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Unit 1

TEXT A

Why Study Humanities? What I Tell Engineering Freshmen

John Horgan

1. What's the point of the humanities? Of studying philosophy, history, literature and "soft" sciences like psychology and poly sci? The Commission on the Humanities and Social Sciences, consisting of academic, corporate, political and entertainment big shots, tries to answer this question in a big new report to Congress. The report is intended to counter plunging enrollment in and support for the humanities, which are increasingly viewed as "luxuries that employment-minded students can ill afford," as *The New York Times* put it.
2. Titled "The Heart of the Matter," the report states: "As we strive to create a more civil public discourse, a more adaptable and creative workforce, and a more secure nation, the humanities and social sciences are the heart of the matter, the keeper of the republic—a source of national memory and civic vigor, cultural understanding and communication, individual fulfillment and the ideals we hold in common. They are critical to a democratic society and they require our support."
3. I find this a bit grandiose, and obscure. I have my own humble defense of the humanities, which I came up with a couple of years ago, when I started teaching a new course required for all freshmen at Stevens Institute of Technology. The syllabus includes Sophocles, Plato, Thucydides, Shakespeare, Descartes, Hobbes, Locke, Kant, Mill, Marx, Nietzsche, William James, Freud, Keynes, Eliot—you know, Greatest Hits of Western Civilization.
4. I love teaching the class, but I don't assume that students love taking it. So on the first day of class I ask my wary-looking students, "How many of you would skip this class if it wasn't required?" After I assure them that they won't hurt my feelings, almost all raise their hands.
5. When I ask what the problem is, they say they came to Stevens for engineering, computer science, physics, pre-med, finance, digital music production, etc. They don't see the point of reading all this old impractical stuff that has nothing to do with their careers. When I ask them to guess why Stevens inflicts this course on them, someone usually says, smirking, "To make us well-rounded."
6. Whenever I get the "well-rounded" response, I want to reply, "Does 'well-rounded' mean, like, chubby?" But I don't want to offend overweight students. Instead I say, "I don't really know what 'well-rounded' means. Does it mean being able chitchat about Shakespeare at cocktail parties? I don't care about that." Then I give them my pitch for the course, which goes something like this:
7. We live in a world increasingly dominated by science. And that's fine. I became a science writer because I think science is the most exciting, dynamic, consequential part of human culture, and I wanted to be a part of that. Also, I have two college-age kids, and I'd be thrilled if they pursued careers in science, engineering or medicine. I certainly want them to learn as much science and math as they can, because those skills can help you get a great job. But it is precisely because science is so powerful that we need the humanities now more than ever. In your science, mathematics and engineering classes, you're given facts, answers, knowledge, and truth.

Your professors say, “This is how things are.” They give you certainty. The humanities, at least the way I teach them, give you uncertainty, doubt and skepticism.

8. The humanities are subversive. They undermine the claims of all authorities, whether political, religious or scientific. This skepticism is especially important when it comes to claims about humanity, about what we are, where we came from, and even what we can be and should be. Science has replaced religion as our main source of answers to these questions. Science has told us a lot about ourselves, and we’re learning more every day.

9. But the humanities remind us that we have an enormous capacity for deluding ourselves. They also tell us that every single human is unique, different than every other human, and each of us keeps changing in unpredictable ways. The societies we live in also keep changing—in part because of science and technology! So in certain important ways, humans resist the kind of explanations that science gives us.

10. The humanities are more about questions than answers, and we’re going to wrestle with some ridiculously big questions in this class. Like, what is truth anyway? How do we know something is true? Or rather, why do we believe certain things are true and other things aren’t? Also, how do we decide whether something is wrong or right to do, for us personally or for society as a whole?

11. Also, what is the meaning of life? What is the point of life? Should happiness be our goal? Well, what on earth is happiness? And should happiness be an end in itself or just a side effect of some other more important goal? Like gaining knowledge, or reducing suffering? Each of you has to find your own answer to these questions. Socrates, one of the philosophers we’re going to read, said wisdom means knowing how little you know. Socrates was a pompous, but there is wisdom in what he says about wisdom.

12. If I do my job, by the end of this course you’ll question all authorities, including me. You’ll question what you’ve been told about the nature of reality, about the purpose of life, about what it means to be a good person. Because that, for me, is the point of the humanities: they keep us from being trapped by our own desire for certainty.

13. Postscript: My Stevens colleague Garry Dobbins, a philosopher, likes to give me a hard time, and I him, but I’m always provoked by his take on things, like this response to my post: “As to the Humanities being to teach us a healthy skepticism, we might all agree that this is indeed one of the consequences of such an education; but if this is necessary, as you make it out, because learning science alone we do not learn the importance, or necessity of ‘uncertainty, doubt and skepticism,’ something strange and even perverse has befallen the study of science! Those taking seriously the study of the history of science, for instance, will know that there was a time when science assumed the cultural preeminence it still occupies among us precisely because it did not teach dogmas, or as you put it, ‘certainty.’ On the contrary; scientific studies from the early modern period down to the early twentieth century, anyway, were liberal studies. Surely the justification of study of the Humanities, history, literature, philosophy and the rest, is not fundamentally different than the justification for the study of science. There are forces at work in human life, whether material or spiritual, which we seek to master, so far as possible. The language in which we express our knowledge of physical forces obeys somewhat different logical rules to that in which we express our knowledge of economics for example: but this doesn’t mean that the one is less knowledge, or logical, or important, than the other, surely! That you speak of the kind of knowledge to be gained

by close study of Shakespeare, Thucydides, or Plato, as ‘impractical’ surely goes to show a misunderstanding as to what is practical in a human life. Unless you can show good reason to believe Socrates mistaken in thinking that self-knowledge is only reliable foundation for a good life.”

14. I responded: “Garry, you’re right that science if properly taught should incorporate skepticism. But science is becoming increasingly dogmatic and arrogant in our era, which is why we need the humanities to foster a healthy anti-dogmatism.”

TEXT B

Why A Liberal Arts Education Matters?

Susan M. Di Biase

1. Most college students, and parents of college students, believe the goal of college is to secure a practical education that will lead to a first real job. They know that today’s job market is competitive and uncertain. Their investment of money and time and effort to gain an education needs to pay off.

2. Of course, most people do need to earn a living for themselves and their families. But isn’t getting a college education about more than just survival? Those of us who support the liberal arts and sciences say it is. We urge students to ask themselves two questions:

Am I preparing myself for my first job or for my whole career?

Am I educating myself only for work or also for life?

Those students who aspire to higher goals may be interested in learning more about why the liberal arts education matters. First of all, what are the liberal arts?

What is liberal arts education?

3. The term “liberal education” was first used in classical Greek and Roman times. It was chosen to emphasize the fact that education was not available for the many people in those societies who were held in slavery, but only for those who were free. The reference to liberty was included in the term because people who were educated started out free, and became more free as their education progressed. The Greeks and Romans recognized that education arms a person to confront the influence of others critically. Such a person is less easily manipulated and deceived. Still today, in order to form a more perfect union, we need citizens who are informed, discerning, and morally courageous. (Liberal) education forms the basis of every democratic society.

4. In *The Republic*, the Greek philosopher Plato explained how a well-rounded education should include the study of astronomy, mathematics, music and poetry. Of course our fields of knowledge have grown “astronomically” since his day, but his basic message underlies the tradition of liberal arts education. Plato taught his students to appreciate logic and order, ideals and beauty. Later teachers included the study of the growing fields of science and the burgeoning wealth of literature. They broadened the study of societies, governments, and history. But the main purpose of

traditional liberal education stayed the same. It was designed to develop one's critical faculty, so necessary to the pursuit of wisdom and virtue. Isn't this aim still relevant today?

Relevance of liberal education in today's world

5. Some people argue that wisdom and virtue are much less important than job training. They are not sure it benefits young people in this world to have ideals they feel passionately about, to have broad interests that excite and consume them, and to have an awareness of the joys and sorrows of people who live far away, or next door. This may be too much to ask, they argue, of the ordinary person struggling to make a living. Better to focus on learning some specific set of skills, because then at least one has a chance of getting a job.

6. Does a broad, idealistic, liberating education also prepare a person to be valuable to a company? Many business leaders say it does. They argue that the job market has changed. Workers no longer stay at one company doing the same job until retirement. Technology drives change at such a pace that in less than five years, most facts college students learn are out of date. Business recruiters are looking for graduates who are inventive and flexible enough to learn new skills. Many students and parents worry about the short-term: preparing for the first real job. Most corporate executives, however, value an education that prepares one for a lifetime of imaginative and productive work. Indeed, business leaders know that survival in today's unstable job market depends upon the intellectual discipline that only a liberal education can offer.

Strengths for employment

7. Education in the arts, sciences, and humanities develops in students three types of skills that employers prize above all others. These are reasoning skills, communication skills, and social skills.

Reasoning skills

8. Educators know that graduates must have strong reasoning and problem-solving abilities to succeed in today's workplace. Graduates must be able to think logically and critically to solve problems on the job. They must also be imaginative. Employers appreciate graduates who have learned to be enthusiastic about learning, who are willing to develop new skills and try new methods and technologies. A liberal arts education is valuable because it teaches students to ask questions that matter, to weigh conflicting evidence, to appreciate the complexity of situations, and to develop logical, convincing arguments for solutions.

9. A student who studies the liberal arts chooses to learn something about a lot of different fields: the arts, the sciences, the humanities. This develops the ability to see connections among very different ideas and very different approaches to studying the world. Study in the liberal arts trains the brain to be flexible: to think logically, yes, but metaphorically as well. Scientists now know that new linkages in the brain (called synapses) are actually formed when the brain is being used in new ways. The student develops the ability to analyze, or break ideas into parts, and to synthesize, to bring parts together to make a whole. These are considered the most difficult intellectual skills, and the person who has developed them gains a wider perspective and greater mental agility.

Communication skills

10. Such intellectual agility also develops the student's ability to organize and communicate thoughts. Employers search for graduates who are able to communicate ideas clearly and coherently, who can be articulate and persuasive in proposing new ideas. Communication skills divide those who move up the career ladder from those who stagnate. Although many people can master the technical skills of a job, very few have the communication skills needed to present a truly professional image in speech and writing.

Social skills

11. Finally, employers want to hire people who have strong social skills, people who cooperate well with others. Having studied literature, history, and the social sciences, such people appreciate the variety of humanity. They treat people who are unlike them with respect and understanding. They are sensitive to cultural and economic differences. People with strong social skills are idealistic enough to strive for cooperation and fairness. They can inspire a team with enthusiasm. They make better leaders, and better citizens.

Strengths for living

12. These broad skills in reasoning and communication form the basis for success in one's personal aspirations as well. Emphasizing the utility of education for job training creates a false dichotomy between work and the rest of life. Our capitalistic society overemphasizes people's roles as producers and consumers of material goods. Overlooked are our roles as citizens and voters, spouses and parents, Girl Scout troop leaders, soccer coaches, church choir members, and neighbors. Liberal education encourages students to consider their eventual roles in working for the good of individuals and of the community. It encourages students to consider which values they would like to express through a good and decent life. It encourages students to view their experiences in the larger context of history and social change. This gives young people a greater sense of purpose in life. This sense, often missing from the lives of young people today, is that of feeling involved in the great effort at civilization and moral progress, which began before we were born and will continue long after we die.

13. One of the saddest results of narrowing the goal of education is that it causes students to overlook the lifelong rewards of a broad education in the arts, sciences, and humanities. Chief among these is the joy of learning. Learning something about a lot of subjects leads to a greater curiosity about the natural world and how it is represented and understood. It infuses it with greater meaning and joy. Watching children play on a bright spring day calls to mind a poem by William Blake. Seeing a magnificent bridge spanning an ancient river leads to a reflection on the years it took the waters to carve the streambed, and the years it took human beings to learn enough to build the bridge. Education is like a Fountain of Youth: it allows people to see the world with the wisdom of the ages, but with minds that are forever curious, forever young.

14. The best thing about a broad, thorough, liberal education is that it can never be taken away. Students sometimes ask, "Why do we have to study chemistry (or history, or foreign languages)

when we will never use this stuff again?" The answer is very simple. One may never use chemical formulas again, but studying chemical formulas makes one's brain work better. One sees connections more quickly. One's thoughts are organized more clearly. It's like sweeping the cobwebs out of your head. Teachers have known for centuries that studying different subjects trains the mind to work in different ways: analytically, synthetically, creatively, logically, metaphorically. And now, scientists know that studying different subjects actually change the biochemical structure of the brain, forming new connections that make it more limber and agile. One is changed forever, and this is the greatest gift. Liberal arts education enriches life in ways that can't be measured in terms of money, and that beg to be handed down.

Unit 2

TEXT A

When Teaching Critical Thinking Backfires

John Horgan

As the fall semester ends, I'm brooding once again over the contradictions of teaching "critical thinking," especially as applied to science. Below is an edited version of an essay I wrote for The Chronicle of Higher Education when I was in a similar mood.

—John Horgan

1. Don't always believe what scientists and other authorities tell you! Be skeptical! Think critically! That's what I tell my students, *ad nauseam*. And some learn the lesson too well.
2. I want to give my students the benefit of my hard-won knowledge of science's fallibility. Early in my career, I was a conventional science writer, easily impressed by scientists' claims. Fields such as physics, neuroscience, genetics and artificial intelligence seemed to be bearing us toward a future in which bionic superhumans would zoom around the cosmos in warp-drive spaceships. Science was an "endless frontier," as physicist Vannevar Bush, a founder of the National Science Foundation, put it in 1945.
3. Doubt gradually undermined my faith. Scientists and journalists, I realized, often presented the public with an overly optimistic picture of science. By relentlessly touting scientific "advances"—from theories of cosmic creation and the origin of life to the latest treatments for depression and cancer—and by overlooking all the areas in which scientists were spinning their wheels, we made science seem more potent and fast-moving than it really is.
4. Now, I urge my students to doubt the claims of physicists that they are on the verge of explaining the origin and structure of the cosmos. Some of these optimists favor string and multiverse theories, which cannot be confirmed by any conceivable experiment. This isn't physics any more, I declare in class, it's science fiction with equations!
5. I give the same treatment to theories of consciousness, which attempt to explain how a three-pound lump of tissue—the brain—generates perceptions, thoughts, memories, emotions and self-awareness. Some enthusiasts assert that scientists will soon reverse-engineer the brain so

thoroughly that they will be able to build artificial brains much more powerful than our own.

6. Balderdash! I tell my classes (or words to that effect). Scientists have proposed countless theories about how the brain absorbs, stores and processes information, but researchers really have no idea how the brain works. And artificial-intelligence advocates have been promising for decades that robots will soon be as smart as HAL or R2-D2. Why should we believe them now?

7. Maybe, just maybe, I suggest, fields such as particle physics, cosmology and neuroscience are bumping up against insurmountable limits. The big discoveries that can be made have been made. Who says science has to solve every problem?

8. Lest my students conclude that I'm some solitary crank, I assign them articles by other skeptics, including a dissection of epidemiology and clinical trials by journalist Gary Taubes in *The New York Times*. He advises readers to doubt dramatic claims about the benefits of some new drug or diet, especially if the claim is new. "Assume that the first report of an association is incorrect or meaningless," Taubes writes, because it probably is. "So be skeptical."

9. To drive this point home, I assign articles by John Ioannidis, an epidemiologist who has exposed the flimsiness of most peer-reviewed research. In a 2005 study, he concluded that "most published research findings are false." He and his colleagues contend that "the more extreme, spectacular results (the largest treatment effects, the strongest associations, or the most unusually novel and exciting biological stories) may be preferentially published." These sorts of dramatic claims are also more likely to be wrong.

10. The cherry on this ice-cream sundae of doubt is a critique by psychologist Philip Tetlock of expertise in soft sciences, such as politics, history, and economics. In his 2005 book *Expert Political Judgment*, Tetlock presents the results of his 20-year study of the ability of 284 "experts" in politics and economics to make predictions about current affairs. The experts did worse than random guessing, or "dart-throwing monkeys," as Tetlock puts it.

11. Like Ioannidis, Tetlock found a correlation between the prominence of experts and their fallibility. The more wrong the experts were, the more visible they were in the media. The reason, he conjectures, is that experts who make dramatic claims are more likely to get air time on CNN or column inches in *The Washington Post*, even though they are more likely to be wrong.

12. For comic relief, I tell my students about a maze study, cited by Tetlock, that pitted rats against Yale undergraduates. Sixty percent of the time, researchers placed food on the left side of a fork in the maze; otherwise the food was placed randomly. After figuring out that the food was more often on the left side of the fork, the rats turned left every time and so were right 60 percent of the time. Yale students, discerning illusory patterns of left-right placement, guessed right only 52 percent of the time. Yes, the rats beat the Yalies! The smarter you are, the more likely you may be to "discover" patterns in the world that aren't actually there.

13. So how do my students respond to my skeptical teaching? Some react with healthy pushback, especially to my suggestion that the era of really big scientific discoveries might be over. "On a scale from toddler knowledge to ultimate enlightenment, man's understanding of the universe could be anywhere," wrote a student named Matt. "How can a person say with certainty that everything is known or close to being known if it is incomparable to anything?"

14. Other students embrace skepticism to a degree that dismays me. Cecelia, a biomedical-engineering major, wrote: "I am skeptical of the methods used to collect data on

climate change, the analysis of this data, and the predictions made based on this data.” Pondering the lesson that correlation does not equal causation, Steve questioned the foundations of scientific reasoning. “How do we know there is a cause for anything?” he asked.

15. In a similar vein, some students echoed the claim of radical postmodernists that we can never really know anything for certain, and hence that almost all our current theories will probably be overturned. Just as Aristotle’s physics gave way to Newton’s, which in turn yielded to Einstein’s, so our current theories of physics will surely be replaced by radically different ones.

16. After one especially doubt-riddled crop of papers, I responded, “Whoa!”(or words to that effect). Science, I lectured sternly, has established many facts about reality beyond a reasonable doubt, embodied by quantum mechanics, general relativity, the theory of evolution, the genetic code. This knowledge has yielded applications—from vaccines to computer chips—that have transformed our world in countless ways. It is precisely because science is such a powerful mode of knowledge, I said, that you must treat new pronouncements skeptically, carefully distinguishing the genuine from the spurious. But you shouldn’t be so skeptical that you deny the possibility of achieving any knowledge at all.

17. My students listened politely, but I could see the doubt in their eyes. We professors have a duty to teach our students to be skeptical. But we also have to accept that, if we do our jobs well, their skepticism may turn on us.

Source: John Horgan, “When Teaching Critical Thinking Backfires”, in *Scientific America*, December 14, 2015 (<https://blogs.scientificamerican.com/cross-check/when-teaching-critical-thinking-backfires/>).

TEXT B

Young Minds in Critical Condition

Michael S. Roth

1. It happens every semester. A student triumphantly points out that Jean-Jacques Rousseau is undermining himself when he claims “the man who reflects is a depraved animal,” or that Ralph Waldo Emerson’s call for self-reliance is in effect a call for reliance on Emerson himself. Trying not to sound too weary, I ask the student to imagine that the authors had already considered these issues.

2. Instead of trying to find mistakes in the texts, I suggest we take the point of view that our authors created these apparent “contradictions” in order to get readers like us to ponder more interesting questions. How do we think about inequality and learning, for example, or how can we stand on our own feet while being open to inspiration from the world around us? Yes, there’s a certain satisfaction in being critical of our authors, but isn’t it more interesting to put ourselves in a frame of mind to find inspiration in them?

3. Our best college students are very good at being critical. In fact, being smart, for many, means being critical. Having strong critical skills shows that you will not be easily fooled. It is a

sign of sophistication, especially when coupled with an acknowledgment of one's own "privilege."

4. The combination of resistance to influence and deflection of responsibility by confessing to one's advantages is a sure sign of one's ability to negotiate the politics of learning on campus. But this ability will not take you very far beyond the university. Taking things apart, or taking people down, can provide the satisfactions of cynicism. But this is thin gruel.

5. The skill at unmasking error, or simple intellectual one-upmanship, is not totally without value, but we should be wary of creating a class of self-satisfied debunkers—or, to use a currently fashionable word on campus, people who like to "trouble" ideas. In overdeveloping the capacity to show how texts, institutions or people fail to accomplish what they set out to do, we may be depriving students of the chance to learn as much as possible from what they study.

6. In campus cultures where being smart means being a critical unmasker, students may become too good at showing how things can't possibly make sense. They may close themselves off from their potential to find or create meaning and direction from the books, music and experiments they encounter in the classroom.

7. Once outside the university, these students may try to score points by displaying the critical prowess for which they were rewarded in school, but those points often come at their own expense. As debunkers, they contribute to a cultural climate that has little tolerance for finding or making meaning—a culture whose intellectuals and cultural commentators get "liked" by showing that somebody else just can't be believed. But this cynicism is no achievement.

8. Liberal education in America has long been characterized by the intertwining of two traditions: of critical inquiry in pursuit of truth and exuberant performance in pursuit of excellence. In the last half-century, though, emphasis on inquiry has become dominant, and it has often been reduced to the ability to expose error and undermine belief. The inquirer has taken the guise of the sophisticated (often ironic) spectator, rather than the messy participant in continuing experiments or even the reverent beholder of great cultural achievements.

9. Of course critical reflection is fundamental to teaching and scholarship, but fetishizing disbelief as a sign of intelligence has contributed to depleting our cultural resources. Creative work, in whatever field, depends upon commitment, the energy of participation and the ability to become absorbed in works of literature, art and science. That type of absorption is becoming an endangered species of cultural life, as our nonstop, increasingly fractured technological existence wears down our receptive capacities.

10. In my film and philosophy class, for example, I have to insist that students put their devices away while watching movies that don't immediately engage their senses with explosions, sex or gag lines. At first they see this as some old guy's failure to grasp their skill at multitasking, but eventually most relearn how to give themselves to an emotional and intellectual experience, one that is deeply engaging partly because it does not pander to their most superficial habits of attention. I usually watch the movies with them (though I've seen them more than a dozen times), and together we share an experience that becomes the subject of reflection, interpretation and analysis. We even forget our phones and tablets when we encounter these unexpected sources of inspiration.

11. Liberal learning depends on absorption in compelling work. It is a way to open ourselves to the various forms of life in which we might actively participate. When we learn to read or look or listen intently, we are, at least temporarily, overcoming our own blindness by trying to understand an experience from another's point of view. We are not just developing techniques of

problem solving; we are learning to activate potential, and often to instigate new possibilities.

12. Yes, hard-nosed critical thinking is a useful tool, but it also may become a defense against the risky insight that absorption can offer. As students and as teachers we sometimes crave that protection; without it we risk changing who we are. We risk seeing a different way of living not as something alien, but as a possibility we might be able to explore, and even embrace.

13. Liberal education must not limit itself to critical thinking and problem solving; it must also foster openness, participation and opportunity. It should be designed to take us beyond the campus to a life of ongoing, pragmatic learning that finds inspiration in unexpected sources, and increases our capacity to understand and contribute to the world — and reshape it, and ourselves, in the process.

Source: Michael S. Roth, “Young Minds in Critical Condition”, *The New York Times* May 10, 2014.

Unit 3

TEXT A

When Practice Makes Imperfect

Ellen J. Langer

When he arrived on the planet he respectfully saluted the lamplighter.

“Good morning. Why have you just put out your lamp?”

“These are the instructions,” replied the lamplighter. “Good morning.”

“What are the instructions?”

“The instructions are that I put out my lamp. Good evening.”

And he lighted his lamp again.

“But why have you just lighted it again?”

“These are the instructions,” replied the lamplighter.

“I do not understand,” said the little prince.

“There is nothing to understand,” said the lamplighter. “Instructions are instructions. Good morning.”

And he put out his lamp.

Then he mopped his forehead with a handkerchief decorated with red squares.

“I follow a terrible profession. In the old days it was reasonable. I put the lamp out in the morning and in the evening I lighted it again. I had the rest of the day for relaxation and the rest of the night for sleep.”

“And the instructions have been changed since that time?”

“The instructions have not been changed,” said the lamplighter. “That is the tragedy! From year to year the planet has turned more rapidly and the orders have not been changed!”

The Little Prince

Antoine De Saint-Exupéry

1. Day after day the celestial lamplighter performed his well-practiced task. For him by now it was second nature. The planet, however, like the rest of the world, kept on changing. The routine stayed fixed, while the context changed.
2. One of the most cherished myths in education or any kind of training is that in order to learn a skill one must practice it to the point of doing it without thinking. Whether I ask colleagues concerned with higher education, parents of young children, or students themselves, everyone seems to agree on this approach to what are called the basics. Whether it is learning how to play baseball, drive, or teach, the advice is the same: practice the basics until they become second nature. I think this is the wrong way to start.
3. Before explaining this last statement, let me give an example of just one context for each of the skills I mentioned that might lead one to question this faith in practicing the basics.
4. As a child in summer camp I was taught to practice holding a baseball bat a particular way. The idea was to do so without thinking so that I could attend to other aspects of the game, such as the particular pitch I was trying to hit. Now, after years of lifting weights imperfectly, my right arm is stronger than my left. Should I hold the bat the same way in spite of this difference? Should everyone hold a bat the same way?
5. Because my driving skills have been overlearned, I flip my turn signal on automatically before making a turn. Now, suppose that I'm on an icy road about to make a turn, but the car is somewhat out of control. Wouldn't turning on the signal in the same old way misguide the car behind by seeming to indicate that the situation is well in hand? Would use of the flashing light be more appropriate in this context? Recently I gave a talk in New Mexico. I was driven from the airport to the hotel across a desert, without a car in sight for miles and miles. At each turn, the driver dutifully signaled.
6. Imagine overlearning the basics of driving in the United States and then taking a vacation in London, where people drive on the left side of the road. The car in front of you swerves out of control and you must react quickly. Do you slip back to old habits or avoid an accident by responding to what the current situation demands? It is interesting to consider that emergencies may often be the result of actions taken in response to previous training rather than in response to present considerations.
7. One of the "basic skills" of teachers, and all lecturers, is the ability to take a large quantity of information and present it in bite-size pieces to students. For those of us who teach, reducing and organizing information becomes second nature. How often do we, so practiced in how to present information for a lecture, continue to present a prepared lesson without noticing that the class is no longer paying attention? Presenting all the prepared content too often overtakes the goal of teaching.
8. For students, note-taking skills can be overlearned, practiced as second nature. Many of us have had the experience of turning to our notes and finding that we don't have the vaguest idea what they mean.
9. Traveling makes us particularly aware of rigidities. In several Asian countries drivers drive on the left side of the road, and pedestrians on the busy sidewalks follow the same pattern as cars, staying to the right or left accordingly. The frequency with which I came close to walking into people when traveling in Asia made clear to me that even a simple exercise, such as walking on the right, if originally learned mindlessly, may be hard to change. Each time I traveled to a different country, the rules changed, and my awkwardness increased.

10. When we drill ourselves in a certain skill so that it becomes second nature, does this lead to performing the skill mindlessly? Do we set limits on ourselves by practicing to the point of overlearning? When we approach a new skill, whether as adults or children, it is, by definition, a time when we know the least about it. Does it make sense to freeze our understanding of the skill before we try it out in different contexts and, at various stages, adjust it to our own strengths and experiences? Does it make sense to stick to what we first learned when that learning occurred when we were most naive? When we first learn a skill, we necessarily attend to each individual step. If we overlearn the drill, we essentially lose sight of the individual components and we find it hard to make small adjustments.

11. Learning the basics in a rote, unthinking manner almost ensures mediocrity. At the least, it deprives learners of maximizing their own potential for more effective performance and, for enjoyment of the activity. Consider tennis. At tennis camp I was taught exactly how to hold my racket and toss the ball when serving. We were all taught the same way. When I later watched the U.S. Open, I noticed that none of the top players served the way I was taught, and, more important, each of them served slightly differently. Most of us are not taught our skills, whether academic, athletic, or artistic, by the real experts. The rules we are given to practice are based on generally accepted truths about how to perform the task and not on our individual abilities. If we mindlessly practice these skills, we are not likely to surpass our teachers. Even if we are fortunate enough to be shown how to do something by a true expert, mindless practice keeps the activity from becoming our own. If we learn the basics but do not overlearn them, we can vary them as we change or as the situation changes.

12. Perhaps the very notion of basics needs to be questioned. So-called basic skills are normatively derived. They are usually at least partially applicable for most people some of the time. They are sometimes not useful at all for some people (e.g., how to hold the racket for someone who is missing a finger or how to read a text for someone with dyslexia). They are not useful, however, as first learned, for everyone across all situations. If they are mindlessly overlearned, they are not likely to be varied even when variation would be advantageous. Perhaps one could say that for everyone there are certain basics, but that there is no such thing as *the* basics.

13. In the classroom, teaching one set of basics for everyone may appear to be easier for the teacher. There are ways, however, to foster mindful learning of basic skills in classrooms full of potential experts. The rationale for this change in approaches is based on the belief that experts at anything become expert in part by varying those same basics. The rest of us, taught not to question, take them for granted.

14. The key to this new way of teaching is based on an appreciation of both the conditional, or context-dependent, nature of the world and the value of uncertainty. Teaching skills and facts in a conditional way sets the stage for doubt and an awareness of how different situations may call for subtle differences in what we bring to them. This way of teaching imposes no special burden on teachers. Rather, it may increase their own mindfulness as it helps individual students come closer to realizing their potential.

TEXT B

Confucius (K'ung Tzu)

Yang Huanyin

1. Eminent teacher, philosopher and political theorist, and founder of its feudal system of education, Confucius is one of Ancient China's most famous figures, a man whose practical experience and deep thinking on the subject have left their mark on educational development in his own country and elsewhere. Revered in antiquity as the "Supreme Sage" and the "Model for Ten Thousand Generations", Confucius now enjoys universal acclaim; his remarkable and lasting contribution to teaching and education has ensured him a place in history, as well as in culture, in China and beyond. The influence of his pedagogy remains perceptible today.

Biographical note

1. Confucius (551-479 BC), whose patronymic was Qiu and given name Zhongni, was born at Quyi in the principality of Lu. Confucius took lifelong delight in learning as well as teaching, and lived to see his reputation as an accomplished polymath spread far and wide. In breaking the aristocratic monopoly of learning and setting up a private academy that was accessible to rich and poor alike, Confucius was moving with his times. "My teaching," he declared, "is open to everyone, without distinction." He was in his 30s when he first accepted disciples; he took in 3,000 in all, seventy-two of whom progressed to complete mastery of the "six arts". In scope, enrolment and quality of teaching, the school of Confucius was unique for its age; both during and after its founder's lifetime and posthumously, it exerted a considerable influence in the political, economic, cultural, ethical and moral spheres. Confucius devoted his energies to this undertaking for almost half a century and his efforts were interrupted only by illness and death at the age of 72.

His views on education

2. In the course of this half century, Confucius, not content to give excellent training to a large number of students, constantly distilled his own teaching experience, thus developing his own educational doctrine.

3. The teacher's first task is to identify his audience. In this connection, Confucius stated that his lessons were destined for all men, without exception (*Analects*, Wei Ling gong). His pupils came from the lowest as well as the highest levels of society, and access to education was thereby broadened considerably. Opening the doors of learning more widely, he hastened the development of general education in Ancient China, thus contributing both to political reform and to the dissemination of culture. At the same time he helped to reveal the humanist character of Confucian teaching, which was to have an unquestionable influence on the private schools and academies of feudal society. This approach also helped to create the conditions whereby the emergent land-owner class could accede to the authority conferred by learning and produce talented men from its midst.

Role and objectives of education

4. Starting from the political principle that virtue was a prerequisite of government, and the psychological observation that "by nature, men are much alike; their practices set them apart" (*Analects*, Yang Huo), Confucius demonstrated that education plays a fundamental role in the

development of society and of individuals alike. Not only does it offer a means of ensuring the supremacy of virtue; it can also alter human nature and improve it in qualitative terms. By raising individual moral standards, it renders society in its entirety more virtuous: the kingdom is well administered, orderly and law-abiding, to the extent that all within it follow the path of righteousness. Confucius was at the origin of that concern for education, which gradually became one of the great traditions of China's feudal society.

5. Another of a teacher's tasks is to determine what type of person he is to form. Denouncing the favoritism and the passing of office from one generation of nobles to the next that prevailed during his time, Confucius recommended appointment according to merit and 'promotion of the ablest' (*Analects*, Zi Lu). He considered that the goal of education was to produce capable individuals (*xiancai*)—whom he also called *shi* (gentlemen) or *junzi* (men of quality)—who “combined competence with virtue” and whose subsequent careers in administration and government would bring about the ideal of a kingdom managed with integrity. The Chinese people have, to this day, kept faith with these two traditions; character development aimed at competence together with moral integrity; and appointment according to merit.

Content

6. In conformity with these objectives, Confucius determined that the twin pillars of education should be moral instruction, which would have priority, and the imparting of knowledge.

7. Moral instruction, which had to take pride of place, since what was needed were individuals of outstanding virtue who would assist the prince in governing with integrity, thus became the basis of Confucian teaching. In deference to the interests of the feudal landowning class, Confucius reshaped the moral concepts of the past, and proclaimed a series of new rules designed to put an end to the political chaos and moral decadence of the times. His ethics, philosophy and politics are indissociable, the first of these being characterized by a rare vitality which was the driving force of feudal morality and civilization for more than two millennia and which was centered on “humanity” or “benevolence” (*ren*), which also signifies love for one's neighbor. This virtue manifests itself in all types of relations between human beings and contains the germ of other qualities: filial piety (*xiao*), respect for the elderly (*ti*), loyalty (*zhong*), respectfulness (*gong*), magnanimity (*kuan*), fidelity (*xin*), diligence (*min*), altruism (*hui*), affability (*wen*), kindness (*liang*), frugality (*jian*), tolerance (*rang*), indulgence (*shu*), wisdom (*zhi*) and courage (*yong*). In order that all these precepts might serve to enhance the responsibility of individuals and society alike, Confucius stressed that each man should cultivate virtue and should receive a moral education. Moral education was thus for Confucius the means whereby his ideas concerning virtue might be materialized.

8. However, Confucius was equally concerned with the intellectual development of his disciples, that is to say, with the inculcation of culture, abilities and skills. In order to instill the moral values of feudal society in them, the basics of an all-round culture and the capacities required to exercise official responsibilities, he drafted six manuals which were considered to be the foundation of teaching and learning: the *Book of Odes* (*Shi*); the *Book of History* (or *Documents*) (*Shu*); the *Book of Rites* (*Li*); the *Book of Music* (*Yue*); the *Book of Changes* (*Yi*); and the *Spring and Autumn Annals* (*Chunqiu*). These didactic works, including philosophy, history, politics, economics, culture and musicianship, constituted the first relatively comprehensive teaching manuals in Chinese history.

9. Besides the six classics, which were designed to provide a general culture, Confucius' teaching also covered the six arts (rites, musicianship, archery, chariot-driving, calligraphy and mathematics),

the purpose of which was to impart skills and know-how through practice; according to Confucius, study of the six classics, coupled with mastery of the six arts, would inculcate sound moral sense and a solid cultural grounding that were necessary for the competent exercise of public office.

10. Rooted in political and moral principles, Confucian education is concerned solely with what constitutes the makings of the “man of quality” and with the tools that the official must master. Natural sciences are hardly touched upon; trade and agriculture are completely ignored. Another outstanding feature of the educational theory and practice of Confucius and the feudal teachers who succeeded him is disdain for manual labor and those engaged in it. Except for a few minor alterations, the content of education continued to reflect the options and priorities established by Confucius throughout the feudal period.

Teachers

11. Confucius had a great deal to say on this subject. Considered to be a remarkable teacher himself, he was revered throughout feudal society and served as a model for countless generations of his successors.

12. He believed that a good teacher should first and foremost be passionately and conscientiously committed to his work. His own knowledge must be broad in scope and fully mastered if his pupil was to benefit from exposure to it. Confucius further believed that in order to elicit good results, the teacher must love his pupils, know them well, understand their psychological particularities, give thought to ways and means of facilitating their access to knowledge and, to that end, develop an effective methodology. The hallmark of a teacher’s virtue, in Confucius’ eyes, was tireless commitment through his lessons to his pupils’ development.

13. The ethical code of education which Confucius elaborated, his own performance as a teacher and his attachment to the “mean” are still considered today as Confucius’ finest and greatest contributions to the cause of learning.

Education and economics

14. Confucius was not unduly concerned with the links between education and economics, but he nevertheless maintained that prosperity should take precedence over education. An educated, vigorous and prosperous population was, to his mind, the sign of sound administration; in other words, not only was education important, but its development must be materially based on development of the economy. A State can be well administered only if its population is in good heart and if its prosperity permits steadily increasing access to education. This concept of educational economics reflects an embryonic materialism.

Educational philosophy

15. In this domain, Confucius, wittingly or unwittingly, applied some of the basic tenets of psychology to the solution of concrete problems with which he was confronted, and he formulated a number of observations in the domains of what we now refer to as differential psychology, learning psychology, moral psychology and teaching psychology. As regards the educational process itself, his remarks concerning the differences between his disciples—differences of intelligence, aptitude, character, aspiration, interest and taste—reflected an attentive attitude that led him to put forward a number of pedagogical principles.

16. Confucius had elaborated a conceptual framework that was in keeping with the interests of the

land-owning class in the China of his day, and he began to put his ideas into practice. His pioneering work, occurring as it did at a time when the old slave-owning system was being replaced by a feudal one, obviously had a revolutionary impact, and assured for Confucius a key place in the history of education in China, without which its development could not be properly understood.

The influence of Confucius

17. If Confucius' thought had a profound influence on the development of Chinese society, and particularly that of its education and moral science, at different times and under a variety of circumstances, it also left its mark on a great number of Eastern and Western countries, which it reached through a wide variety of channels. Confucius and his doctrine do not belong only to China; he is acknowledged throughout the world as a major figure of universal civilization and culture.

18. From the time it began to spread, Confucian thought deeply influenced the political, economic and cultural, and to an even greater extent the educational and ethical, development of the countries which it reached. He was taken as a model by successive generations, and the supreme incarnation of virtue, an object of veneration for teachers, pupils and society as a whole. In all these countries, as in China, the Confucian classics served as didactic models during the feudal period, education being based on respect for Confucius and the reading of his canonical works.

19. Today, Confucius still has an important place in the education system of countries of the region. In the other Asian countries, the past and present influence of Confucianism on education, although less far-reaching, is nevertheless to a greater or lesser extent perceptible, pointing inevitably to the conclusion that no other teacher has been as influential as Confucius in this part of Asia.

20. As a result of his outstanding qualities as a teacher, Confucius is regarded in many countries as a model for members of the profession. In China, his birthday was celebrated as a holiday—an occasion marked by commemorative events and ceremonies to honor especially meritorious teachers, and to encourage others to draw inspiration from the virtues of the great educator.

Unit 4

TEXT A

On Running After One's Hat

G. K. Chesterton

1. I feel an almost savage envy on hearing that London has been flooded in my absence, while I am in the mere country. My own Battersea has been, I understand, particularly favored as a meeting of the waters. Battersea was already, as I need hardly say, the most beautiful of human localities. Now that it has the additional splendor of great sheets of water, there must be something quite incomparable in the landscape (or waterscape) of my own romantic town. Battersea must be a vision of Venice. The boat that brought the meat from the butcher's must have shot along those lanes of rippling silver with the strange smoothness of the gondola. The greengrocer who brought cabbage to the corner of the Latchmere Road must have leant upon the oar with the unearthly grace of the gondolier. There is nothing so perfectly poetical as an island; and when a district is flooded it

becomes an archipelago.

2. Some consider such romantic views of flood or fire slightly lacking in reality. But really this romantic view of such inconveniences is quite as practical as the other. The true optimist who sees in such things an opportunity for enjoyment is quite as logical and much more sensible than the ordinary “Indignant Ratepayer” who sees in them an opportunity for grumbling. Real pain, as in the case of being burnt at Smithfield or having a toothache, is a positive thing; it can be supported, but scarcely enjoyed. But, after all, our toothaches are the exception, and as for being burnt at Smithfield, it only happens to us at the very longest intervals. And most of the inconveniences that make men swear or women cry are really sentimental or imaginative inconveniences—things altogether of the mind. For instance, we often hear grown-up people complaining of having to hang about a railway station and wait for a train. Did you ever hear a small boy complain of having to hang about a railway station and wait for a train? No; for to him to be inside a railway station is to be inside a cavern of wonder and a palace of poetical pleasures. Because to him the red light and the green light on the signal are like a new sun and a new moon. Because to him when the wooden arm of the signal falls down suddenly, it is as if a great king had thrown down his staff as a signal and started a shrieking tournament of trains. I myself am of little boys’ habit in this matter. They also serve who only stand and wait for the two fifteen. Their meditations may be full of rich and fruitful things. Many of the most purple hours of my life have been passed at Clapham Junction, which is now, I suppose, under water. I have been there in many moods so fixed and mystical that the water might well have come up to my waist before I noticed it particularly. But in the case of all such annoyances, as I have said, everything depends upon the emotional point of view. You can safely apply the test to almost every one of the things that are currently talked of as the typical nuisance of daily life.

3. For instance, there is a current impression that it is unpleasant to have to run after one’s hat. Why should it be unpleasant to the well-ordered and pious mind? Not merely because it is running, and running exhausts one. The same people run much faster in games and sports. The same people run much more eagerly after an uninteresting, little leather ball than they will after a nice silk hat. There is an idea that it is humiliating to run after one’s hat; and when people say it is humiliating they mean that it is comic. It certainly is comic; but man is a very comic creature, and most of the things he does are comic—eating, for instance. And the most comic things of all are exactly the things that are most worth doing. A man running after a hat is not half so ridiculous as a man running after a wife.

4. Now a man could, if he felt rightly in the matter, run after his hat with the manliest ardor and the most sacred joy. He might regard himself as a jolly huntsman pursuing a wild animal, for certainly no animal could be wilder. In fact, I am inclined to believe that hat-hunting on windy days will be the sport of the upper classes in the future. There will be a meet of ladies and gentlemen on some high ground on a gusty morning. They will be told that the professional attendants have started a hat in such-and-such a thicket, or whatever be the technical term. Notice that this employment will in the fullest degree combine sport with humanitarianism. The hunters would feel that they were not inflicting pain. Nay, they would feel that they were inflicting pleasure, rich, almost riotous pleasure, upon the people who were looking on. When last I saw an old gentleman running after his hat in Hyde Park, I told him that a heart so benevolent as his ought to be filled with peace and thanks at the thought of how much unaffected pleasure his every gesture and bodily attitude were at that moment giving to the crowd.

5. The same principle can be applied to every other typical domestic worry. A gentleman trying to

get a fly out of the milk or a piece of cork out of his glass of wine often imagines himself to be irritated. Let him think for a moment of the patience of anglers sitting by dark pools, and let his soul be immediately irradiated with gratification and repose. Again, I have known some people of very modern views driven by their distress to the use of theological terms to which they attached no doctrinal significance, merely because a drawer was jammed tight and they could not pull it out. A friend of mine was particularly afflicted in this way. Every day his drawer was jammed, and every day in consequence it was something else that rhymes to it. But I pointed out to him that this sense of wrong was really subjective and relative; it rested entirely upon the assumption that the drawer could, should, and would come out easily. "But if," I said, "you picture to yourself that you are pulling against some powerful and oppressive enemy, the struggle will become merely exciting and not exasperating. Imagine that you are tugging up a lifeboat out of the sea. Imagine that you are roping up a fellow-creature out of an Alpine crevasse. Imagine even that you are a boy again and engaged in a tug-of-war between French and English." Shortly after saying this I left him; but I have no doubt at all that my words bore the best possible fruit. I have no doubt that every day of his life he hangs on to the handle of that drawer with a flushed face and eyes bright with battle, uttering encouraging shouts to himself, and seeming to hear all round him the roar of an applauding ring.

6. So I do not think that it is altogether fanciful or incredible to suppose that even the floods in London may be accepted and enjoyed poetically. Nothing beyond inconvenience seems really to have been caused by them; and inconvenience, as I have said, is only one aspect, and that the most unimaginative and accidental aspect of a really romantic situation. An adventure is only an inconvenience rightly considered. An inconvenience is only an adventure wrongly considered. The water that girdled the houses and shops of London must, if anything, have only increased their previous witchery and wonder. For as the Roman Catholic priest in the story said: "Wine is good with everything except water," and on a similar principle, water is good with everything except wine.

TEXT B

Happiness in the Workplace

Tal Ben-Shahar

1. Ten years ago I met a young man, a corporate lawyer, who was working in a prestigious New York firm and was about to make partner. He owned a luxury apartment overlooking Central Park and had just bought a new BMW, for cash.
2. He worked extremely hard, spending at least sixty hours each week in the office. Every morning he had to drag himself out of bed to get there, for he felt that he had very little to which he could look forward—the meetings with clients and colleagues and the legal briefs and contracts that filled his days were nothing more to him than a series of chores to be gotten through.
3. When I asked him what he would do for a living in an ideal world, he said that he would work in an art gallery. Were no jobs available in art galleries? No, no, he told me, there were jobs. Was he not qualified to find work? He was. But working in an art gallery, he said, would entail a steep loss of income and lowered standard of living. He hated the law firm but saw no way out.
4. Here was a man who was unhappy because he felt enslaved to a job he disliked. And he's not

alone in his unhappiness; in the United States, only 50 percent of employees say that they are satisfied with their work. Yet my conversation with the lawyer, and with many others who were dissatisfied at work, made clear to me that they were enslaved not because they had no choice but because they had made a choice that made them unhappy.

The Meaning, Pleasure, Strengths (MPS) Process

5. Finding the right work—work that corresponds to both our passions and our strengths—can be challenging. We can begin the process by asking these three crucial questions—“What gives me *meaning*?” “What gives me *pleasure*?” “What are my *strengths*?”—and noting the trends that emerge. Looking at the answers and identifying areas of overlap can help us determine what kind of work would make us happiest.

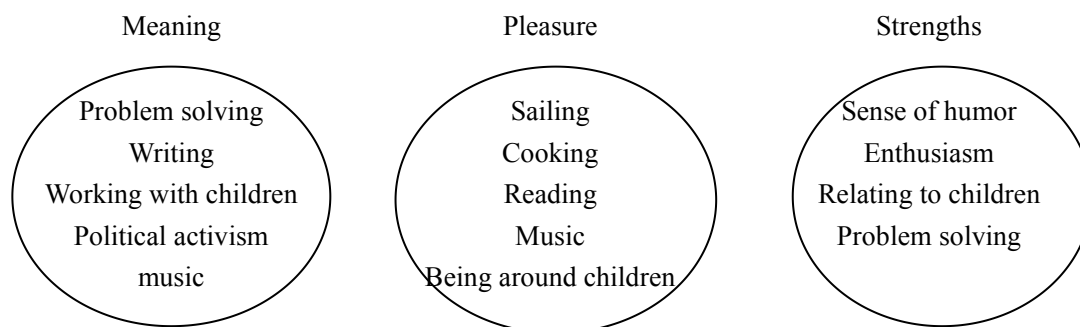
6. Generating accurate answers to these questions requires more effort than simply jotting down whatever leaps to mind when, for instance, we try to think about what we find meaningful. Most of us have more or less ready-made answers to such questions; these answers are usually true but may stop short of representing the full range of experiences that we have found meaningful. We may need to spend time reflecting, thinking deeply to recall those moments in our lives when we felt a sense of true purpose.

7. We may also need to spend some time considering the answers to the three questions. The lists we generate may be long, and the way in which we phrase our answers may not make the areas of overlap immediately apparent.

Using the MPS Process

8. Our lists will probably be messier and less straightforward than the following example, which is meant to show how the process works in its most basic form—how thinking about meaning, pleasure, and our strengths can lead us to more happiness and success.

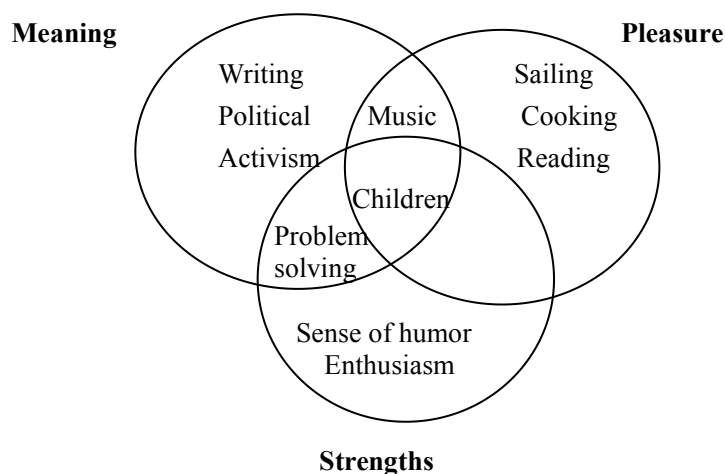
9. Let’s say I derive meaning from solving problems, writing, working with children, engaging in political activism, and music. I enjoy sailing, cooking, reading, music, and being around children. My strengths are my sense of humor, my enthusiasm, my ability to relate to children, and my problem-solving skills.



Which of the answers overlap?

10. In looking at the second diagram, I can see that working with children would give me meaning and pleasure, and I would be good at it. To figure out what specific jobs would be best for me, I would now take into consideration some other aspects of my personality and my life. For example, I

am highly organized and like to plan my week's work in advance—therefore, I prefer to have a more structured daily schedule. I like to travel, and it would therefore be important for me to have a job that allows long breaks.



11. So what kind of work with children would provide a structured daily schedule and long breaks? What kind of work might involve or make the best use of my other passions and skills, such as my enthusiasm, my sense of humor, and my love of reading and problem solving? Taking all of these factors into account, I might consider becoming an English teacher. While the process may not have led me to the most financially remunerative job, it may have helped me to identify the work that is most profitable to me in the ultimate currency—happiness.

12. The MPS process can also help us make important decisions in other areas of our lives. When choosing a class in school, for example, we can look for an overlap between courses that would be meaningful for our future career, that we would enjoy, and that we would be good at.

13. A manager, too, can use the MPS process for the benefit of her staff and organization. Helping her employees identify and perform activities that they enjoy, find meaningful, and are good at will yield more commitment and better overall performance. The MPS process might even be useful for a manager selecting new employees. Not every workplace can satisfy the needs and tap the strengths of every person. It is important for the manager to create, from the outset, a fit between those she hires and what the workplace has to offer.

Crafting Our Calling

14. The implicit assumption in the MPS process is that a person has a choice about where he works. But what if he has no choice or little choice? What if, because of external constraints, he cannot leave his current position or find work that meets the three criteria of meaning, pleasure, and strengths? Moreover, certain occupations or positions are more likely to draw out people's strengths and afford both meaning and pleasure. Working as a medical doctor, one could argue, lends itself more to meaning than work as a secondhand car dealer; similarly, Wrzesniewski's research that employees who are higher in the organizational hierarchy are more likely to experience their work as

a calling.

15. But regardless of whether one is the CEO or a clerk, a physician or a salesperson, there is still much that a person can do to craft his work in a way that will maximize the yield in the ultimate currency—so that is experienced more as a calling than as a job. In the words of Amy Wrzesniewski and Jane Dutton, “Even in the most restricted and routine jobs, employees can exert some influence on what is the essence of their work.”

16. In research of Wrzesniewski and Dutton conducted on hospital cleaners, one group of employees experienced their work as a job—as boring and meaningless—while the other group perceived the same work as engaging and meaningful. The second group of hospital cleaners crafted their work in creative ways. They engaged in more interactions with nurses, patients, and their visitors, taking it upon themselves to make the patients and hospital staff feel better. Generally, they saw their work in its broader context and actively imbued it with meaning: they were not merely removing the garbage and washing dirty linen but were contributing to patients’ well-being and the smooth functioning of the hospital.

17. When it comes to generating the ultimate currency, how we *perceive* the work can matter more than the work itself. Hospital cleaners who recognize a simple truth, which is that their work makes a difference, are happier than doctors who don’t experience their work as meaningful.

18. The researchers saw a similar trend among hairdressers, information technicians, nurses, and restaurant kitchen employees who created meaningful relationships with customers or with others in their organization. They found the same was true among engineers: those who saw themselves as teachers, team creators, and relationship builders felt they were contributing significantly to their companies’ success, and thus related to their work more as a calling than as a job.

Focusing on Happiness

19. In *Zen and the Art of Motorcycle Maintenance*, Robert M. Pirsig writes, “The truth knocks on the door and you say, ‘Go away, I’m looking for the truth’ and so it goes away.” We very often fail to recognize the rich sources of pleasure and meaning that are right in front of us in our work. The potential for happiness may be all around us, but if it goes unnoticed—if our focus is elsewhere and we fail to perceive it—we risk losing it. To turn a possibility into a *reality*, we first need to *realize* that the possibility exists.

20. Happiness is not merely contingent on what we do or where we are but on what we choose to perceive. There are people who are unhappy regardless of the work they do or the relationship they are in, and yet they continuously fool themselves into thinking that an external makeover will affect them internally.

21. Ralph Waldo Emerson was right: “To different minds, the same world is a hell, and a heaven.” The exact same event can be perceived, and hence experienced, in very different ways by different people; what we choose to focus on largely determines whether or not we enjoy what we do—within a relationship, at school, and in the workplace. For example, an unhappy investment banker may learn to derive meaning and pleasure from her work if she chooses to focus on those aspects that are personally meaningful and pleasurable. If, however, like many people, she focuses primarily on the material rewards, she is less likely to sustain happiness. A change in perception can make a significant difference; as numerous hairdressers, hospital workers, and engineers so clearly

demonstrate, we can find the treasure by focusing on it.

22. Hamlet's claim that "there is nothing either good or bad but thinking makes it so" is largely, but not entirely, accurate. The fact that what we choose to focus on—our perception—matters so much does not mean that just anybody can find happiness in any situation. For example, there are people who, regardless of their focus, will not derive meaning and pleasure from investment banking or from teaching. Of course there are also certain circumstances people find themselves in that make the possibility of finding happiness extremely difficult. Happiness is a product of the external as well as of the internal, of what we choose to pursue as well as of what we choose to perceive.

23. Most of us can, and often do, find a job or a career in which we are relatively satisfied. But we can usually do better. To help us find our calling, we need to take the advice of my wise student Ebony Carter, who said, "Instead of focusing on what we can 'live with,' we should be thinking about what we can't live without." Finding a calling is about heeding the call of our inner voice. That call leads to our calling; that voice guides us to our vocation.

Unit 5

TEXT A

We Need a Paris Agreement for Plastics

They're flowing into the natural environment every day at an unprecedented rate

Dave Ford

1. My entry into the ocean plastics crisis began when our organization, SoulBuffalo, ran the first ever activist-to-industry ocean plastics summit in May of 2019. To imagine the summit, picture 165 senior leaders from Coca-Cola, Dow, Greenpeace, the American Chemistry Council, the World Bank, World Wildlife Fund (WWF) and representatives of some of the world's 15 million informal waste pickers all stuck on a boat together in the middle of the Atlantic Garbage Patch for four days.

2. These stakeholders have wildly different strategies, visions and objectives. Our mission was to bring them together in the heart of the crisis to ignite new relationships and accelerate action. We snorkeled together in a sea of plastics and hosted boundary-pushing conversations between leaders that don't usually sit in the same room.

3. We saw up close the paradox of plastic, part wonder material, part environmental scourge. Lightweight and strong, plastic preserves food like no other material. Yet it breaks down into microplastics and nanoplastics, which can now be found everywhere in the world—from the deepest oceans to our very own bodies. Every day plastic is flowing into our natural environment at an unprecedented rate—a dump truck's worth every minute into our oceans alone. As I wrote in *Scientific American* in August, the pandemic has made it worse. Enough masks are being made per year to cover the entire country of Switzerland.

4. Confronting this reality together in the Atlantic Garbage Patch built bridges between the plastic industry and environmental NGOs. Five of the ideas workshopped during the summit are funded and

up and running today (including the Plastic Pickers Operational Working Group). The summit made a powerful impact, but the crisis is far from resolved. The need for a complete overhaul of our broken system for managing waste is clear. The growing consensus is that the most effective way to do this is through a U.N. Global Treaty on Plastics. In 14 months at United Nations Environmental Assembly's Fifth Session (UNEA-5), the U.N. will decide on whether to move a treaty forward.

5. The 70-plus-member Ocean Plastics Leadership Network, the activist-to-industry network dedicated to the plastics crisis that was born on that ship in the middle of the Atlantic, is committed to accelerating the work towards a "Paris Agreement" for plastics. We are currently at work on a yearlong series of virtual dialogues during the 14-month groundwork period leading up to the UNEA5 decision in February 2022 on whether to develop a global plastics treaty. Our role is to help map consensus amongst major stakeholders to accelerate a plastics treaty. Traditionally, negotiations on global treaties are incredibly hard, and the vast number of stakeholders in the global plastics crisis only adds to the complexity of the task.

6. Among the stakeholders for a new global agreement on plastic pollution are 193 U.N.-recognized governments; thousands of companies dependent on plastic; trade and advocacy groups; activists and industry-facing nonprofits; waste pickers in the developing world who are responsible for picking plastic out of landfills and off beaches; and seven billion consumers who recycle on average 14 percent of the total amount of plastic they consume.

7. We're under no illusion about the scope of this challenge. We must create a safe forum for tough conversations to take place among this vast and varied group in advance of the February 2022 decision to inform negotiators at the U.N. and help advance the treaty. In the words of Costa Rican diplomat Christiana Figueres, who was central to the realization of the Paris Agreement, we must employ "relentless optimism," coupled with "radical collaboration."

8. Despite this complexity, we believe a meaningful global agreement can be reached and that we must make it happen faster than any treaty before. There are good reasons for optimism. In 1988, the International Maritime Organization ratified a global agreement titled MARPOL Annex V making it illegal for ships to dump plastic in the ocean anywhere in the world. It is still in effect today, proving there's precedent for global agreements to preserve our oceans. All of the Caribbean nations, the Nordic countries and the Pacific Island states have called for a new global agreement. Sixty-eight countries have publicly expressed interest in a plastics treaty, as have a broad coalition of African countries, and the European Union. While the U.S. has been notably silent on the topic, the groundswell of worldwide support is encouraging.

9. In November, the U.K.'s environmental minister declared the time to start negotiating a plastics treaty is now. "We have a chance now to tackle plastic pollution in the way that the Paris agreement has done for climate change," said Lord Zac Goldsmith. There is also hope across the environmental community that the recently elected Biden administration will be a meaningful force on the plastics treaty, as the Obama administration was for climate.

10. Major reports released in 2020 from industry, NGOs and government also provide a useful blueprint to ground discussions. WWF, Ellen MacArthur Foundation and Boston Consulting Group laid out the business case for a global treaty, and 30 major companies have signed onto a "Business Call for a U.N. Treaty on Plastic Pollution." They urged others to join them in advocating for an

international response that aligns businesses and governments and offers a clear approach to addressing the plastic crisis.

11. Environmental NGO groups also voiced their support for a plastics treaty in a report from the Center for International Environmental Law, the Environment Investigation Agency and GAIA (Global Alliance for Incinerator Alternatives). The report has the backing of the Break Free from Plastic movement and Greenpeace. Finally, just a few weeks ago, the Nordic Council of Ministers rolled out a 148-page report that provides a suggested framework and positioning for a future treaty.

12. These reports reveal that there is already alignment on some fundamental points. First, they all call for harmonized reporting on plastics throughout their life cycle, making it possible to account for everything that is being made and how it is handled. This requires a standardization of terms for all things plastic, so regions and stakeholders all speak the same language. Second, all the reports recommend national action plans, where each country sets up its own plans to manage waste based on minimum requirements, much as nations do with greenhouse gas emissions under the Paris accord. Finally, the reports agree that scientific panels should monitor progress globally, and a financial mechanism must support developing countries and distribute funds internationally.

13. While environmental organizations (like OPLN member Greenpeace) and industry groups (like OPLN member American Chemistry Council) may agree on some of the basic structures of a global agreement there are still challenging issues to address. Environmental groups call for mandatory plastic reduction goals and enforceable mechanisms in the treaty, as well as limits on new fossil fuel-derived virgin plastic production. Meanwhile, many industry groups believe a treaty can be successful without mandatory reduction goals and heavily emphasize the expansion of advanced recycling or chemical recycling technologies. Many environmental activist groups see the advanced recycling models as a license to continue with the status quo on consumption.

14. A landmark report from the Pew Charitable Trusts, SYSTEMIQ and various academic partners, titled “Breaking the Plastic Wave,” points toward a way to help bridge this divide: we need to dramatically ramp up *both* upstream solutions such as reduction goals championed by environmental groups *and* downstream solutions championed by industry, including fixing our broken mechanical recycling system and investing in new technologies.

15. How long will bridging this divide take? The road to the Paris Agreement actually began in 1991 with the U.N. Framework Convention on Climate Change, and continued with the Kyoto Protocol in 1997, and the failed meetings in Copenhagen in 2009. The Paris Agreement was finally signed in 2016, 25 years after the first framework was agreed upon. The Montreal Protocol, which has been instrumental in repairing our ozone layer, was signed in 1987, 14 years after CFCs were posited to pose a danger—speedy by U.N. standards. A high seas treaty to conserve marine biological diversity in international waters has been under discussion for 12 years now.

16. However, there is a precedent for greater speed when the issue is plastic. The Basel plastic amendments included plastic waste in a legally binding framework to make global trade in plastic waste more transparent and better regulated. This was a major accomplishment, and the time between the first proposal and unanimous adoption by governments was just eight months, previously an unheard-of time frame in which to negotiate an international agreement.

17. Reports such as “Breaking the Plastic Wave” tell us we’re running out of time. We must rapidly accelerate both upstream and downstream solutions to have any chance of solving this crisis. If we

delay dramatic action by just five years and maintain current government and industry commitments, an additional 80 million metric tons of plastic will end up in the ocean by 2040 (or about half of all the plastic that has accumulated from the start of the plastics era up to now).

18. Preventing this disaster for ocean ecosystems and human health and well-being requires creating safe spaces for discussion between environmental and industry groups now. The only way forward is to approach the obstacles head-on in the belief that tension equals progress, and that all parties, regardless of their perspective and approach, should have a seat at the table. If we are brave enough to have those conversations, we have reason to be relentlessly optimistic that an ambitious plastics treaty matching the scale and urgency of the problem can be realized in record time.

TEXT B

The Climate Emergency: 2020 in Review

Despite some promising developments, the need for action has grown even more urgent

William J. Ripple, Christopher Wolf, Thomas M. Newsome, Phoebe Barnard, William R. Moomaw

1. The climate emergency has arrived and is accelerating more rapidly than most scientists anticipated, and many of them are deeply concerned. The adverse effects of climate change are much more severe than expected, and now threaten both the biosphere and humanity. There is mounting evidence linking increases in extreme weather frequency and intensity to climate change. The year 2020, one of the hottest years on record, also saw extraordinary wildfire activity in the Western United States and Australia, a Siberian heat wave with record high temperatures exceeding 38 degrees C (100.4 degrees Fahrenheit) within the Arctic circle, a record low for October Arctic sea ice extent of 2.04 million square miles, an Atlantic hurricane season resulting in more than \$46 billion in damage, and deadly floods and landslides in South Asia that displaced more than 12 million people.

2. Every effort must be made to reduce emissions and increase removals of atmospheric carbon in order to restore the melting Arctic and end the deadly cycle of damage that the current climate is delivering. Scientists now find that catastrophic climate change could render a significant portion of the Earth uninhabitable consequent to continued high emissions, self-reinforcing climate feedback loops and looming tipping points. To date, 1,859 jurisdictions in 33 countries have issued climate emergency declarations covering more than 820 million people.

3. In January 2020, we warned of untold human suffering in a report titled World Scientists' Warning of a Climate Emergency with more than 11,000 scientist signatories from 153 countries at time of publication. As an Alliance of World Scientists, we continue to collect signatures from scientists, with now more than 13,700 signatories. In our paper, we presented graphs showing vital signs of very troubling climate change trends with little progress by humanity. Based on these trends and scientists' moral obligation to "clearly warn humanity of any catastrophic threat" and to "tell it like it is," we declared a climate emergency and proposed policy suggestions. We called for

transformative change with six steps involving energy, short-lived air pollutants, nature, food, economy and population.

4. Here, we investigate progress for these six steps during 2020. We have seen a few promising developments on energy, nature and food. Impressively, the European Union is on track to meet its emissions reduction goal for 2020 and become zero net carbon by 2050; however, this goal will still increase temperatures from the damaging levels of today. We are also encouraged by the recent trend of governments committing to zero net carbon, including China by 2060 and Japan by 2050. Similar pledges have been made by the United Kingdom, many subnational governments and some corporations, although there is mounting evidence that a 2050 or later target may be inadequate and net zero carbon should be reached much earlier, for example, by 2030.

5. U.S. President-elect Joe Biden has pledged that the U.S. will rejoin the Paris agreement and proposed a \$2 trillion climate plan to phase down fossil fuels by expanding renewable energy capacity while creating jobs, reducing pollution and investing in historically disadvantaged communities. It is critically important to significantly reduce CO₂ emissions while simultaneously increasing carbon accumulation by forests, mangroves, wetlands and other ecosystems. Progress for nature came in the form of the Bonn Challenge to restore forest and other ecosystems, but much more investment is needed in natural climate solutions. Global meat consumption, which must be reduced for climate mitigation, is expected to decline 3 percent this year, largely as a result of COVID-19. While likely a temporary decline, this coincides with increasingly popular meat substitutes; annual U.S. sales are projected to reach \$1 billion in 2020.

6. Although lockdowns associated with the COVID-19 pandemic resulted in a decrease in CO₂ emissions of 7 percent in 2020, this reduction is unlikely to be long-lived because there has been no major concurrent shift in the way we produce energy. This drop in emissions was a tiny blip compared to the cumulative buildup of greenhouse gases, which has led to all five of the hottest years on record occurring since 2015. In fact, atmospheric concentrations of CO₂ continued to rise rapidly in 2020 reaching a record high in September. COVID-19 also led to a one year postponement of the COP26 United Nations climate change conference, after the 2019 failure of the COP25 conference to make meaningful progress. We are concerned that no major industrialized country is on track to limit warming to 1.5 degrees C, the target of the Paris Agreement. Instead, the actions of many wealthy countries—including the U.S.—are consistent with greater than three degrees C warming. Unfortunately, progress in 2020 has also been limited in the areas of short-lived air pollutants, the economy and population.

7. As we move into 2021 and beyond, we need a massive-scale mobilization to address the climate crisis, including much more progress on the six steps of climate change mitigation. Key actions for each step include the following:

Energy. Swiftly phasing out fossil fuels is a top priority. This can be achieved through a multipronged strategy based on rapidly transitioning to low-carbon renewables such as solar and wind power, implementing massive conservation practices, and imposing carbon fees high enough to curtail the use of fossil fuels.

Short-lived pollutants. Quickly cutting emissions of methane, black carbon (soot), hydrofluorocarbons and other short-lived climate pollutants is vital. It can dramatically reduce the short-term rate of warming, which may otherwise be difficult to affect. Specific actions to address short-lived pollutants include reducing methane emissions from landfills and the energy

sector (methane), promoting improved clean cookstoves (soot) and developing better refrigerant options and management (hydrofluorocarbons).

Nature. We must restore and protect natural ecosystems such as forests, mangroves, wetlands and grasslands, allowing these ecosystems to reach their ecological potential for sequestering carbon dioxide. The logging of the Amazon, tropical forests in Southeast Asia, and other rainforests including the proposed cutting in the Tongass National Forest of Alaska is especially devastating to the climate. Creation of new protected areas, including strategic forest carbon reserves, should be a top priority. Payment for ecosystem services programs offer an equitable way for wealthier nations to help protect natural ecosystems.

Food. A dietary shift toward eating more plant-based foods and consuming fewer animal products, especially beef, would significantly reduce emissions of methane and other greenhouse gases. It would also free up agricultural lands for growing human food and, potentially, reforestation (“Nature” step). Relevant policy actions include minimizing tillage to maximize soil carbon, cutting livestock subsidies and supporting research and development of environmentally friendly meat substitutes. Reducing food waste is also critical, given that at least one third of all food produced is wasted.

Economy. We must transition to a carbon-free economy that reflects our dependence on the biosphere. Exploitation of ecosystems for profit absolutely must be halted for long-term sustainability. While this is a broad, holistic step involving ecological economics, there are specific actions that support this transition. Examples include cutting subsidies to and divesting from the fossil fuel industry.

Population. The global human population, growing by more than 200,000 people per day, must be stabilized and gradually reduced using approaches that ensure social and economic justice such as supporting education for all girls and women, and increasing the availability of voluntary family planning services.

8. These steps synergize with each other and together ensure a sustainable future. They also have many co-benefits beyond climate mitigation. For example, stabilizing human population size can improve climate adaptation capacity in the event of declining crop yields. Similarly, plant-rich diets offer significant benefits for human health.

9. In December 2020, U.N. Secretary-General Antonio Guterres pleaded for every nation to declare a “climate emergency.” Thus, we call for the U.S. government to proclaim a climate emergency with either Joe Biden declaring a national climate emergency through an executive order or Congress passing major climate mitigation funding and a declaration of a climate emergency (H.Con.Res.52, S.Con.Res.22) that has been buried in a Congressional committee throughout 2020. One year ago, we were troubled about poor progress on mitigating climate change. We are now alarmed by the failure of sufficient progress during 2020.

10. However, there are glimmers of hope. Young people in more than 3,500 locations continued global climate strikes calling for urgent action. The Black Lives Matter movement has brought deep social injustice and inequality to the surface of our social and economic systems. Rapid progress in each of the six steps can be achieved when they are framed from the start in the context of climate justice, as climate change is a deeply moral issue. But this is only possible when those who face the greatest climate risks help shape the response, including Indigenous

peoples, women, youth, people of color and low-income people. Aggressive transformative change, if framed holistically and equitably, will accelerate broad-based restorative action and avert the worst of the climate emergency. The survival of our society as we know it depends upon this unprecedented change.

Unit 6

TEXT A

Why “De-growth” Shouldn’t Scare Businesses

Thomas Roulet & Joel Bothello

1. The concept of degrowth dates back to the 1970s, when a group of French intellectuals led by the philosopher Andre Gorz proposed a simple idea: In response to mounting environmental and social problems, they suggested that the only real solution was to produce and consume less—to shrink our economies to cope with the carrying capacity of our planet. The proposal was considered by many at the time to be too radical. But with today’s climate crisis, debates around degrowth have been reinvigorated, and many major figures such as Noam Chomsky, Yanis Varoufakis and Anthony Giddens have, to varying degrees, expressed support for the idea.
2. For others though—especially business leaders—degrowth is completely unthinkable, not least because of the anti-consumerist roots of the term. The prevailing view is that growth is an economic necessity, and any threat to that not only undermines business, but basic societal functioning. For instance, there is a warning about the dire social consequences of what is perceived to be a movement of “consumer shaming.” Framed in these terms, the resistance of multinational CEOs and entrepreneurs alike is predictable, as is the reluctance of politicians to promote degrowth policies that would potentially prove unpopular with key constituents. The economist Tim Jackson provides a concise assessment: “Questioning growth is deemed to be the act of lunatics.”
3. Critics of degrowth have also put forth other arguments that, at face value, seem valid: the economist Joseph Stiglitz argues, for instance, that since growth is unquestionably good for human development, we simply need a different kind of growth that is better for the environment, not less of it. Others argue that the philosophy of degrowth does not seriously account for technological innovation—specifically the idea that we can continue current growth patterns if we innovate products that are less resource-intensive and generate fewer waste by-products.
4. There are, however, problems with these perspectives. First, given the finite nature of our planet, infinite economic growth—even of a different variety—is a logical impossibility. Secondly, innovation and improvements produce, in many cases, unintended consequences. One of which is the Jevons paradox, where individuals compensate for efficiency through increased consumption. For instance, more energy-efficient refrigerators lead to more refrigerators in a home.
5. The third and most fundamental issue is that the degrowth movement has already begun: at a grassroots level, consumer demand is actively being transformed, despite political and corporate reticence. A recent YouGov poll in France highlights that 27% of respondents are seeking to

consume less—double the percentage from two years prior. The number of people eating less meat or giving it up altogether has been rising exponentially in recent years, too. Similarly, the movement of Flygskam (literally “flight shaming” in Swedish) has had early successes in reducing pollution: 10 Swedish airports have reported considerable declines in passenger traffic over the past year, which they attribute directly to Flygskam. In the apparel industry, fast fashion is still popular, but garment manufacturers are preparing for a backlash as consumers voice growing criticism of the ecological impact of clothing. Accounts such as these indicate how consumers in many contexts are increasingly conscious of the negative consequences of consumerism and are seeking to change their habits. We are witnessing the emergence of consumer-driven degrowth.

6. These stories also indicate how degrowth opens new opportunities: some companies and industries will certainly be disrupted, but others that are sufficiently prepared for such transitions will handily outmaneuver their competitors. For instance, Flygskam has been a boon for train travel, bolstered by a social media movement called Tågskryt (“train brag”). Meanwhile reduced meat consumption has been accompanied by an explosion in meat substitutes that produce one-tenth of the greenhouse gases compared to the real thing. Accordingly, degrowth reshuffles competitive dynamics within and across industries and, despite what many corporate leaders assume, offers new bases for competitive advantage.

7. Based on our examination of companies at the forefront of the degrowth movement, we’ve identified three of their strategies that can apply to larger incumbent firms. First, firms can pursue degrowth-adapted product design, involving the creation of products that have longer lifespans, are modular, or are locally produced. Fairphone, a social enterprise, eschews the built-in obsolescence of larger mobile device manufacturers and produces repairable phones that dramatically extend their longevity. Similarly, the start-up The 30 Year Sweatshirt sells high-quality, durable products that run counter to fast fashion principles. Although incumbents have yet to follow suit, such transformations are not without precedent: for example, the American auto industry was forced to move away from planned obsolescence, which was a common practice dating back to the 1920s, when Japanese competitors seized the market in the 1970s-80s with more reliable and fuel-efficient vehicles that were built to last.

8. Second, firms can engage in value-chain repositioning, where they exit from certain stages of the value chain and delegate some tasks to stakeholders. As an example, the vehicle manufacturer Local Motors created a proof-of-concept recyclable vehicle crafted with 50 individual parts printed onsite, compared with the roughly 25,000 parts required for a traditional vehicle. The company crowdsourced designs and crowdfunded the project from their potential consumers. Larger firms such as Lego have also taken advantage of this model, launching marketplaces for either creating new designs or trading used products. This way, the firm creates different ways to consume despite production limits. Firms that incorporate stakeholder engagement in their operations are thereby faster to adapt to degrowth when it becomes more mainstream.

9. Third, firms can lead through degrowth-oriented standard setting. This entails creation of a standard for the rest of the industry to follow. The apparel company Patagonia—that explicitly follows an “antigrowth” strategy—is the poster child for this philosophy, offering a worn-wear store and providing free repairs for not only their own products, but also for those of other garment manufacturers. In a similar vein, the automobile company Tesla released all its patents in 2014, seeking to catalyze the diffusion of electric vehicles. Such initiatives were not merely marketing ploys, but also strategies to standardize a practice or technological platform throughout

an industry—one in which companies like Patagonia or Tesla would have existing expertise.

10. These strategies illustrate potential ways that firms can adapt to consumer-driven degrowth. Firms may pursue more than one strategy (or all three) simultaneously: In 2016, for example, Google attempted to create a longer lasting phone with modular components, soliciting feedback from supply chain actors on how to create standardized parts for their handset. Although “Project Ara” was ultimately cancelled, it did reveal a common thread among the strategies. Effective and inclusive communication with stakeholders across the supply chain is crucial, but framing the project in a way that all those stakeholders can buy into requires considerable effort and adjustment through trial and error.

11. As we continue to grapple with climate change, we can expect consumers, rather than politicians, to increasingly drive degrowth by changing their consumption patterns. Firms should think in an innovative way about this consumer-driven degrowth as an opportunity, instead of resisting or dismissing the demands of this small but growing movement. Businesses that successfully do so will emerge more resilient and adaptable—instead of necessarily selling more, they will sell better, and grow in a way that satisfies consumers while respecting the environment.

Source: Thomas Roulet and Joel Bothello, “Why ‘De-growth’ Shouldn’t Scare Businesses”, *Harvard Business Review* (Feb 4, 2020), retrieved at <https://hbr.org/2020/02/why-de-growth-shouldnt-scare-businesses>

TEXT B

What Happens When Society Crumbles and Progress Stops

Richard Webb, Debora Mackenzie & John Horgan

The end of industrial civilization

1. Rome, the Maya, Bronze Age Greece: every complex society in history has collapsed. Will our industrial civilization be any different? Probably not. It all comes down to complexity and energy. Societies inevitably grow more complex as they chase prosperity and find solutions to the problems thrown up by success, and that comes at a cost: energy. Civilizations collapse, the thinking goes, when they can no longer generate enough juice to maintain existing complexity and solve new problems.

2. We got to where we are today because the industrial revolution exploited readily available high-quality anthracite coal. We then used that energy to tap progressively harder-to-access energy sources, driving our complexity to unprecedented heights. But unless we find a bounteous new source, we will one day overshoot what we can afford. Then complexity quickly unravels: political and economic institutions falter, production and trade diminish, global supply chains break. Technologies become impossible. States fragment. Lots of people die.

3. But there is hope. Except for small, isolated societies in which everyone died, no historical collapse has wiped the slate clean. All retained enough of their technologies and institutions to start afresh, and eventually do better. So could our descendants take what remains and build a new civilization? The problem is that this time, there might be nothing left. “Rome didn’t have nuclear

weapons,” says Ian Morris at Stanford University in California. Collapsing societies undergo dramatic shifts in power and wealth, which are always accompanied by violence, he says. “This could be the final collapse.”

4. Globalization could also make our meltdown different. When past societies fell, there were others left to carry on, says Thomas Homer-Dixon at the University of Waterloo in Canada. “If our one global civilization collapses there won’t be outside resources, capital and knowledge to reboot things.” For Ugo Bardi at the University of Florence in Italy, the chances of rebuilding depend on whether we can keep the electrical grid running. This isn’t just to keep the lights on, but to produce the materials required for industrial civilization—steel for machinery, potash for fertilizer, silicon for semiconductors and so on. With easily accessible fossil-fuel energy sources long exhausted, Bardi calculates that after a collapse we wouldn’t be able to recover enough energy to mine or smelt the materials we rely on unless we retain a working grid.

5. That means we can future-proof our energy supplies, but only if we act now. Generating fossil-fuel or nuclear energy requires substantial energy up front—if that system collapses we won’t have what it takes to crank it up again. Sun and wind, however, are free; we need only maintain the devices that capture them. Bardi calculates that if half our electricity came from renewables, the grid could generate enough energy to maintain us and, crucially, itself, through crises that would completely collapse our present system. But we would need to build it while we have the silicon and civil order, and that would require investment in renewables to be 50 times its current level. If not, says Bardi, “we don’t have enough anthracite to reinvent electricity or launch the industrial revolution again. So it will be agriculture: simple tools and dark nights.” Then again, climate instability might hinder farming, leaving hunting and gathering.

6. To do any better than that we will need to keep our key institutions, Homer-Dixon thinks, but that could be impossible amid severe climate change and conflict. When things settle down, all our records could be gone: even hard drives decay in a century or two. And in case you think we might be better off forgetting the knowledge that led to our civilization’s fall, think again: the more primitive the society, the more violent people were. Collapse will be no return to Eden. Time to start installing those solar cells.

The End of Economic Growth

7. If it’s shrinking or flaccid, you’re in trouble. You want it large and growing. We’re talking about gross domestic product—that vital symbol of a nation’s economic virility. On the face of it, the obsession with economic growth is fair enough. A bigger cake means more to share around, and that further increases GDP in a never-ending virtuous circle. Or does it?

8. The idea that economic growth has natural limits first came to public attention in 1972, with a report called *Limits to Growth* from the think tank Club of Rome. It argued that sooner or later, the world’s economies would demand more resources than the planet could supply. But things aren’t that simple, says environmental economist Cameron Hepburn of the University of Oxford. “We’ve had scare stories for 40 to 50 years about resources running out. They don’t come true and they won’t.” Where a resource has a price, he says, using too much forces the price up—and the economic burn drives us to find alternative ways of making things.

9. Innovation, then, is the key to sustained, sustainable growth. But innovation might be a finite

resource too, says Robert Gordon of Northwestern University in Evanston, Illinois, author of *The Rise and Fall of American Growth*. Since the first throes of the industrial revolution, he argues, economic growth has been propelled by consecutive technological revolutions: steam power, electricity and the internal combustion engine, and digital communications. But today it's not easy to see where the next big boosts are coming from. That might explain why GDP growth has been slowing in Western economies since the 1970s.

10. Hepburn thinks that view is unduly pessimistic. "I don't think humanity has lost its mojo," he says. Part of the problem is accountancy, he says: GDP, defined as the total value of goods and services an economy makes, is not a good way to measure economic strength in societies that are finding better ways to make things cheaper. He also sees a big productivity-boosting innovation shimmering on the horizon: cheap solar power. Anyway, would a world with no economic growth be so bad? The conventional doom-laden answer is yes. Zero growth brings political polarization, says Gordon: there's less money to finance schools and hospitals, and the gulf between the haves and have-nots widens. The growth of populist movements in Europe and the U.S. since the 2008 financial crash gives us a foretaste of what we can expect. Some pessimists even see the beginnings of parallels with political changes in the zero-growth 1930s that propelled the world to war.

11. The outlook doesn't have to be that gloomy, says Tim Jackson of the University of Surrey in Guildford, U.K., author of the 2009 book *Prosperity Without Growth*. Beyond a certain level of material development, our well-being need not rely on making and consuming ever more stuff. In this vision, prosperity does not have to be curtailed in a post-growth world: a sharing economy, greater emphasis on renovation and refurbishment rather than making new things, and more time spent on cultural activities are all ways of increasing value while maintaining social cohesion and without consuming more. That sounds utopian, and it would require revisiting assumptions that have underpinned economic thinking for a century or more. We might all end up the richer for it, though. "It's not a trivial thing to achieve by any means," says Jackson. "But we could have more fun with less stuff."

The End of Science

12. Twenty years ago, I asserted that science at its purest and grandest, the quest to understand the universe and our place in it, is ending. Scientists will produce no revelations as startling as natural selection, the genetic code, quantum mechanics, relativity or the big bang theory. Yes, they will keep extending, refining and applying their knowledge, but they won't discover anything to force radical revisions of our current maps of reality. Nor will they solve the deepest riddles of existence. Why is there something rather than nothing? How did life begin on Earth, and was it a once-in-eternity fluke? How does matter make mind? Since my book *The End of Science* was published in 1996, science has achieved nothing that contradicts my dismal forecast.

13. Take physics. The discovery of the Higgs boson and that of gravitational waves confirm the foundational paradigms of quantum mechanics and general relativity. Brilliant achievements, sure, but they don't fundamentally alter our view of the universe. In their desperation to go beyond what we know, physicists are still pursuing string and multiverse theories. But such ideas are as lacking in empirical evidence as they were 20 years ago; in fact, they are yet to yield any testable

predictions. Stung by this complaint, some physicists have begun to argue that falsifiability—our best criterion for distinguishing science from pseudoscience—is overrated. Not a good sign.

14. Biology has fared better in recent years, spawning countless advances, from cloning and the Human Genome Project to CRISPR, a powerful new gene-editing technique. But all fit neatly within the framework of DNA-based genetics and neo-Darwinism. There's nothing revelatory here.

15. Of all fields, neuroscience has the greatest potential for breakthroughs that could turn our world upside down. Imagine if researchers demonstrated conclusively that bacteria or iPhones are conscious, or have free will. That would shake things up. The U.S. and Europe are pouring money into giant brain-research projects. But the vexed question of how mental and physical states are related, known as the mind-body problem, remains as baffling today as when Descartes pondered it in the 17th century.

16. So are scientists starting to accept my end-of-science thesis? Hardly. Most reject it as vehemently now as they did 20 years ago. But rather than present reasoned arguments, they usually profess their faith in scientific progress and scoff at any mention of limits. That's fine with me, because my views have evolved since I started teaching at an engineering school. When my students resist my argument, as many do, I'm relieved. Get out there and prove me wrong, I say. If one of them cracks the neural code or finds extraterrestrial life, launching a whole new era of science, I would be more than happy to eat my words. I would be ecstatic.

Source: *New Scientist*, 4 June 2016, pages 29-35

Unit 7

TEXT A

The Trees Are Talking

Pioneering research has revealed how social cooperation thrives in the forest.

Rebecca Giggs

1. Above all else in the plant kingdom, trees make good trellises for our self-regarding thoughts. Robert Frost knew this when he wrote “Two roads diverged in a yellow wood.” A woodland is the right spot to yield to reflection. Though the life of a tree has little in common with the life of a person, we are accustomed to approaching trees on personal, even introspective, terms. As *trunk* is a synonym for *torso*, as *branch* can be interchangeable with *limb*, trees of great variety (especially the old ones) give body to human concerns. We look to trees for their symbolism, and to have our own comparatively stunted existence put into perspective. High up in the Sierra Nevada mountains, bristlecone pines preside—seemingly more stone than wood, partly fossilized. Some rise from saplings at a tempo so slow that they endure through generations, even whole civilizations—thousands of years—living off the ephemeral sustenance that all trees rely on: light,

water, a smattering of nutrients drawn from the soil. These ancient pines have been called sages and sentinels, as though it were their edict to stand watch over cycles of human progress and folly.

2. Yet have we ever really understood trees in the plural? Since the turn of the millennium, a remarkable recasting of our attention—away from the gravitas of individual trees and toward the question of what trees do together, as a collective—has been under way. What passes between trees, the nuance of their exchanges, and the seemingly delicate mechanism of their connections—that mystery has inspired a rich new realm of research, and along with it, a subgenre of literature dedicated to spreading a revised conception of the powers and processes that allow arboreal plants to thrive. The title of the German forester Peter Wohlleben’s hugely popular 2015 book, *The Hidden Life of Trees: What They Feel, How They Communicate—Discoveries From a Secret World*, sums up the paradigm shift and captures the tone of awed revelation shared by researchers and readers alike. What a tree *is*—tree botany in its essentials—feels utterly changed. Will our self-centered thoughts, as we stand in the never-silent forest, change too, and how?

3. Though we often talk of trees as though they were nature’s metronomes, observing the steady tick of time in their corrugated rings, research makes clear that a single tree is not all one age. In non-deciduous forests—those that don’t undergo a seasonal fall—the leaves on an individual tree have staggered life spans. The lifetime of a leaf offers clues to its function, and to the tree’s overall strategies for survival. On the coachwood, darker, larger leaves live longer; more nutrients go into their production, so retaining them makes sense. The foliage of other trees turns over quickly—perhaps because the tree has evolved to keep pace with high levels of insect defoliation. Trees possibly gain secondary benefits from herbivory. Leaves may, in effect, be sacrificed so as to bring “frass” (insect excrement) to enrich the ground around a tree’s base. Each leaf has its biography, its society, and an obituary. If a tree was once understood as a mostly static living object, here we see it rippling with change, configured by its surroundings.

4. Fashioned by a host of extrinsic factors, a tree also exerts its influence in previously invisible ways. Leaves collect light, of course, and thereby beget the energy a tree needs for fresh growth, regeneration, and reproduction. But leaves, including their stems and buds, also emit airborne biochemicals. Some plant matter, having caught fire, releases smoke that signals to certain seeds that conditions are conducive to germination. Leaves assailed by grazers might effuse what some scientists call “wound hormones”—in certain trees, this response can convey more than the fact of injury. Studies done on other plants exposed to vapors from damaged leaves have shown that unharmed neighbors begin to ramp up production of defensive toxins, targeted to deter specific herbivores. A canopy is the lively and fluctuating expression of tree interaction and strategy, besides being a habitat for tree-living creatures.

5. Suzanne Simard, a preeminent forest ecologist who teaches at the University of British Columbia, goes underground to uncover camaraderie in tree plantations in *Finding the Mother Tree: Discovering the Wisdom of the Forest*. As Simard frames it, the trees she and her team study are engaged in a kind of mutual aid. Resources are rerouted from trees in the sunlight to those that grow in their shade, from trees that have surplus water to those that are dehydrated. Signals are telegraphed from bug-infested trees to adjacent, healthy trees. Saplings detached from the network fail to thrive. As an aged tree reaches its terminus, it might use mycorrhizal linkages to entrust sizable carbon stores to its young; these, Simard names “Mother Trees” (mothering here being tantamount to self-sacrifice). Rather than being competitive organisms, each tree invests in the well-being of the forest as a whole, via mycorrhizae.

6. Simard's and other ecologists' explorations have ushered in a new kind of tree, or a new vision of tree life, different from the tree life that poets have romanticized: the solitary, singular tree, a heavy anchor flung into the past, emblematic of fortitude or witness. This newfound tree is networked, sensitive, companionate, and communicative; it matters as part of a conjoined whole, the canopy or a mycorrhizal woodlot. It displays caretaking toward offspring and, far from being siloed in its own world, it engages in a dynamic exchange. Such findings make trees seem capable of so much more than we once imagined. The notion that plants "do" anything, outside of surging toward the light and siphoning water, would imply threshold competencies that have long been regarded as mental, or at the very least sensory. Biologists have traditionally held that the faculties required for communication belong to life-forms with brains, eyes, ears, nostrils, and tongues (at a minimum, skin), not to plant life. Can something made mostly of wood demonstrate an awareness of other organisms nearby? Can it be strategically responsive, and exhibit kinship, or a sense of self? Is a tree intelligent? In stories, trees that interact are declared anthropomorphic, because fellow feeling is considered a human trait. To speak of trees as social beings remains, in some quarters, heretical.

7. No wonder, though, that this account of a forest has also struck many as beguiling. The portrayal of resource-sharing in the woods sounds so benevolent, so wise, in a world where inequality continues to increase. While strife and delusion travel with terrifying speed in our networked, online existence, the spectacle of intricate, protective arboreal cooperation beckons as blissful, utopian. The discovery of a covert unity and nurturance among separate trees acquires a special resonance against the backdrop of the coronavirus pandemic. What looks lone and immobile is, in fact, linked and supportive. Squint, and qualities once deemed anthropomorphic begin to seem, well, vegetalmorphic.

8. Yet perhaps we haven't truly let go of trunk bias and the narcissism of seeing ourselves in trees. We are discrete beings and know no other way of life so intimately as we know our own. As social mammals, we make a virtue of parental ministrations where other life-forms appear to have no need for it. By choice, we seek dialogues; we enter into collective arrangements that many hold to be a common good; we tend to our communities. Trees do not make this choice; almost certainly they do not consider themselves *selves*. Indeed, some trees are, biologically speaking, monastic—secluded in small groves, they profit from dispersing their seeds into rivers to be carried far away by ocean currents. Others, such as the strangler fig, are innately parasitic. Tree flourishing doesn't necessarily entail solidarity. Tropical trees in high-diversity rain forests may not benefit from germinating near their "conspecifics" (their parents), because then a population of devouring insects, adapted to feed off one plant species, could more readily hop between adult and sapling. So mycorrhizal fostering of young trees would not be advantageous in a biodiverse environment: It would bond new trees to old in a proximity that increases the chance of defoliation, and also the spread of species-specific pathogens. What looks, to us, like ruthlessness and self-interest might best serve a tree's genetic inheritance in the long run.

9. Returning from a hike recently, I glimpsed red hemorrhaging from the base of a tree set back from the trail, and an instinct released a bleat of adrenaline within me so swiftly—*pain, there's pain*—that I stumbled on the path. I drew the brush aside and saw that the bleeding thing was a bloodwood tree, its vivid "blood" only sap. A tree has no nervous system, no pain receptors, no neurons, and very likely the bloodwood was only extruding a borer insect by inundating it with fluid. What any tree "feels," what it "wills" or "wants," is so far removed from our reality that even to use scare quotes is misleading. Plant intelligence remains staunchly nonhuman. And yet, in that moment,

I could not stop sympathy from welling up, a response that felt more animal than cerebral. For a second, I touched the gleaming sap, glossy but solidifying in the air. It gave off no warmth. I thought then of fungi, a flickering presence in this landscape, appearing spasmodically as puffballs, conks, and earthstars, only to melt away back underground: hidden organisms, dainty, deathly. That a tree's durability might rest on such a fragile life raft seemed the most important message to hear.

TEXT B

The Death of the Trees

Thom Hartmann

12. I was in elementary school, we were taught that the oceans and the forests were the chief sources of oxygen for the planet. It turns out that, at least for those animals that breathe air, this is only partially correct. The oceans account for less than 8 percent of the atmosphere's oxygen, and that is dropping rapidly: there are now millions of acres of ocean that are dying from the dumping of toxic wastes or changes in water temperature, and they therefore have become net *consumers* of oxygen.

13. Trees, it turns out, are *the* major source of recycled oxygen for the atmosphere. They are our planet's lungs. A full-grown pine or hardwood tree has a leaf surface area that can run from 0.25 acre to more than 3 acres, depending on the species. Rain forest trees have leaf surface areas that run as high as 40 acres per tree. Throughout this enormous surface area, sunlight is used as an energy source to drive the conversion of carbon dioxide into oxygen and plant matter (using the C, which is carbon). Trees literally breathe in the CO₂ through that enormous leaf area after we exhale it as biological waste, and they exhale oxygen as their own waste. Without trees our atmosphere would most likely become toxic to us; and because rain forest trees have such a massively larger leaf area than our common trees, the rain forests of the world provide much of the oxygen that you are breathing as you read this page. While this is common knowledge, it's really among the least important functions that trees play: other details about trees' role in our survival are less well known.

The Root System "Water Pump"

14. A rain forest tree will draw 3 million gallons of water up through its roots and release it into the atmosphere as water vapor during its lifetime. While it may seem that this would deplete the soil of water, actually the reverse is true: trees draw water *into* the soil, the first step in a complex cycle that prevents land from becoming desert.

15. Without forestland pumping millions of tons of water into an area's atmosphere, there's little moisture released into the air to condense into clouds and then fall again as rain. The result is that just downwind of the place that was once forest but is now denuded, the rains no longer fall and a process called *desertification* begins. This has happened over much of north and eastern Africa, leading to massive famines as the rains stop, crops fail, the topsoil is blown away, and what is left is desert. Most rainfall on nonforestland is either absorbed and becomes surface ground water or is transported along culverts, ditches, sewers, streams, and rivers, eventually reaching the ocean. On our continental landmasses, only *trees* effectively cycle large quantities of water back into the

atmosphere. For comparison, think about the evaporation from a 40-acre lake. That may seem like a lot of water to be evaporating into the atmosphere, but those 40 acres equal the evaporative leaf surface of a *single* large tree.

16. As of this writing, more than 1,500 acres of land are becoming desert worldwide every hour, largely because of the destruction of upwind forests. The total amount of rain forest left on the planet is about the size of the continental United States, and every year an area the size of Florida is cut down and permanently destroyed.

Reseeded Saplings Can't Pull the Water Down

17. The timber industry's ads that show loggers planting seedlings after stripping trees from a forest are utterly misleading with regard to water. They may well be replacing trees, but they're creating a decades-long gap in the water cycle.

18. Another problem is that they're setting up an ecological disaster by planting the same species throughout a deforested area. When an entire forest is all made of the same species of tree, and they're all the same age, it becomes an irresistible treat for tree-eating caterpillars, beetles, and fungi, as we've seen in numerous forests in North America and Europe.

19. Taking thousands of tons of biomass (fully grown trees and habitat) out of a forest and replacing it with saplings that weigh a few ounces will do little for the downwind areas that need the atmospheric moisture to produce rainfall. Even by the time the trees regenerate, the ecological diversity and the natural fauna and flora of the region have been decimated, as the diversity of numerous plant species are replaced by the single-species seedlings used by the loggers. But it's not just the timber companies who are responsible for the destruction of the planet's forests.

Trees for Beef: Slashing Rain Forests So Americans Can Have a 99-Cent Burger

20. Recently, a friend of my son's complained to me that one of the giant fast-food hamburger chains was responsible for the destruction of many of the rain forests in the Americas. I didn't understand what he meant: the assumption I'd always had was that the rain forests were cut by timber companies eager to sell rare woods to Japan and Scandinavia for manufacture of furniture and specialty items. If the fast-food chains were killing off the rain forests, I thought, it must be because they were buying cheap wood for paper to wrap their burgers in, or that their plastic packaging was somehow damaging to the rain forests. It turns out, however, that I shared a common misconception, one that I'm sure the American fast-food industry is probably quite happy keeping intact.

21. While these rain forests that have taken centuries to grow are often logged and the wood is sold, they're just as often simply burned and not reseeded, particularly if they're in places where it's inconvenient to take the wood to market. The "free" wood is usually only an added bonus, a quick buck for a peasant farmer to use to buy some breeder cattle.

22. The most common reason why people are destroying most of the South and Central American rain forests is corporate greed: the American meat habit has provided an economic boom to multinational corporate ranchers, and it is the primary reason behind the destruction of the tropical rain forests of the Americas. Poor farmers and factory farmers alike engage in slash-and-burn agriculture, cutting ancient forests to plant a single crop: grass for cattle.

23. As John Robbins points out in his book *Diet for a New America*, "The United States imports 200 million pounds of beef every year from El Salvador, Guatemala, Nicaragua, Honduras, Costa Rica, and Panama—while the average citizen in those countries eats less meat each year than the

average American house cat.” This deforestation of Latin America for burgers is particularly distressing when you consider that this very fragile area contains 58 percent of the entire planet’s rain forests (19 percent are in Africa and 23 percent in Oceania and Southeast Asia).

Deforesting Removes Roots, Affecting Groundwater and the Water Cycle

24. Another problem related to deforestation is the loss of drinkable groundwater. Drinkable water falls from the skies as rain and soaks into the ground. At deeper levels, the water has often acquired (from the soil) high concentrations of dissolved minerals, particularly salts. Trees reach deeply down into the earth and draw up moisture from just above this salty water and pump it up into the atmosphere, using the minerals to harden the wood of the tree. This removal of water from the soil creates a downward draw, into the soil, for the fresh water raining down from above. This circulation keeps the soil healthy.

25. When forests are cut, however, the more saline subterranean water begins to creep upward, infiltrating into higher and higher levels of soil. When this salty water hits a level a few yards below the surface, the remaining trees become immune damaged, just like an AIDS patient, vulnerable to parasitic infections. We see the result of this in beetle infestations and fungal infections such as “rust,” which are wiping out trees around the world.

26. People often think that beetle, caterpillar, moth, and fungus infections are external agents that cause forests to die, so they react with mass sprayings of insecticides or fungicides or by shrugging their shoulders and saying that nothing can be done. But in a healthy forest, such infestations are rare, just as in a healthy human opportunistic infections are rare. One reason why even multispecies, varied-aged tracts of forest in Europe and the United States are dying from these conditions is because they’ve already been weakened by humans’ pumping out much of the surface water, pouring down acid rain on them, and destroying surrounding forests. In Europe the percentage of land that is forest has been reduced to 27 percent. In Asia it’s 19 percent. In North America (including the vast forests of Canada), it’s at 25 percent.

27. When the salty water continues higher and reaches a foot or two below the surface, crops begin to die. And when it hits the surface, the soil becomes incapable of sustaining vegetation and desertification sets in. To deal with this growing soil salinity crisis, farmers from California to Europe to Australia have begun installing deep-water pumps to remove the salt-contaminated water that the trees would have once drawn down deep below the surface. While this works as a short-term solution, over the long term it only makes the problem worse because that undesirable water is not being cycled back up into the atmosphere, as it would be by a tree, but instead is dumped into waterways, which it poisons on its way to the sea. The result is further downwind desertification as well as the poisoning of rivers and lakes.

28. The loss of trees means not only the loss of current topsoil because of salination and desertification but also the loss of future soils. The roots of most plants anchor only into the topsoil, using it for mechanical support and as a medium from which to derive nutrients and water. Trees, however, have deep roots that break up lower levels of rock, slowly bringing them to the surface, and shallow roots that break up surface rock. They also draw minerals up into the tree itself to help make the plant matter. When the leaves are shed, they form an essential component of soil.

29. The result of this action by the roots of trees is the formation of new topsoil. It takes, on average, about 400 years for a forest to create a foot of topsoil that is capable of sustaining crops. Without a forest there is almost no topsoil being created at all. (Some sand is formed through air and

water erosion of rock, but that is not soil.) This also shows how slash-and-burn agriculture, where a few feet of topsoil are exposed by burning a forest and then used up by agriculture over just a few years, is so shortsighted.

30. Given that without soil we can have no crops, it would seem that we'd be concerned about both the loss of our soil-creating trees and the loss of our current soil itself. Instead, more than 300 tons of topsoil are lost worldwide *every minute* as governments and the agricultural corporations that produce most of America's crops look the other way.

31. Because of rising average temperatures from global warming, the life cycle of the bark beetle in Alaska has been cut from two years to one for reproduction. This has led to a near doubling of the population of bark beetles, which have devastated several million acres of Alaskan forests.

Forests are imperiled worldwide.

32. Hardly anything illustrates the rich, complex, interdependent nature of our environment as well as trees do, but they continue to be cut and burned. The result aggravates our situation in these last hours of ancient sunlight: we have less oxygen-releasing leaf surface, less circulation in the water cycle, and increased desertification, while at the same time the burning puts more carbon into the atmosphere. These facts make it appear that humans (at least the humans who control such matters) have no concept of their role in the ecosystem.