without teachers passing on to us what they know is essential about life?

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In times of stress, the best thing we can do for each other is to listen with our ears and our hearts and to be assured that our questions are just as important as our answers.

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Human relationships are primary in all of living. When the gusty winds blow and shake our lives, if we know that people care about us, we may bend with the wind... but we won’t break.

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There is no normal life that is free of pain. It’s the very wrestling with our problems that can be the impetus for our growth.

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Look for the helpers. You will always find people who are helping... Because if you look for the helpers, you will know that there is hope.

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Some days, doing “the best we can” may still fall short of what we would like to be able to do, but life isn’t perfect—on any front—and doing what we can with what we have is the most we should expect of ourselves or anyone else.

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<sup>22</sup>See for example: Rogers 1995, 2003, 2005.



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When I say, “it’s you I like,” I’m talking about that part of you that knows that life is far more than anything you can ever see or hear or touch... that deep part of you that allows you to stand for those things without which humankind cannot survive:

*love* that conquers hate,  
*peace* that rises triumphant over war, and  
*justice* that proves more powerful than greed.

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Without human beings there never would have been a computer or anything else that we call advanced technology. That’s something I like to help children remember: that, no matter what the machine may be, it was people who thought it up and made it, and it’s people who make it work.

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No one else can lead the life you live.

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The gifts we treasure most over the years are often small and simple. In easy times and in tough times, what seems to matter most is the way we show those nearest us that we’ve been listening to their needs, to their joys, and to their challenges.

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Love isn’t a state of perfect caring. It is an active noun like “struggle.” To love someone is to strive to accept that person exactly the way he or she is, right here and now.

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There’s never been a time in our history when there have been so many changes, so many unusual things to deal with for which we have no experience. It’s as if our whole society were walking along a road through a wilderness of constant change with strangers we think we should know, but don’t quite understand.

Some other quotes were also posted online as *Mister Rogers’ Neighborhood: Thoughts For All Ages* [formerly on the PBS website, partially preserved at [https://en.wikiquote.org/wiki/Fred\\_Rogers](https://en.wikiquote.org/wiki/Fred_Rogers)]:

Little by little we human beings are confronted with situations that give us more and more clues that we aren’t perfect.

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If only you could sense how important you are to the lives of those you meet; how important you can be to people you may never even dream of. There is something of yourself that you leave at every meeting with another person.

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As human beings, our job in life is to help people realize how rare and valuable each one of us really is, that each of us has something that no one else has—or ever will have—something inside that is unique to all time. It’s our job to encourage each other to discover that uniqueness and to provide ways of developing its expression.

### 12.3.20 Martin Luther King, Jr.

Martin Luther King, Jr. (1929–1968) was a Christian minister who became justly famous for organizing nonviolent mass protests to lobby U.S. federal, state, and local governments and businesses to grant proper rights to African Americans. Along the way, he also advocated against the Vietnam War and economic injustices. He won the Nobel Peace Prize in 1964 and was assassinated in 1968.

Throughout King’s life, he faced staggering obstacles and evils. Although that opposition ultimately claimed his life, he never wavered from his objectives to improve society, or from his peaceful and enlightened methods of pursuing those objectives. Future creators could learn much from the example of King’s entire life, and also from the large number of speeches and writings that he left behind. I only quote parts of two examples here, but I urge you to seek out more.<sup>23</sup>

On 28 February 1954, King spoke on “Rediscovering Lost Values” at the Second Baptist Church of Detroit, focusing on the importance of improving the ethical behavior of individuals and groups in society:<sup>24</sup>

There is something wrong with our world, something fundamentally and basically wrong. I don’t think we have to look too far to see that. I’m sure that most of you would agree with me in making that assertion. And when we stop to analyze the cause of our world’s ills, many things come to mind.

We begin to wonder if it is due to the fact that we don’t know enough. But it can’t be that. Because in terms of accumulated knowledge we know more today than men have known in any period of human history. We have the facts at our disposal. We know more about mathematics, about science, about social science, and philosophy, than we’ve ever known in any period of the world’s history. So it can’t be because we don’t know enough.

And then we wonder if it is due to the fact that our scientific genius lags behind. That is, if we have not made enough progress scientifically. Well then, it can’t be that. For our scientific progress over the past years has been amazing. Man through his scientific genius has been able to warp distance and place time in chains, so that today it’s possible to eat breakfast in New York City and supper in London, England. Back in about 1753 it took a letter three days to go from New York City to Washington, and today you can go from here to China in less time than that. It can’t be because man is stagnant in his scientific progress. Man’s scientific genius has been amazing.

I think we have to look much deeper than that if we are to find the real cause of man’s problems and the real cause of the world’s ills today. If we are to really find it I think we will have to look in the hearts and souls of men.

The trouble isn’t so much that we don’t know enough, but it’s as if we aren’t good enough. The trouble isn’t so much that our scientific genius lags behind, but our moral genius lags behind. The great problem facing modern man is that, that the means by which we live, have outdistanced the spiritual ends for which we live. So we find

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<sup>23</sup>See especially: King 1986, 1998.

<sup>24</sup><https://kinginstitute.stanford.edu/king-papers/documents/rediscovering-lost-values-0>

ourselves caught in a messed-up world. The problem is with man himself and man's soul. We haven't learned how to be just and honest and kind and true and loving. And that is the basis of our problem. The real problem is that through our scientific genius we've made of the world a neighborhood, but through our moral and spiritual genius we've failed to make of it a brotherhood. And the great danger facing us today is not so much the atomic bomb that was created by physical science. Not so much that atomic bomb that you can put in an aeroplane and drop on the heads of hundreds and thousands of people—as dangerous as that is. But the real danger confronting civilization today is that atomic bomb which lies in the hearts and souls of men, capable of exploding into the vilest of hate and into the most damaging selfishness. That's the atomic bomb that we've got to fear today. Problem is with the men. Within the heart and the souls of men. That is the real basis of our problem. [...]

Most people can't stand up for their, for their convictions, because the majority of people might not be doing it. See, everybody's not doing it, so it must be wrong. And, and since everybody is doing it, it must be right. So a sort of numerical interpretation of what's right. [...]

Now that isn't the only thing that convinces me that we've strayed away from this attitude, this principle. The other thing is that we have adopted a sort of a pragmatic test for right and wrong—whatever works is right. If it works, it's all right. Nothing is wrong but that which does not work. If you don't get caught, it's right. That's the attitude, isn't it? It's all right to disobey the Ten Commandments, but just don't disobey the Eleventh, Thou shall not get caught. That's the attitude. That's the prevailing attitude in, in our culture. No matter what you do, just do it with a, with a bit of finesse. You know, a sort of attitude of the survival of the slickest. Not the Darwinian survival of the fittest, but the survival of the slickest—who, whoever can be the slickest is, is the one who right. It's all right to lie, but lie with dignity. It's all right to steal and to rob and extort, but do it with a bit of finesse. It's even all right to hate, but just dress your hate up in the garments of love and make it appear that you are loving when you are actually hating. Just get by! That's the thing that's right according to this new ethic.

My friends, that attitude is destroying the soul of our culture! It's destroying our nation! The thing that we need in the world today, is a group of men and women who will stand up for right and be opposed to wrong, wherever it is. A group of people who have come to see that some things are wrong, whether they're never caught up with. Some things are right, whether nobody sees you doing them or not.

On 12 April 1963, King was arrested for peacefully protesting against racial segregation in Birmingham, Alabama. On scraps of paper that were smuggled into and out of his jail cell, King wrote his now-famous “Letter from a Birmingham Jail,” completed on 16 April 1963:<sup>25</sup>

Injustice anywhere is a threat to justice everywhere. We are caught in an inescapable network of mutuality, tied in a single garment of destiny. Whatever affects one directly, affects all indirectly. Never again can we afford to live with the narrow, provincial “outside agitator” idea. Anyone who lives inside the United States can never be considered an outsider anywhere within its bounds. [...]

<sup>25</sup>[https://www.africa.upenn.edu/Articles.Gen/Letter\\_Birmingham.html](https://www.africa.upenn.edu/Articles.Gen/Letter_Birmingham.html)

We know through painful experience that freedom is never voluntarily given by the oppressor; it must be demanded by the oppressed. Frankly, I have yet to engage in a direct action campaign that was “well timed” in the view of those who have not suffered unduly from the disease of segregation. For years now I have heard the word “Wait!” It rings in the ear of every Negro with piercing familiarity. This “Wait” has almost always meant “Never.” We must come to see, with one of our distinguished jurists, that “justice too long delayed is justice denied.”

We have waited for more than 340 years for our constitutional and God given rights. The nations of Asia and Africa are moving with jetlike speed toward gaining political independence, but we still creep at horse and buggy pace toward gaining a cup of coffee at a lunch counter. Perhaps it is easy for those who have never felt the stinging darts of segregation to say, “Wait.” But when you have seen vicious mobs lynch your mothers and fathers at will and drown your sisters and brothers at whim; when you have seen hate filled policemen curse, kick and even kill your black brothers and sisters; when you see the vast majority of your twenty million Negro brothers smothering in an airtight cage of poverty in the midst of an affluent society; when you suddenly find your tongue twisted and your speech stammering as you seek to explain to your six year old daughter why she can’t go to the public amusement park that has just been advertised on television, and see tears welling up in her eyes when she is told that Funtown is closed to colored children, and see ominous clouds of inferiority beginning to form in her little mental sky, and see her beginning to distort her personality by developing an unconscious bitterness toward white people; when you have to concoct an answer for a five year old son who is asking: “Daddy, why do white people treat colored people so mean?”; when you take a cross county drive and find it necessary to sleep night after night in the uncomfortable corners of your automobile because no motel will accept you; when you are humiliated day in and day out by nagging signs reading “white” and “colored”; when your first name becomes “nigger,” your middle name becomes “boy” (however old you are) and your last name becomes “John,” and your wife and mother are never given the respected title “Mrs.”; when you are harried by day and haunted by night by the fact that you are a Negro, living constantly at tiptoe stance, never quite knowing what to expect next, and are plagued with inner fears and outer resentments; when you are forever fighting a degenerating sense of “nobodiness”—then you will understand why we find it difficult to wait. There comes a time when the cup of endurance runs over, and men are no longer willing to be plunged into the abyss of despair. I hope, sirs, you can understand our legitimate and unavoidable impatience. You express a great deal of anxiety over our willingness to break laws. This is certainly a legitimate concern. Since we so diligently urge people to obey the Supreme Court’s decision of 1954 outlawing segregation in the public schools, at first glance it may seem rather paradoxical for us consciously to break laws. One may well ask: “How can you advocate breaking some laws and obeying others?” The answer lies in the fact that there are two types of laws: just and unjust. I would be the first to advocate obeying just laws. One has not only a legal but a moral responsibility to obey just laws. Conversely, one has a moral responsibility to disobey unjust laws. I would agree with St. Augustine that “an unjust law is no law at all.”

Now, what is the difference between the two? How does one determine whether a law is just or unjust? A just law is a man made code that squares with the moral law or the

law of God. An unjust law is a code that is out of harmony with the moral law. To put it in the terms of St. Thomas Aquinas: An unjust law is a human law that is not rooted in eternal law and natural law. Any law that uplifts human personality is just. Any law that degrades human personality is unjust. All segregation statutes are unjust because segregation distorts the soul and damages the personality. It gives the segregator a false sense of superiority and the segregated a false sense of inferiority. Segregation, to use the terminology of the Jewish philosopher Martin Buber, substitutes an "I it" relationship for an "I thou" relationship and ends up relegating persons to the status of things. Hence segregation is not only politically, economically and sociologically unsound, it is morally wrong and sinful. Paul Tillich has said that sin is separation. Is not segregation an existential expression of man's tragic separation, his awful estrangement, his terrible sinfulness? Thus it is that I can urge men to obey the 1954 decision of the Supreme Court, for it is morally right; and I can urge them to disobey segregation ordinances, for they are morally wrong.

Let us consider a more concrete example of just and unjust laws. An unjust law is a code that a numerical or power majority group compels a minority group to obey but does not make binding on itself. This is difference made legal. By the same token, a just law is a code that a majority compels a minority to follow and that it is willing to follow itself. This is sameness made legal. Let me give another explanation. A law is unjust if it is inflicted on a minority that, as a result of being denied the right to vote, had no part in enacting or devising the law. [...]

We should never forget that everything Adolf Hitler did in Germany was "legal" and everything the Hungarian freedom fighters did in Hungary was "illegal." It was "illegal" to aid and comfort a Jew in Hitler's Germany. Even so, I am sure that, had I lived in Germany at the time, I would have aided and comforted my Jewish brothers. If today I lived in a Communist country where certain principles dear to the Christian faith are suppressed, I would openly advocate disobeying that country's antireligious laws.

I must make two honest confessions to you, my Christian and Jewish brothers. First, I must confess that over the past few years I have been gravely disappointed with the white moderate. I have almost reached the regrettable conclusion that the Negro's great stumbling block in his stride toward freedom is not the White Citizen's Council or the Ku Klux Klanner, but the white moderate, who is more devoted to "order" than to justice; who prefers a negative peace which is the absence of tension to a positive peace which is the presence of justice; who constantly says: "I agree with you in the goal you seek, but I cannot agree with your methods of direct action"; who paternalistically believes he can set the timetable for another man's freedom; who lives by a mythical concept of time and who constantly advises the Negro to wait for a "more convenient season." Shallow understanding from people of good will is more frustrating than absolute misunderstanding from people of ill will. Lukewarm acceptance is much more bewildering than outright rejection.

I had hoped that the white moderate would understand that law and order exist for the purpose of establishing justice and that when they fail in this purpose they become the dangerously structured dams that block the flow of social progress. I had hoped that the white moderate would understand that the present tension in the South is a

necessary phase of the transition from an obnoxious negative peace, in which the Negro passively accepted his unjust plight, to a substantive and positive peace, in which all men will respect the dignity and worth of human personality. Actually, we who engage in nonviolent direct action are not the creators of tension. We merely bring to the surface the hidden tension that is already alive. We bring it out in the open, where it can be seen and dealt with. Like a boil that can never be cured so long as it is covered up but must be opened with all its ugliness to the natural medicines of air and light, injustice must be exposed, with all the tension its exposure creates, to the light of human conscience and the air of national opinion before it can be cured. [...]

Oppressed people cannot remain oppressed forever. The yearning for freedom eventually manifests itself, and that is what has happened to the American Negro. Something within has reminded him of his birthright of freedom, and something without has reminded him that it can be gained. Consciously or unconsciously, he has been caught up by the Zeitgeist, and with his black brothers of Africa and his brown and yellow brothers of Asia, South America and the Caribbean, the United States Negro is moving with a sense of great urgency toward the promised land of racial justice. If one recognizes this vital urge that has engulfed the Negro community, one should readily understand why public demonstrations are taking place. The Negro has many pent up resentments and latent frustrations, and he must release them. So let him march; let him make prayer pilgrimages to the city hall; let him go on freedom rides—and try to understand why he must do so. If his repressed emotions are not released in nonviolent ways, they will seek expression through violence; this is not a threat but a fact of history. So I have not said to my people: “Get rid of your discontent.” Rather, I have tried to say that this normal and healthy discontent can be channeled into the creative outlet of nonviolent direct action. And now this approach is being termed extremist. But though I was initially disappointed at being categorized as an extremist, as I continued to think about the matter I gradually gained a measure of satisfaction from the label. Was not Jesus an extremist for love: “Love your enemies, bless them that curse you, do good to them that hate you, and pray for them which spitefully use you, and persecute you.” Was not Amos an extremist for justice: “Let justice roll down like waters and righteousness like an ever flowing stream.” Was not Paul an extremist for the Christian gospel: “I bear in my body the marks of the Lord Jesus.” Was not Martin Luther an extremist: “Here I stand; I cannot do otherwise, so help me God.” And John Bunyan: “I will stay in jail to the end of my days before I make a butchery of my conscience.” And Abraham Lincoln: “This nation cannot survive half slave and half free.” And Thomas Jefferson: “We hold these truths to be self evident, that all men are created equal . . .” So the question is not whether we will be extremists, but what kind of extremists we will be. Will we be extremists for hate or for love? Will we be extremists for the preservation of injustice or for the extension of justice? In that dramatic scene on Calvary’s hill three men were crucified. We must never forget that all three were crucified for the same crime—the crime of extremism. Two were extremists for immorality, and thus fell below their environment. The other, Jesus Christ, was an extremist for love, truth and goodness, and thereby rose above his environment. Perhaps the South, the nation and the world are in dire need of creative extremists.

Future creators can be “creative extremists” by improving the world through their revolutionary scientific innovations and also by helping people however they can in their daily lives.

### 12.3.21 14th Dalai Lama

Tenzin Gyatso (1935–) is the 14th Dalai Lama or head of Tibetan Buddhism. Following the communist revolution in China in 1949, the new Chinese government seized control of Tibet in 1950 and imposed increasingly harsh treatment on people there. Many Tibetan Buddhists were imprisoned and tortured, and in 1959 the Dalai Lama escaped into exile in India. The Dalai Lama has spent the rest of his long life traveling around the world to advocate not only for the people of Tibet, but also for the general importance of human rights, ethical behavior, and religion.

He summarized his most important lessons in *Ethics for the New Millennium* [Dalai Lama 1999]. They have a remarkable amount of overlap with other independent sources in this section, and they are highly applicable to future creators (as well as everyone else):

[pp. 102–104:] I am reminded of the example of Lopon-la, a monk from Namgyal, the Dalai Lama’s own monastery. Following my escape from Tibet, Lopon-la was one of many thousands of monks and officials imprisoned by the occupying forces. When he was finally released, he was allowed to come to India, where he rejoined his old monastery. More than twenty years after last seeing him, I found Lopon-la much as I remembered him. He looked older, of course, but physically he was unscathed, and mentally his ordeal had not affected him adversely at all. His gentleness and serenity remained. From our conversation, I learned that he had, nevertheless, endured grievous treatment during those long years of imprisonment. In common with all others, he had been subjected to “re-education,” during which he had been forced to denounce his religion, and, on many occasions, he was tortured as well. When I asked him whether he had ever been afraid, he admitted that there was one thing that had scared him: the possibility that he might lose compassion and concern for his jailers. [...]

[T]he one who practices patient forbearance is determined not to give in to negative impulses (which are experienced as afflictive emotion in the form of anger, hatred, desire for revenge, and so on) but rather counters their sense of injury and does not return harm for harm.

None of the foregoing is meant to imply that there are not times when it is appropriate to respond to others with strong measures. Nor does practicing patience in the sense I have described it mean that we must accept whatever people would do to us and simply give in. Nor does it mean that we should never act at all when we meet with harm. [...] There are times in everyone’s life when harsh words—or even physical intervention—may be called for. [...] Cowardice arises when we lose all confidence as a result of fear. Patient forbearance means that we remain firm even if we are afraid.

[p. 174:] The work of a person laboring in some humble occupation is no less relevant to the well-being of society than that of, for example, a doctor, a teacher, a monk, or a nun. All human endeavor is potentially great and noble. So long as we carry out our work with good motivation, thinking, “My work is for others,” it will be of benefit to the wider community. But when concern for others’ feelings and welfare is missing, our activities tend to become spoiled. Through lack of basic human feeling, religion, politics, economics, and so on can be rendered dirty. Instead of serving humanity, they become agents of its destruction.

Therefore, in addition to developing a sense of universal responsibility, we need actually to be responsible people. Until we put our principles into practice, they remain just that.

[pp. 233–237:] The best way to ensure that when we approach death we do so without remorse is to ensure that in the present moment we conduct ourselves responsibly and with compassion for others. [...]

Our own heart, our own mind, is the temple. The doctrine is compassion. Love for others and respect for their rights and dignity, no matter who or what they are: ultimately these are all we need. [...]

Unfortunately, though most of us think of ourselves as compassionate, we tend to ignore these commonsense truths. [...W]e waste so much of our time in meaningless activity. [...] We shrink from considering others on the grounds that we are too busy. We run right and left, making calculations and telephone calls and thinking that this would be better than that. We do one thing but worry that if something else comes along we had better do another. But in this we engage only in the coarsest and most elementary levels of the human spirit. Moreover, by being inattentive to the needs of others, inevitably we end up harming them. We think ourselves very clever, but how do we use our abilities? All too often we use them to deceive our neighbors, to take advantage of them and better ourselves at their expense. And when things do not work out, full of self-righteousness, we blame them for our difficulties. Yet lasting satisfaction cannot be derived from the acquisition of objects. [...]

Therefore, with my two hands joined, I appeal to you the reader to ensure that you make the rest of your life as meaningful as possible. [...]

If you cannot, for whatever reason, be of help to others, at least don't harm them. Consider yourself a tourist. Think of the world as it is seen from space, so small and insignificant yet so beautiful. Could there really be anything to be gained from harming others during our stay here? [... T]ry to help in however small a way those who are downtrodden and those who, for whatever reason, cannot or do not help themselves. Try not to turn away from those whose appearance is disturbing, from the ragged and unwell. Try never to think of them as inferior to yourself. If you can, try not even to think of yourself as better than the humblest beggar. You will look the same in your grave.

To close with, I would like to share a short prayer which gives me great inspiration in my quest to benefit others:

*May I become at all times, both now and forever  
 A protector for those without protection  
 A guide for those who have lost their way  
 A ship for those with oceans to cross  
 A bridge for those with rivers to cross  
 A sanctuary for those in danger  
 A lamp for those without light  
 A place of refuge for those who lack shelter  
 And a servant to all in need.*



### 12.3.22 Joseph Brodsky

Joseph Brodsky (1940–1996) was a Russian poet and essayist who was exiled to the United States in the 1970s and won the Nobel Prize in Literature in 1987. In 1988, he delivered a commencement address at the University of Michigan, Ann Arbor. In that speech, he gave the new university graduates remarkable advice based on the many years of cruelties he had suffered from various people and organizations [Brodsky 1995, pp. 145–147]:

The world you are about to enter and exist in doesn't have a good reputation. [...] It's not a nice place, as you are soon to find out, and I rather doubt that it will get much nicer by the time you leave it. [...]

Try not to pay attention to those who will try to make life miserable for you. There will be a lot of those—in the official capacity as well as the self-appointed. Suffer them if you can't escape them, but once you have steered clear of them, give them the shortest shrift possible. Above all, try to avoid telling stories about the unjust treatment you received at their hands; avoid it no matter how receptive your audience may be. Tales of this sort extend the existence of your antagonists; most likely they are counting on your being talkative and relating your experience to others. By himself, no individual is worth an exercise in injustice (or for that matter, in justice). The ratio of one-to-one doesn't justify the effort: it's the echo that counts. That's the main principle of any oppressor, whether state-sponsored or autodidact. Therefore, steal, or still, the echo, so that you don't allow an event, however unpleasant or momentous, to claim any more time than it took for it to occur.

What your foes do derives its significance or consequence from the way you react. Therefore, rush through or past them as though they were yellow and not red lights. Don't linger on them mentally or verbally; don't pride yourself on forgiving or forgetting them—worse come to worse, do the forgetting first. This way you'll spare your brain cells a lot of useless agitation; this way, perhaps, you may even save those pigheads from themselves, since the prospect of being forgotten is shorter than that of being forgiven. So flip the channel: you can't put this network out of circulation, but at least you can reduce its ratings. Now, this solution is not likely to please angels, but then again, it's bound to hurt demons, and for the moment that's all that really matters.

Brodsky was quite correct—unfortunately you are likely to encounter a number of toxic people and experiences in life. While there is only so much you can do to minimize how much pain they inflict when they are present, you have far greater power to reduce the remembered pain they inflict when they are elsewhere, or when they have gone away entirely. If those memories are given free reign for the rest of your life, they can consume vast amounts of time and energy that could have been devoted to far more productive and enjoyable pursuits.

In certain situations it may actually be appropriate to recall those toxic people and experiences, in order to try to heal some of the wounds they left, or in order to warn others of danger. Yet sometimes there have been so many monsters, and there is so little you can do about that, that you just have to bury all the monsters in a mass grave and try to never look back (figuratively speaking of course, but rather like the aftermath in countless films about an invasion of monstrous aliens, from *The War of the Worlds* and *The Blob* to *Aliens* and *The Avengers*).

### 12.3.23 Octavia Butler

Octavia Butler (1947–2006) was an American author of many science fiction novels and short stories. As a black woman in the field of mostly white male science fiction authors, Butler was personally an innovator. Moreover, her fictional characters were often innovators who were trying to make the world a better place, despite the present and extrapolated future flaws of humanity. In Butler’s *Parable of the Sower* and *Parable of the Talents* novels, the main character and voice for innovation is the fictional Lauren Olamina. Future creators may find familiarity or inspiration in the words of Butler and her protagonists.

Butler began writing the two *Parable* novels around 1990, when the nearly half-century-long Cold War had just ended, the United States was the “sole superpower” in the world, and U.S. jobs and services were relatively good. Yet with astonishing accuracy, she described the timeline, nature, and details of the dystopian collapse of the United States that would occur in the following decades. Her novels are well worth reading for those predictions and commentary.

Suffering through the dystopian collapse, the fictional Lauren Olamina devotes her life to helping the people around her, working to build a better society, and advocating for the advancement of science and technology. Here are a few examples of passages from *Parable of the Sower* [Butler 1993] that I have found especially meaningful:

[Prologue:] Prodigy is, at its essence, adaptability and persistent, positive obsession. Without persistence, what remains is an enthusiasm of the moment. Without adaptability, what remains may be channeled into destructive fanaticism. Without positive obsession, there is nothing at all.

[Chapter 3:] Maybe I’ll be more like Alicia Leal, the astronaut. Like her, I believe in something that I think my dying, denying, backward-looking people need. I don’t have all of it yet. I don’t even know how to pass on what I do have. I’ve got to learn to do that. It scares me how many things I’ve got to learn. How will I learn them? [...]

Sometimes I don’t know the answer. I doubt myself. I doubt what I think I know. I try to forget about it. After all, if it’s real, why doesn’t anyone else know about it? [...] We haven’t even begun to deal with it. [...]

Even so, why can’t I do what others have done—ignore the obvious. Live a normal life. It’s hard enough to do that in this world.

But this thing (This idea? Philosophy? New religion?) won’t let me alone, won’t let me forget it, won’t let me go. Maybe. . . Maybe it’s like my sharing: One more weirdness; one more crazy, deep-rooted delusion that I’m stuck with. I am stuck with it. And in time, I’ll have to do something about it. In spite of what my father will say or do to me, in spite of the poisonous rottenness outside the wall where I might be exiled, I’ll have to do something about it.

[Chapter 5:] “We can get ready. That’s what we’ve got to do now. Get ready for what’s going to happen, get ready to survive it, get ready to make a life afterward. Get focused on arranging to survive so that we can do more than just get batted around by crazy people, desperate people, and leaders who don’t know what they’re doing! [...]

I realize I don't know very much. None of us knows very much. But we can all learn more. Then we can teach one another. We can stop denying reality or hoping it will go away by magic. [...]

"Nothing is going to save us. If we don't save ourselves, we're dead."

[Chapter 6:]

Drowning people

Sometimes die

Fighting their rescuers.

[Chapter 10:] Civilization is to groups what intelligence is to individuals. It is a means of combining the intelligence of many to achieve ongoing group adaptation.

Civilization, like intelligence, may serve well, serve adequately, or fail to serve its adaptive function. When civilization fails to serve, it must disintegrate unless it is acted upon by unifying internal or external forces.

[Chapter 11:] I'm still learning how dogged people can be in denial, even when their freedom or their lives are at stake.

[Chapter 12:] The weak can overcome the strong if the weak persist. Persisting isn't always safe, but it's often necessary.

[Chapter 13:] People are setting fires to get rid of whomever they dislike from personal enemies to anyone who looks or sounds foreign or racially different. People are setting fires because they're frustrated, angry, hopeless. They have no power to improve their lives, but they have the power to make others even more miserable. And the only way to prove to yourself that you have power is to use it.

[Chapter 14:]

In order to rise

From its own ashes

A phoenix

First

Must

Burn.

[Chapter 19:] "From what I've read," I said to him, "the world goes crazy every three or four decades. The trick is to survive until it goes sane again."

[Chapter 21:] "Human beings are good at creating hells for themselves, even out of richness."

[Chapter 23:]

Your teachers

Are all around you.

All that you perceive,

All that you experience,

All that is given to you  
 or taken from you,  
 All that you love or hate,  
 need or fear  
 Will teach you—  
 If you will learn.  
 God is your first  
 and your last teacher.  
 God is your harshest teacher:  
 subtle,  
 demanding.  
 Learn or die.

Likewise, here are a few of my favorite passages from *Parable of the Talents* [Butler 1998]:

[Chapter 1: I have read that the period of upheaval that journalists have begun to refer to as “the Apocalypse” or more commonly, more bitterly, “the Pox” lasted from 2015 through 2030—a decade and a half of chaos. This is untrue. The Pox has been a much longer torment. It began well before 2015, perhaps even before the turn of the millennium. It has not ended.

I have also read that the Pox was caused by accidentally coinciding climatic, economic, and sociological crises. It would be more honest to say that the Pox was caused by our own refusal to deal with obvious problems in those areas. We caused the problems: then we sat and watched as they grew into crises. I have heard people deny this, but I was born in 1970. I have seen enough to know that it is true. I have watched education become more a privilege of the rich than the basic necessity that it must be if civilized society is to survive. I have watched as convenience, profit, and inertia excused greater and more dangerous environmental degradation. I have watched poverty, hunger, and disease become inevitable for more and more people.

Overall, the Pox has had the effect of an installment-plan World War III. In fact, there were several small, bloody shooting wars going on around the world during the Pox. These were stupid affairs—wastes of life and treasure. They were fought, ostensibly, to defend against vicious foreign enemies. All too often, they were actually fought because inadequate leaders did not know what else to do. Such leaders knew that they could depend on fear, suspicion, hatred, need, and greed to arouse patriotic support for war.

Amid all this, somehow, the United States of America suffered a major nonmilitary defeat. It lost no important war, yet it did not survive the Pox. Perhaps it simply lost sight of what it once intended to be, then blundered aimlessly until it exhausted itself.

What is left of it now, what it has become, I do not know.

[Chapter 2:] The Thirteenth and Fourteenth Amendments—the ones abolishing slavery and guaranteeing citizenship rights—still exist, but they’ve been so weakened by custom, by Congress and the various state legislatures, and by recent Supreme Court decisions that they don’t much matter.

[\[Chapter 10:\]](#)

We can,  
Each of us,  
Do the impossible  
As long as we can convince ourselves  
That it has been done before.

[\[Chapter 11:\]](#)

Choose your Leaders  
    with wisdom and forethought.  
To be led by a coward  
    is to be controlled  
    by all that the coward fears.  
To be led by a fool  
    is to be led  
    by the opportunists  
    who control the fool.  
To be led by a thief  
    is to offer up  
    your most precious treasures  
    to be stolen.  
To be led by a liar  
    is to ask  
    to be told lies.  
To be led by a tyrant  
    is to sell yourself  
    and those you love  
    into slavery.

[\[Chapter 12:\]](#)

Beware:  
Ignorance  
Protects itself.  
Ignorance  
Promotes suspicion.  
Suspicion  
Engenders fear.  
Fear quails,  
Irrational and blind,  
Or fear looms,  
Defiant and closed.  
Blind, closed,  
Suspicious, afraid,  
Ignorance  
Protects itself,  
And protected,  
Ignorance grows.

[\[Chapter 13:\]](#)

When vision fails  
Direction is lost.

When direction is lost  
Purpose may be forgotten.

When purpose is forgotten  
Emotion rules alone.

When emotion rules alone,  
Destruction . . . destruction.

[\[Chapter 15:\]](#) We were snatched away and given alone into the hands of people who believed that it was their duty to break us and remake us in the Christian American image. And, of course, breaking people is much easier than putting them together again.

So much agony caused, so much evil done in God's name.

[\[Chapter 15:\]](#) Slaves are always told that they've caused something bad, done something sinful, made stupid mistakes. Good things were the acts of our "teachers" or of God. Bad things were our fault. Either we had done some specific wrong or God was so generally displeased with us that He was punishing the whole camp.

If you hear nonsense like that often enough for long enough, you begin to believe it. You weigh yourself down with blame for all the world's pain.

[\[Chapter 18:\]](#)

Beware:  
All too often,  
We say  
What we hear others say.  
We think  
What we're told that we think.  
We see  
What we're permitted to see.  
Worse!  
We see what we're told that we see.  
Repetition and pride are the keys to this.  
To hear and to see  
Even an obvious lie  
Again  
And again and again  
May be to say it,  
Almost by reflex  
Then to defend it  
Because we've said it

And at last to embrace it  
Because we've defended it  
And because we cannot admit  
That we've embraced and defended  
An obvious lie.  
Thus, without thought,  
Without intent,  
We make  
Mere echoes  
Of ourselves—  
And we say  
What we hear others say.

[Chapter 20:] “We keep falling into the same ditches, you know? I mean, we learn more and more about the physical universe, more about our own bodies, more technology, but somehow, down through history, we go on building empires of one kind or another, then destroying them in one way or another. We go on having stupid wars that we justify and get passionate about, but in the end, all they do is kill huge numbers of people, maim others, impoverish still more, spread disease and hunger, and set the stage for the next war. And when we look at all of that in history, we just shrug our shoulders and say, well, that's the way things are. That's the way things always have been. [...]

“There seem to be solid biological reasons why we are the way we are. If there weren't, the cycles wouldn't keep replaying. The human species is a kind of animal, of course. But we can do something no other animal species has ever had the option to do. We can choose: We can go on building and destroying until we either destroy ourselves or destroy the ability of our world to sustain us. Or we can make something more of ourselves. We can grow up. We can leave the nest. We can fulfill the Destiny, make homes for ourselves among the stars, and become some combination of what we want to become and whatever our new environments challenge us to become. Our new worlds will remake us as we remake them. And some of the new people who emerge from all this will develop new ways to cope. [...]

“Some people might want to do it for the sake of their children—to give them the chance to begin again and do things right this time. But that idea alone won't do it. It won't bring in enough people, money, or persistence. Fulfilling the Destiny is a long-term, expensive, uncertain project—or rather it's hundreds of projects. Maybe thousands. And with no guarantees of anything. Politicians, on the other hand, are short-term thinkers, opportunists, sometimes with consciences, but opportunists nevertheless. Business people are hungry for profit, short- and long-term. The truth is, preparing for interstellar travel and then sending out ships filled with colonists is bound to be a job so long, thankless, expensive, and difficult that I suspect that only a religion could do it.”

[Chapter 20:] “We choose our purpose. [...] I chose mine before I was old enough to know any better—or it chose me. Purpose is essential.”

[Chapter 20:] “[N]o one thought about what kind of society we were building with such stupid decisions. People who could afford to educate their children in private schools were glad to see the government finally stop wasting their tax money, educating other people’s children. They seemed to think they lived on Mars. They imagined that a country filled with poor, uneducated, unemployable people somehow wouldn’t hurt them!” [...]

“I’m literate, and the idea of leaving children illiterate is criminal.”

[Chapter 21:] I thought the best we could all do was to look after one another and clean up the various hells we’ve made right here on earth. That seemed to me a big enough job for any person or group[....]

[Chapter 21:] Earthseed [...] financed scientific exploration and inquiry, and technological creativity. It set up grade schools and eventually colleges, and offered full scholarships to poor but gifted students. The students who accepted had to agree to spend seven years teaching, practicing medicine, or otherwise using their skills to improve life in the many Earthseed communities. Ultimately, the intent was to help the communities to launch themselves toward the stars and to live on the distant worlds they found circling those stars.

[Epilogue:] 2090 [...]

I have not given them heaven, but I’ve helped them to give themselves the heavens. I can’t give them individual immortality, but I’ve helped them to give our species its only chance at immortality. I’ve helped them to the next stage of growth. They’re young adults now, leaving the nest. [...]

Today’s shuttles have been loaded with cargoes of people, already deeply asleep in DiaPause—the suspended-animation process that seems to be the best of the bunch. Traveling with the people are frozen human and animal embryos, plant seeds, tools, equipment, memories, dreams, and hopes. [...] The libraries of the Earth go with them. All this is to be off-loaded on the Earth’s first starship[....]

I will go with the first ship to leave after my death. If I thought I could survive as something other than a burden, I would go on this one, alive. No matter. Let them someday use my ashes to fertilize their crops. Let them do that. It’s arranged. I’ll go, and they’ll give me to their orchards and their groves.

Note the numerous similarities throughout Butler’s *Parable* novels with the plot, themes, and philosophical insights of Walter M. Miller, Jr. (Section 12.3.16). Both authors channeled what they had personally seen and experienced of humanity into allegories of civilizational collapse and renaissance, Miller with the then-new possibility of global nuclear war and Butler with her amazingly prescient vision of the non-nuclear societal decay that did in fact occur over the following decades. I believe we could learn a great deal by really listening to both of these authors, as well as the other sources in this chapter.



## 12.4 Afterword

I have written this book to help you as an individual, as a fellow human being, as a future creator. I would very much like to meet you, although the boundaries of time and space likely prohibit that. Even without meeting in person, you now know me—how I think, what I think about, what I value, what I have experienced, what I have tried to do. I sincerely believe that I know you too, if you are drawn to the same sorts of aspirations and encounter the same types of obstacles as I have.

Let me then end with this final personal message to you:

1. Help other people. Make this your greatest priority, every single day, for the rest of your life. It is the only thing that will matter as you look back at the end of your life. Help both humanity in general and the specific people with whom you interact in your daily life. Utilize your scientific or other specific talents to help people, yet always bear in mind that what would help a person the most might not be any special talent of yours, but rather simply your willingness to genuinely listen or to lend a hand when they are in need. Help unconditionally, even if people and the world do nothing to help you. Do not harm any person, or humanity in general, no matter how tempted you may feel by profit, revenge, or other motives.

2. Develop and use your talents to the greatest possible extent, and harness them to serve the first principle, helping people. History has repeatedly demonstrated that one person with the right new idea and the right opportunities to develop that idea can change the world in dramatic ways. Even if your ideas or your opportunities are much more limited, everyone can improve the world at least a little, one person at a time. If you are a future creator, work every day to exercise your ability to produce revolutionary scientific discoveries or inventions. While you may also need to perform less useful or seemingly useless work to support yourself or your family, do your best to maximize how much of your time and energy you spend each day making the greatest difference you can.

3. Do not stop, ever. No matter what scientific or nonscientific obstacles you may encounter, do not ever give up or give in. You have time, you have talents, and you have opportunities; you should always try to make the most effective use of them. Depending on what you encounter in life, you may well need to rethink and change your specific beliefs, objectives, and methods of pursuing those objectives. You may need to change directions in small or radically large ways. You may need to rest and recover for a time. If you lack certain ideas, talents, health, resources, assistance, financial support, or political support, you may need to decide how to make the most of whatever you do have. If (even through no fault of your own) you lose health, resources, or support, you may need to reevaluate your plans and methods. If you have made mistakes, make the most of the time and opportunities you have left. But never, ever give up.

I believe in you. I would not have written this whole book if I did not. Believe in yourself. Know that you have incalculable inherent value, regardless of what others may say, or the silences of what they do not say. Know that you have unique talents, gifts, ideas, and opportunities; do not let others denigrate and rob you of that. Do your best to help people, and no matter what happens, be satisfied in that. Be at peace and be proud.