RULE 1

STAND UP STRAIGHT WITH YOUR SHOULDERS BACK

LOBSTERS—AND TERRITORY

If you are like most people, you don't often think about lobsters[2]—unless you're eating one. However, these interesting and delicious crustaceans are very much worth considering. Their nervous systems are comparatively simple, with large, easily observable neurons, the magic cells of the brain. Because of this, scientists have been able to map the neural circuitry of lobsters very accurately. This has helped us understand the structure and function of the brain and behaviour of more complex animals, including human beings. Lobsters have more in common with you than you might think (particularly when you are feeling crabby—ha ha).

Lobsters live on the ocean floor. They need a home base down there, a range within which they hunt for prey and scavenge around for stray edible bits and pieces of whatever rains down from the continual chaos of carnage and death far above. They want somewhere secure, where the hunting and the gathering is good. They want a home.

This can present a problem, since there are many lobsters. What if two of them occupy the same territory, at the bottom of the ocean, at the same time, and both want to live there? What if there are hundreds of lobsters, all trying to make a living and raise a family, in the same crowded patch of sand and refuse?

Other creatures have this problem, too. When songbirds come north in the spring, for example, they engage in ferocious territorial disputes. The songs they sing, so peaceful and beautiful to human ears, are siren calls and cries of domination. A brilliantly musical bird is a small warrior proclaiming his sovereignty. Take the wren, for example, a small, feisty, insect-eating songbird common in North America. A newly arrived wren wants a sheltered place to build a nest, away from the wind and rain. He wants it close to food, and attractive to potential mates. He also wants to convince competitors for that space to keep their distance.

Birds—and Territory

My dad and I designed a house for a wren family when I was ten years old. It looked like a Conestoga wagon, and had a front entrance about the size of a quarter. This made it a good house for wrens, who are tiny, and not so good for other, larger birds, who couldn't get in. My elderly neighbour had a birdhouse, too, which we built for her at the same time, from an old rubber boot. It had an opening large enough for a bird the size of a robin. She was looking forward to the day it was occupied.

A wren soon discovered our birdhouse, and made himself at home there. We could hear his lengthy, trilling song, repeated over and over, during the early spring. Once he'd built his nest in the covered wagon, however, our new avian tenant started carrying small sticks to our neighbour's nearby boot. He packed it so full that no other bird, large or small, could possibly get in. Our neighbour was not pleased by this pre-emptive strike, but there was nothing to be done about it. "If we take it down," said my dad, "clean it up, and put it back in the tree, the wren will just pack it full of sticks again." Wrens are small, and they're cute, but they're merciless.

I had broken my leg skiing the previous winter—first time down the hill—and had received some money from a school insurance policy designed to reward unfortunate,

clumsy children. I purchased a cassette recorder (a high-tech novelty at the time) with the proceeds. My dad suggested that I sit on the back lawn, record the wren's song, play it back, and watch what happened. So, I went out into the bright spring sunlight and taped a few minutes of the wren laying furious claim to his territory with song. Then I let him hear his own voice. That little bird, one-third the size of a sparrow, began to dive-bomb me and my cassette recorder, swooping back and forth, inches from the speaker. We saw a lot of that sort of behaviour, even in the absence of the tape recorder. If a larger bird ever dared to sit and rest in any of the trees near our birdhouse there was a good chance he would get knocked off his perch by a kamikaze wren.

Now, wrens and lobsters are very different. Lobsters do not fly, sing or perch in trees. Wrens have feathers, not hard shells. Wrens can't breathe underwater, and are seldom served with butter. However, they are also similar in important ways. Both are obsessed with status and position, for example, like a great many creatures. The Norwegian zoologist and comparative psychologist Thorlief Schjelderup-Ebbe observed (back in 1921) that even common barnyard chickens establish a "pecking order."[3]

The determination of Who's Who in the chicken world has important implications for each individual bird's survival, particularly in times of scarcity. The birds that always have priority access to whatever food is sprinkled out in the yard in the morning are the celebrity chickens. After them come the second-stringers, the hangers-on and wannabes. Then the third-rate chickens have their turn, and so on, down to the bedraggled, partially-feathered and badly-pecked wretches who occupy the lowest, untouchable stratum of the chicken hierarchy.

Chickens, like suburbanites, live communally. Songbirds, such as wrens, do not, but they still inhabit a dominance hierarchy. It's just spread out over more territory. The wiliest, strongest, healthiest and most fortunate birds occupy prime territory, and defend it. Because of this, they are more likely to attract high-quality mates, and to hatch chicks who survive and thrive. Protection from wind, rain and predators, as well as easy access to superior food, makes for a much less stressed existence. Territory matters, and there is little difference between territorial rights and social status. It is often a matter of life and death.

If a contagious avian disease sweeps through a neighbourhood of well-stratified songbirds, it is the least dominant and most stressed birds, occupying the lowest rungs of the bird world, who are most likely to sicken and die.[4] This is equally true of human neighbourhoods, when bird flu viruses and other illnesses sweep across the planet. The poor and stressed always die first, and in greater numbers. They are also much more susceptible to non-infectious diseases, such as cancer, diabetes and heart disease. When the aristocracy catches a cold, as it is said, the working class dies of pneumonia.

Because territory matters, and because the best locales are always in short supply, territory-seeking among animals produces conflict. Conflict, in turn, produces another problem: how to win or lose without the disagreeing parties incurring too great a cost. This latter point is particularly important. Imagine that two birds engage in a squabble about a desirable nesting area. The interaction can easily degenerate into outright physical combat. Under such circumstances, one bird, usually the largest, will eventually win—but even the victor may be hurt by the fight. That means a third bird, an undamaged, canny bystander, can move in, opportunistically, and defeat the now-crippled victor. That is not at all a good deal for the first two birds.

Conflict—and Territory

Over the millennia, animals who must co-habit with others in the same territories have in consequence learned many tricks to establish dominance, while risking the least amount

of possible damage. A defeated wolf, for example, will roll over on its back, exposing its throat to the victor, who will not then deign to tear it out. The now-dominant wolf may still require a future hunting partner, after all, even one as pathetic as his now-defeated foe. Bearded dragons, remarkable social lizards, wave their front legs peaceably at one another to indicate their wish for continued social harmony. Dolphins produce specialized sound pulses while hunting and during other times of high excitement to reduce potential conflict among dominant and subordinate group members. Such behavior is endemic in the community of living things.

Lobsters, scuttling around on the ocean floor, are no exception.[5] If you catch a few dozen, and transport them to a new location, you can observe their status-forming rituals and techniques. Each lobster will first begin to explore the new territory, partly to map its details, and partly to find a good place for shelter. Lobsters learn a lot about where they live, and they remember what they learn. If you startle one near its nest, it will quickly zip back and hide there. If you startle it some distance away, however, it will immediately dart towards the nearest suitable shelter, previously identified and now remembered.

A lobster needs a safe hiding place to rest, free from predators and the forces of nature. Furthermore, as lobsters grow, they moult, or shed their shells, which leaves them soft and vulnerable for extended periods of time. A burrow under a rock makes a good lobster home, particularly if it is located where shells and other detritus can be dragged into place to cover the entrance, once the lobster is snugly ensconced inside. However, there may be only a small number of high-quality shelters or hiding places in each new territory. They are scarce and valuable. Other lobsters continually seek them out.

This means that lobsters often encounter one another when out exploring. Researchers have demonstrated that even a lobster raised in isolation knows what to do when such a thing happens.[6] It has complex defensive and aggressive behaviours built right into its nervous system. It begins to dance around, like a boxer, opening and raising its claws, moving backward, forward, and side to side, mirroring its opponent, waving its opened claws back and forth. At the same time, it employs special jets under its eyes to direct streams of liquid at its opponent. The liquid spray contains a mix of chemicals that tell the other lobster about its size, sex, health, and mood.

Sometimes one lobster can tell immediately from the display of claw size that it is much smaller than its opponent, and will back down without a fight. The chemical information exchanged in the spray can have the same effect, convincing a less healthy or less aggressive lobster to retreat. That's dispute resolution Level 1.[7] If the two lobsters are very close in size and apparent ability, however, or if the exchange of liquid has been insufficiently informative, they will proceed to dispute resolution Level 2. With antennae whipping madly and claws folded downward, one will advance, and the other retreat. Then the defender will advance, and the aggressor retreat. After a couple of rounds of this behaviour, the more nervous of the lobsters may feel that continuing is not in his best interest. He will flick his tail reflexively, dart backwards, and vanish, to try his luck elsewhere. If neither blinks, however, the lobsters move to Level 3, which involves genuine combat.

This time, the now enraged lobsters come at each other viciously, with their claws extended, to grapple. Each tries to flip the other on its back. A successfully flipped lobster will conclude that its opponent is capable of inflicting serious damage. It generally gives up and leaves (although it harbours intense resentment and gossips endlessly about the victor behind its back). If neither can overturn the other—or if one will not quit despite being flipped—the lobsters move to Level 4. Doing so involves extreme risk, and is not something to be engaged in without forethought: one or both lobsters will emerge damaged from the ensuing fray, perhaps fatally.

The animals advance on each other, with increasing speed. Their claws are open, so they can grab a leg, or antenna, or an eye-stalk, or anything else exposed and vulnerable. Once a body part has been successfully grabbed, the grabber will tail-flick backwards, sharply, with claw clamped firmly shut, and try to tear it off. Disputes that have escalated to this point typically create a clear winner and loser. The loser is unlikely to survive, particularly if he or she remains in the territory occupied by the winner, now a mortal enemy.

In the aftermath of a losing battle, regardless of how aggressively a lobster has behaved, it becomes unwilling to fight further, even against another, previously defeated opponent. A vanquished competitor loses confidence, sometimes for days. Sometimes the defeat can have even more severe consequences. If a dominant lobster is badly defeated, its brain basically dissolves. Then it grows a new, subordinate's brain—one more appropriate to its new, lowly position.[8] Its original brain just isn't sophisticated to manage the transformation from king to bottom dog without virtually complete dissolution and regrowth. Anyone who has experienced a painful transformation after a serious defeat in romance or career may feel some sense of kinship with the once successful crustacean.

The Neurochemistry of Defeat and Victory

A lobster loser's brain chemistry differs importantly from that of a lobster winner. This is reflected in their relative postures. Whether a lobster is confident or cringing depends on the ratio of two chemicals that modulate communication between lobster neurons: serotonin and octopamine. Winning increases the ratio of the former to the latter.

A lobster with high levels of serotonin and low levels of octopamine is a cocky, strutting sort of shellfish, much less likely to back down when challenged. This is because serotonin helps regulate postural flexion. A flexed lobster extends its appendages so that it can look tall and dangerous, like Clint Eastwood in a spaghetti Western. When a lobster that has just lost a battle is exposed to serotonin, it will stretch itself out, advance even on former victors, and fight longer and harder.[9] The drugs prescribed to depressed human beings, which are selective serotonin reuptake inhibitors, have much the same chemical and behavioural effect. In one of the more staggering demonstrations of the evolutionary continuity of life on Earth, Prozac even cheers up lobsters.[10]

High serotonin/low octopamine characterizes the victor. The opposite neurochemical configuration, a high ratio of octopamine to serotonin, produces a defeated-looking, scrunched-up, inhibited, drooping, skulking sort of lobster, very likely to hang around street corners, and to vanish at the first hint of trouble. Serotonin and octopamine also regulate the tail-flick reflex, which serves to propel a lobster rapidly backwards when it needs to escape. Less provocation is necessary to trigger that reflex in a defeated lobster. You can see an echo of that in the heightened startle reflex characteristic of the soldier or battered child with post-traumatic stress disorder.

The Principle of Unequal Distribution

When a defeated lobster regains its courage and dares to fight again it is more likely to lose again than you would predict, statistically, from a tally of its previous fights. Its victorious opponent, on the other hand, is more likely to win. It's winner-take-all in the lobster world, just as it is in human societies, where the top 1 percent have as much loot as the bottom 50 percent[11]—and where the richest eighty-five people have as much as the bottom three and a half billion.

That same brutal principle of unequal distribution applies outside the financial domain—indeed, anywhere that creative production is required. The majority of scientific papers

are published by a very small group of scientists. A tiny proportion of musicians produces almost all the recorded commercial music. Just a handful of authors sell all the books. A million and a half separately titled books (!) sell each year in the US. However, only five hundred of these sell more than a hundred thousand copies.[12] Similarly, just four classical composers (Bach, Beethoven, Mozart, and Tchaikovsky) wrote almost all the music played by modern orchestras. Bach, for his part, composed so prolifically that it would take decades of work merely to hand-copy his scores, yet only a small fraction of this prodigious output is commonly performed. The same thing applies to the output of the other three members of this group of hyper-dominant composers: only a small fraction of their work is still widely played. Thus, a small fraction of the music composed by a small fraction of all the classical composers who have ever composed makes up almost all the classical music that the world knows and loves.

This principle is sometimes known as Price's law, after Derek J. de Solla Price,[13] the researcher who discovered its application in science in 1963. It can be modelled using an approximately L-shaped graph, with number of people on the vertical axis, and productivity or resources on the horizontal. The basic principle had been discovered much earlier. Vilfredo Pareto (1848–1923), an Italian polymath, noticed its applicability to wealth distribution in the early twentieth century, and it appears true for every society ever studied, regardless of governmental form. It also applies to the population of cities (a very small number have almost all the people), the mass of heavenly bodies (a very small number hoard all the matter), and the frequency of words in a language (90 percent of communication occurs using just 500 words), among many other things. Sometimes it is known as the Matthew Principle (Matthew 25:29), derived from what might be the harshest statement ever attributed to Christ: "to those who have everything, more will be given; from those who have nothing, everything will be taken."

You truly know you are the Son of God when your dicta apply even to crustaceans.

Back to the fractious shellfish: it doesn't take that long before lobsters, testing each other out, learn who can be messed with and who should be given a wide berth—and once they have learned, the resultant hierarchy is exceedingly stable. All a victor needs to do, once he has won, is to wiggle his antennae in a threatening manner, and a previous opponent will vanish in a puff of sand before him. A weaker lobster will quit trying, accept his lowly status, and keep his legs attached to his body. The top lobster, by contrast—occupying the best shelter, getting some good rest, finishing a good meal—parades his dominance around his territory, rousting subordinate lobsters from their shelters at night, just to remind them who's their daddy.

All the Girls

The female lobsters (who also fight hard for territory during the explicitly maternal stages of their existence[14]) identify the top guy quickly, and become irresistibly attracted to him. This is brilliant strategy, in my estimation. It's also one used by females of many different species, including humans. Instead of undertaking the computationally difficult task of identifying the best man, the females outsource the problem to the machine-like calculations of the dominance hierarchy. They let the males fight it out and peel their paramours from the top. This is very much what happens with stock-market pricing, where the value of any particular enterprise is determined through the competition of all.

When the females are ready to shed their shells and soften up a bit, they become interested in mating. They start hanging around the dominant lobster's pad, spraying attractive scents and aphrodisiacs towards him, trying to seduce him. His aggression has made him successful, so he's likely to react in a dominant, irritable manner. Furthermore, he's large, healthy and powerful. It's no easy task to switch his attention from fighting to

mating. (If properly charmed, however, he will change his behaviour towards the female. This is the lobster equivalent of *Fifty Shades of Grey*, the fastest-selling paperback of all time, and the eternal Beauty-and-the-Beast plot of archetypal romance. This is the pattern of behaviour continually represented in the sexually explicit literary fantasies that are as popular among women as provocative images of naked women are among men.)

It should be pointed out, however, that sheer physical power is an unstable basis on which to found lasting dominance, as the Dutch primatologist Frans de Waal[15] has taken pains to demonstrate. Among the chimp troupes he studied, males who were successful in the longer term had to buttress their physical prowess with more sophisticated attributes. Even the most brutal chimp despot can be taken down, after all, by two opponents, each three-quarters as mean. In consequence, males who stay on top longer are those who form reciprocal coalitions with their lower-status compatriots, and who pay careful attention to the troupe's females and their infants. The political ploy of baby-kissing is literally millions of years old. But lobsters are still comparatively primitive, so the bare plot elements of Beast and Beauty suffice for them.

Once the Beast has been successfully charmed, the successful female (lobster) will disrobe, shedding her shell, making herself dangerously soft, vulnerable, and ready to mate. At the right moment, the male, now converted into a careful lover, deposits a packet of sperm into the appropriate receptacle. Afterward, the female hangs around, and hardens up for a couple of weeks (another phenomenon not entirely unknown among human beings). At her leisure, she returns to her own domicile, laden with fertilized eggs. At this point another female will attempt the same thing—and so on. The dominant male, with his upright and confident posture, not only gets the prime real estate and easiest access to the best hunting grounds. He also gets all the girls. It is exponentially more worthwhile to be successful, if you are a lobster, and male.

Why is all this relevant? For an amazing number of reasons, apart from those that are comically obvious. First, we know that lobsters have been around, in one form or another, for more than 350 million years.[16] This is a very long time. Sixty-five million years ago, there were still dinosaurs. That is the unimaginably distant past to us. To the lobsters, however, dinosaurs were the *nouveau riche*, who appeared and disappeared in the flow of near-eternal time. This means that dominance hierarchies have been an essentially permanent feature of the environment to which all complex life has adapted. A third of a billion years ago, brains and nervous systems were comparatively simple. Nonetheless, they already had the structure and neurochemistry necessary to process information about status and society. The importance of this fact can hardly be overstated.

The Nature of Nature

It is a truism of biology that evolution is conservative. When something evolves, it must build upon what nature has already produced. New features may be added, and old features may undergo some alteration, but most things remain the same. It is for this reason that the wings of bats, the hands of human beings, and the fins of whales look astonishingly alike in their skeletal form. They even have the same number of bones. Evolution laid down the cornerstones for basic physiology long ago.

Now evolution works, in large part, through variation and natural selection. Variation exists for many reasons, including gene-shuffling (to put it simply) and random mutation. Individuals vary within a species for such reasons. Nature chooses from among them, across time. That theory, as stated, appears to account for the continual alteration of life-forms over the eons. But there's an additional question lurking under the surface: what exactly is the "nature" in "natural selection"? What exactly is "the environment" to which animals adapt? We make many assumptions about nature—about the environment—and

these have consequences. Mark Twain once said, "It's not what we don't know that gets us in trouble. It's what we know for sure that just ain't so."

First, it is easy to assume that "nature" is something with a nature—something static. But it's not: at least not in any simple sense. It's static and dynamic, at the same time. The environment—the nature that selects—itself transforms. The famous yin and yang symbols of the Taoists capture this beautifully. Being, for the Taoists—reality itself—is composed of two opposing principles, often translated as feminine and masculine, or even more narrowly as female and male. However, yin and yang are more accurately understood as chaos and order. The Taoist symbol is a circle enclosing twin serpents, head to tail. The black serpent, chaos, has a white dot in its head. The white serpent, order, has a black dot in its head. This is because chaos and order are interchangeable, as well as eternally juxtaposed. There is nothing so certain that it cannot vary. Even the sun itself has its cycles of instability. Likewise, there is nothing so mutable that it cannot be fixed. Every revolution produces a new order. Every death is, simultaneously, a metamorphosis.

Considering nature as purely static produces serious errors of apprehension. Nature "selects." The idea of *selects* contains implicitly nested within it the idea of *fitness*. It is "fitness" that is "selected." Fitness, roughly speaking, is the probability that a given organism will leave offspring (will propagate its genes through time). The "fit" in "fitness" is therefore the matching of organismal attribute to environmental demand. If that demand is conceptualized as static—if nature is conceptualized as eternal and unchanging—then evolution is a never-ending series of linear improvements, and fitness is something that can be ever more closely approximated across time. The still-powerful Victorian idea of evolutionary progress, with man at the pinnacle, is a partial consequence of this model of nature. It produces the erroneous notion that there is a destination of natural selection (increasing fitness to the environment), and that it can be conceptualized as a fixed point.

But nature, the selecting agent, is not a static selector—not in any simple sense. Nature dresses differently for each occasion. Nature varies like a musical score—and that, in part, explains why music produces its deep intimations of meaning. As the environment supporting a species transforms and changes, the features that make a given individual successful in surviving and reproducing also transform and change. Thus, the theory of natural selection does not posit creatures matching themselves ever more precisely to a template specified by the world. It is more that creatures are in a dance with nature, albeit one that is deadly. "In my kingdom," as the Red Queen tells Alice in Wonderland, "you have to run as fast as you can just to stay in the same place." No one standing still can triumph, no matter how well constituted.

Nature is not simply dynamic, either. Some things change quickly, but they are nested within other things that change less quickly (music frequently models this, too). Leaves change more quickly than trees, and trees more quickly than forests. Weather changes faster than climate. If it wasn't this way, then the conservatism of evolution would not work, as the basic morphology of arms and hands would have to change as fast as the length of arm bones and the function of fingers. It's chaos, within order, within chaos, within higher order. The order that is most real is the order that is most unchanging—and that is not necessarily the order that is most easily seen. The leaf, when perceived, might blind the observer to the tree. The tree can blind him to the forest. And some things that are most real (such as the ever-present dominance hierarchy) cannot be "seen" at all.

It is also a mistake to conceptualize nature romantically. Rich, modern city-dwellers, surrounded by hot, baking concrete, imagine the environment as something pristine and paradisal, like a French impressionist landscape. Eco-activists, even more idealistic in

their viewpoint, envision nature as harmoniously balanced and perfect, absent the disruptions and depredations of mankind. Unfortunately, "the environment" is also elephantiasis and guinea worms (don't ask), anopheles mosquitoes and malaria, starvation-level droughts, AIDS and the Black Plague. We don't fantasize about the beauty of these aspects of nature, although they are just as real as their Edenic counterparts. It is because of the existence of such things, of course, that we attempt to modify our surroundings, protecting our children, building cities and transportation systems and growing food and generating power. If Mother Nature wasn't so hell-bent on our destruction, it would be easier for us to exist in simple harmony with her dictates.

And this brings us to a third erroneous concept: that nature is something strictly segregated from the cultural constructs that have emerged within it. The order within the chaos and order of Being is all the more "natural" the longer it has lasted. This is because "nature" is "what selects," and the longer a feature has existed the more time it has had to be selected—and to shape life. It does not matter whether that feature is physical and biological, or social and cultural. All that matters, from a Darwinian perspective, is permanence—and the dominance hierarchy, however social or cultural it might appear, has been around for some half a billion years. It's permanent. It's real. The dominance hierarchy is not capitalism. It's not communism, either, for that matter. It's not the military-industrial complex. It's not the patriarchy—that disposable, malleable, arbitrary cultural artefact. It's not even a human creation; not in the most profound sense. It is instead a near-eternal aspect of the environment, and much of what is blamed on these more ephemeral manifestations is a consequence of its unchanging existence. We (the sovereign *we*, the *we* that has been around since the beginning of life) have lived in a dominance hierarchy for a long, long time. We were struggling for position before we had skin, or hands, or lungs, or bones. There is little more natural than culture. Dominance hierarchies are older than trees.

The part of our brain that keeps track of our position in the dominance hierarchy is therefore exceptionally ancient and fundamental.[17] It is a master control system, modulating our perceptions, values, emotions, thoughts and actions. It powerfully affects every aspect of our Being, conscious and unconscious alike. This is why, when we are defeated, we act very much like lobsters who have lost a fight. Our posture droops. We face the ground. We feel threatened, hurt, anxious and weak. If things do not improve, we become chronically depressed. Under such conditions, we can't easily put up the kind of fight that life demands, and we become easy targets for harder-shelled bullies. And it is not only the behavioural and experiential similarities that are striking. Much of the basic neurochemistry is the same.

Consider serotonin, the chemical that governs posture and escape in the lobster. Low-ranking lobsters produce comparatively low levels of serotonin. This is also true of low-ranking human beings (and those low levels decrease more with each defeat). Low serotonin means decreased confidence. Low serotonin means more response to stress and costlier physical preparedness for emergency—as anything whatsoever may happen, at any time, at the bottom of the dominance hierarchy (and rarely something good). Low serotonin means less happiness, more pain and anxiety, more illness, and a shorter lifespan—among humans, just as among crustaceans. Higher spots in the dominance hierarchy, and the higher serotonin levels typical of those who inhabit them, are characterized by less illness, misery and death, even when factors such as absolute income —or number of decaying food scraps—are held constant. The importance of this can hardly be overstated.

Top and Bottom

There is an unspeakably primordial calculator, deep within you, at the very foundation of your brain, far below your thoughts and feelings. It monitors exactly where you are positioned in society—on a scale of one to ten, for the sake of argument. If you're a number one, the highest level of status, you're an overwhelming success. If you're male, you have preferential access to the best places to live and the highest-quality food. People compete to do you favours. You have limitless opportunity for romantic and sexual contact. You are a successful lobster, and the most desirable females line up and vie for your attention.[18]

If you're female, you have access to many high-quality suitors: tall, strong and symmetrical; creative, reliable, honest and generous. And, like your dominant male counterpart, you will compete ferociously, even pitilessly, to maintain or improve your position in the equally competitive female mating hierarchy. Although you are less likely to use physical aggression to do so, there are many effective verbal tricks and strategies at your disposal, including the disparaging of opponents, and you may well be expert at their use.

If you are a low-status ten, by contrast, male or female, you have nowhere to live (or nowhere good). Your food is terrible, when you're not going hungry. You're in poor physical and mental condition. You're of minimal romantic interest to anyone, unless they are as desperate as you. You are more likely to fall ill, age rapidly, and die young, with few, if any, to mourn you.[19] Even money itself may prove of little use. You won't know how to use it, because it is difficult to use money properly, particularly if you are unfamiliar with it. Money will make you liable to the dangerous temptations of drugs and alcohol, which are much more rewarding if you have been deprived of pleasure for a long period. Money will also make you a target for predators and psychopaths, who thrive on exploiting those who exist on the lower rungs of society. The bottom of the dominance hierarchy is a terrible, dangerous place to be.

The ancient part of your brain specialized for assessing dominance watches how you are treated by other people. On that evidence, it renders a determination of your value and assigns you a status. If you are judged by your peers as of little worth, the counter restricts serotonin availability. That makes you much more physically and psychologically reactive to any circumstance or event that might produce emotion, particularly if it is negative. You need that reactivity. Emergencies are common at the bottom, and you must be ready to survive.

Unfortunately, that physical hyper-response, that constant alertness, burns up a lot of precious energy and physical resources. This response is really what everyone calls stress, and it is by no means only or even primarily psychological. It's a reflection of the genuine constraints of unfortunate circumstances. When operating at the bottom, the ancient brain counter assumes that even the smallest unexpected impediment might produce an uncontrollable chain of negative events, which will have to be handled alone, as useful friends are rare indeed, on society's fringes. You will therefore continually sacrifice what you could otherwise physically store for the future, using it up on heightened readiness and the possibility of immediate panicked action in the present. When you don't know what to do, you must be prepared to do anything and everything, in case it becomes necessary. You're sitting in your car with the gas and brake pedals both punched to the mat. Too much of that and everything falls apart. The ancient counter will even shut down your immune system, expending the energy and resources required for future health now, during the crises of the present. It will render you impulsive,[20] so that you will jump, for example, at any short-term mating opportunities, or any possibilities of pleasure, no matter how sub-par, disgraceful or illegal. It will leave you far more likely to live, or die, carelessly, for a rare opportunity at pleasure, when it manifests itself. The physical demands of emergency preparedness will wear you down in every way.[21]

If you have a high status, on the other hand, the counter's cold, pre-reptilian mechanics assume that your niche is secure, productive and safe, and that you are well buttressed with social support. It thinks the chance that something will damage you is low and can be safely discounted. Change might be opportunity, instead of disaster. The serotonin flows plentifully. This renders you confident and calm, standing tall and straight, and much less on constant alert. Because your position is secure, the future is likely to be good for you. It's worthwhile to think in the long term and plan for a better tomorrow. You don't need to grasp impulsively at whatever crumbs come your way, because you can realistically expect good things to remain available. You can delay gratification, without forgoing it forever. You can afford to be a reliable and thoughtful citizen.

Malfunction

Sometimes, however, the counter mechanism can go wrong. Erratic habits of sleeping and eating can interfere with its function. Uncertainty can throw it for a loop. The body, with its various parts, needs to function like a well-rehearsed orchestra. Every system must play its role properly, and at exactly the right time, or noise and chaos ensue. It is for this reason that routine is so necessary. The acts of life we repeat every day need to be automatized. They must be turned into stable and reliable habits, so they lose their complexity and gain predictability and simplicity. This can be perceived most clearly in the case of small children, who are delightful and comical and playful when their sleeping and eating schedules are stable, and horrible and whiny and nasty when they are not.

It is for such reasons that I always ask my clinical clients first about sleep. Do they wake up in the morning at approximately the time the typical person wakes up, and at the same time every day? If the answer is no, fixing that is the first thing I recommend. It doesn't matter so much if they go to bed at the same time each evening, but waking up at a consistent hour is a necessity. Anxiety and depression cannot be easily treated if the sufferer has unpredictable daily routines. The systems that mediate negative emotion are tightly tied to the properly cyclical circadian rhythms.

The next thing I ask about is breakfast. I counsel my clients to eat a fat and protein-heavy breakfast as soon as possible after they awaken (no simple carbohydrates, no sugars, as they are digested too rapidly, and produce a blood-sugar spike and rapid dip). This is because anxious and depressed people are already stressed, particularly if their lives have not been under control for a good while. Their bodies are therefore primed to hypersecrete insulin, if they engage in any complex or demanding activity. If they do so after fasting all night and before eating, the excess insulin in their bloodstream will mop up all their blood sugar. Then they become hypoglycemic and psycho-physiologically unstable.[22] All day. Their systems cannot be reset until after more sleep. I have had many clients whose anxiety was reduced to subclinical levels merely because they started to sleep on a predictable schedule and eat breakfast.

Other bad habits can also interfere with the counter's accuracy. Sometimes this happens directly, for poorly understood biological reasons, and sometimes it happens because those habits initiate a complex positive feedback loop. A positive feedback loop requires an input detector, an amplifier, and some form of output. Imagine a signal picked up by the input detector, amplified, and then emitted, in amplified form. So far, so good. The trouble starts when the input detector detects that output, and runs it through the system again, amplifying and emitting it again. A few rounds of intensification and things get dangerously out of control.

Most people have been subject to the deafening howling of feedback at a concert, when the sound system squeals painfully. The microphone sends a signal to the speakers. The speakers emit the signal. The signal can be picked up by the microphone and sent through

the system again, if it's too loud or too close to the speakers. The sound rapidly amplifies to unbearable levels, sufficient to destroy the speakers, if it continues.

The same destructive loop happens within people's lives. Much of the time, when it happens, we label it mental illness, even though it's not only or even at all occurring inside people's psyches. Addiction to alcohol or another mood-altering drug is a common positive-feedback process. Imagine a person who enjoys alcohol, perhaps a bit too much. He has a quick three or four drinks. His blood alcohol level spikes sharply. This can be extremely exhilarating, particularly for someone who has a genetic predisposition to alcoholism.[23] But it only occurs while blood alcohol levels are actively rising, and that only continues if the drinker keeps drinking. When he stops, not only does his blood alcohol level plateau and then start to sink, but his body begins to produce a variety of toxins, as it metabolizes the ethanol already consumed. He also starts to experience alcohol withdrawal, as the anxiety systems that were suppressed during intoxication start to hyper-respond. A hangover is alcohol withdrawal (which quite frequently kills withdrawing alcoholics), and it starts all too soon after drinking ceases. To continue the warm glow, and stave off the unpleasant aftermath, the drinker may just continue to drink, until all the liquor in his house is consumed, the bars are closed and his money is spent.

The next day, the drinker wakes up, badly hungover. So far, this is just unfortunate. The real trouble starts when he discovers that his hangover can be "cured" with a few more drinks the morning after. Such a cure is, of course, temporary. It merely pushes the withdrawal symptoms a bit further into the future. But that might be what is required, in the short term, if the misery is sufficiently acute. So now he has learned to drink to cure his hangover. When the medication causes the disease, a positive feedback loop has been established. Alcoholism can quickly emerge under such conditions.

Something similar often happens to people who develop an anxiety disorder, such as agoraphobia. People with agoraphobia can become so overwhelmed with fear that they will no longer leave their homes. Agoraphobia is the consequence of a positive feedback loop. The first event that precipitates the disorder is often a panic attack. The sufferer is typically a middle-aged woman who has been too dependent on other people. Perhaps she went immediately from over-reliance on her father to a relationship with an older and comparatively dominant boyfriend or husband, with little or no break for independent existence.

In the weeks leading up to the emergence of her agoraphobia, such a woman typically experiences something unexpected and anomalous. It might be something physiological, such as heart palpitations, which are common in any case, and whose likelihood is increased during menopause, when the hormonal processes regulating a women's psychological experience fluctuate unpredictably. Any perceptible alteration in heart-rate can trigger thoughts both of heart attack and an all-too-public and embarrassing display of post-heart attack distress and suffering (death and social humiliation constituting the two most basic fears). The unexpected occurrence might instead be conflict in the sufferer's marriage, or the illness or death of a spouse. It might be a close friend's divorce or hospitalization. Some real event typically precipitates the initial increase in fear of mortality and social judgment.[24]

After the shock, perhaps, the pre-agoraphobic woman leaves her house, and makes her way to the shopping mall. It's busy and difficult to park. This makes her even more stressed. The thoughts of vulnerability occupying her mind since her recent unpleasant experience rise close to the surface. They trigger anxiety. Her heart rate rises. She begins to breathe shallowly and quickly. She feels her heart racing and begins to wonder if she is suffering a heart attack. This thought triggers more anxiety. She breathes even more

shallowly, increasing the levels of carbon dioxide in her blood. Her heart rate increases again, because of her additional fear. She detects that, and her heart rate rises again.

Poof! Positive feedback loop. Soon the anxiety transforms into panic, regulated by a different brain system, designed for the severest of threats, which can be triggered by too much fear. She is overwhelmed by her symptoms, and heads for the emergency room, where after an anxious wait her heart function is checked. There is nothing wrong. But she is not reassured.

It takes an additional feedback loop to transform even that unpleasant experience into full-blown agoraphobia. The next time she needs to go to the mall, the pre-agoraphobic becomes anxious, remembering what happened last time. But she goes, anyway. On the way, she can feel her heart pounding. That triggers another cycle of anxiety and concern. To forestall panic, she avoids the stress of the mall and returns home. But now the anxiety systems in her brain note that she ran away from the mall, and conclude that the journey there was truly dangerous. Our anxiety systems are very practical. They assume that anything you run away from is dangerous. The proof of that is, of course, the fact you ran away.

So now the mall is tagged "too dangerous to approach" (or the budding agoraphobic has labelled herself, "too fragile to approach the mall"). Perhaps that is not yet taking things far enough to cause her real trouble. There are other places to shop. But maybe the nearby supermarket is mall-like enough to trigger a similar response, when she visits it instead, and then retreats. Now the supermarket occupies the same category. Then it's the corner store. Then it's buses and taxis and subways. Soon it's everywhere. The agoraphobic will even eventually become afraid of her house, and would run away from that if she could. But she can't. Soon she's stuck in her home. Anxiety-induced retreat makes everything retreated from more anxiety-inducing. Anxiety-induced retreat makes the self smaller and the ever-more-dangerous world larger.

There are many systems of interaction between brain, body and social world that can get caught in positive feedback loops. Depressed people, for example, can start feeling useless and burdensome, as well as grief-stricken and pained. This makes them withdraw from contact with friends and family. Then the withdrawal makes them more lonesome and isolated, and more likely to feel useless and burdensome. Then they withdraw more. In this manner, depression spirals and amplifies.

If someone is badly hurt at some point in life—traumatized—the dominance counter can transform in a manner that makes additional hurt more rather than less likely. This often happens in the case of people, now adults, who were viciously bullied during childhood or adolescence. They become anxious and easily upset. They shield themselves with a defensive crouch, and avoid the direct eye contact interpretable as a dominance challenge.

This means that the damage caused by the bullying (the lowering of status and confidence) can continue, even after the bullying has ended.[25] In the simplest of cases, the formerly lowly persons have matured and moved to new and more successful places in their lives. But they don't fully notice. Their now-counterproductive physiological adaptations to earlier reality remain, and they are more stressed and uncertain than is necessary. In more complex cases, a habitual assumption of subordination renders the person more stressed and uncertain than necessary, *and* their habitually submissive posturing continues to attract genuine negative attention from one or more of the fewer and generally less successful bullies still extant in the adult world. In such situations, the psychological consequence of the previous bullying increases the likelihood of continued bullying in the present (even though, strictly speaking, it wouldn't have to, because of maturation, or geographical relocation, or continued education, or improvement in objective status).

Rising Up

Sometimes people are bullied because they *can't* fight back. This can happen to people who are weaker, physically, than their opponents. This is one of the most common reasons for the bullying experienced by children. Even the toughest of six-year-olds is no match for someone who is nine. A lot of that power differential disappears in adulthood, however, with the rough stabilization and matching of physical size (with the exception of that pertaining to men and women, with the former typically larger and stronger, particularly in the upper body) as well as the increased penalties generally applied in adulthood to those who insist upon continuing with physical intimidation.

But just as often, people are bullied because they *won't* fight back. This happens not infrequently to people who are by temperament compassionate and self-sacrificing—particularly if they are also high in negative emotion, and make a lot of gratifying noises of suffering when someone sadistic confronts them (children who cry more easily, for example, are more frequently bullied).[26] It also happens to people who have decided, for one reason or another, that all forms of aggression, including even feelings of anger, are morally wrong. I have seen people with a particularly acute sensitivity to petty tyranny and over-aggressive competitiveness restrict within themselves all the emotions that might give rise to such things. Often they are people whose fathers who were excessively angry and controlling. Psychological forces are never unidimensional in their value, however, and the truly appalling potential of anger and aggression to produce cruelty and mayhem are balanced by the ability of those primordial forces to push back against oppression, speak truth, and motivate resolute movement forward in times of strife, uncertainty and danger.

With their capacity for aggression strait-jacketed within a too-narrow morality, those who are only or merely compassionate and self-sacrificing (and naïve and exploitable) cannot call forth the genuinely righteous and appropriately self-protective anger necessary to defend themselves. If you *can* bite, you generally don't *have to*. When skillfully integrated, the ability to respond with aggression and violence decreases rather than increases the probability that actual aggression will become necessary. If you say no, early in the cycle of oppression, and you mean what you say (which means you state your refusal in no uncertain terms and stand behind it) then the scope for oppression on the part of oppressor will remain properly bounded and limited. The forces of tyranny expand inexorably to fill the space made available for their existence. People who refuse to muster appropriately self-protective territorial responses are laid open to exploitation as much as those who genuinely can't stand up for their own rights because of a more essential inability or a true imbalance in power.

Naive, harmless people usually guide their perceptions and actions with a few simple axioms: people are basically good; no one really wants to hurt anyone else; the threat (and, certainly, the use) of force, physical or otherwise, is wrong. These axioms collapse, or worse, in the presence of individuals who are genuinely malevolent.[27] *Worse* means that naive beliefs can become a positive invitation to abuse, because those who aim to harm have become specialized to prey on people who think precisely such things. Under such conditions, the axioms of harmlessness must be retooled. In my clinical practice I often draw the attention of my clients who think that good people never become angry to the stark realities of their own resentments.

No one likes to be pushed around, but people often put up with it for too long. So, I get them to see their resentment, first, as anger, and then as an indication that something needs to be said, if not done (not least because honesty demands it). Then I get them to see such action as part of the force that holds tyranny at bay—at the social level, as much as the individual. Many bureaucracies have petty authoritarians within them, generating unnecessary rules and procedures simply to express and cement power. Such people

produce powerful undercurrents of resentment around them which, if expressed, would limit their expression of pathological power. It is in this manner that the willingness of the individual to stand up for him or herself protects everyone from the corruption of society.

When naive people discover the capacity for anger within themselves, they are shocked, sometimes severely. A profound example of that can be found in the susceptibility of new soldiers to post-traumatic stress disorder, which often occurs because of something they watch themselves doing, rather than because of something that has happened to them. They react like the monsters they can truly be in extreme battlefield conditions, and the revelation of that capacity undoes their world. And no wonder. Perhaps they assumed that all of history's terrible perpetrators were people totally unlike themselves. Perhaps they were never able to see within themselves the capacity for oppression and bullying (and perhaps not their capacity for assertion and success, as well). I have had clients who were terrified into literally years of daily hysterical convulsions by the sheer look of malevolence on their attackers' faces. Such individuals typically come from hyper-sheltered families, where nothing terrible is allowed to exist, and everything is fairyland wonderful (or else).

When the wakening occurs—when once-naïve people recognize in themselves the seeds of evil and monstrosity, and see themselves as dangerous (at least potentially) their fear decreases. They develop more self-respect. Then, perhaps, they begin to resist oppression. They see that they have the ability to withstand, because they are terrible too. They see they can and must stand up, because they begin to understand how genuinely monstrous they will become, otherwise, feeding on their resentment, transforming it into the most destructive of wishes. To say it again: There is very little difference between the capacity for mayhem and destruction, integrated, and strength of character. This is one of the most difficult lessons of life.

Maybe you are a loser. And maybe you're not—but if you are, you don't have to continue in that mode. Maybe you just have a bad habit. Maybe you're even just a collection of bad habits. Nonetheless, even if you came by your poor posture honestly—even if you were unpopular or bullied at home or in grade school[28]—it's not necessarily appropriate now. Circumstances change. If you slump around, with the same bearing that characterizes a defeated lobster, people will assign you a lower status, and the old counter that you share with crustaceans, sitting at the very base of your brain, will assign you a low dominance number. Then your brain will not produce as much serotonin. This will make you less happy, and more anxious and sad, and more likely to back down when you should stand up for yourself. It will also decrease the probability that you will get to live in a good neighbourhood, have access to the highest quality resources, and obtain a healthy, desirable mate. It will render you more likely to abuse cocaine and alcohol, as you live for the present in a world full of uncertain futures. It will increase your susceptibility to heart disease, cancer and dementia. All in all, it's just not good.

Circumstances change, and so can you. Positive feedback loops, adding effect to effect, can spiral counterproductively in a negative direction, but can also work to get you ahead. That's the other, far more optimistic lesson of Price's law and the Pareto distribution: those who start to have will probably get more. Some of these upwardly moving loops can occur in your own private, subjective space. Alterations in body language offer an important example. If you are asked by a researcher to move your facial muscles, one at a time, into a position that would look sad to an observer, you will report feeling sadder. If you are asked to move the muscles one by one into a position that looks happy, you will report feeling happier. Emotion is partly bodily expression, and can be amplified (or dampened) by that expression.[29]

Some of the positive feedback loops instantiated by body language can occur beyond the private confines of subjective experience, in the social space you share with other people. If your posture is poor, for example—if you slump, shoulders forward and rounded, chest tucked in, head down, looking small, defeated and ineffectual (protected, in theory, against attack from behind)—then you will feel small, defeated and ineffectual. The reactions of others will amplify that. People, like lobsters, size each other up, partly in consequence of stance. If you present yourself as defeated, then people will react to you as if you are losing. If you start to straighten up, then people will look at and treat you differently.

You might object: the bottom is real. Being at the bottom is equally real. A mere transformation of posture is insufficient to change anything that fixed. If you're in number ten position, then standing up straight and appearing dominant might only attract the attention of those who want, once again, to put you down. And fair enough. But standing up straight with your shoulders back is not something that is only physical, because you're not only a body. You're a spirit, so to speak—a psyche—as well. Standing up physically also implies and invokes and demands standing up metaphysically. Standing up means voluntarily accepting the burden of Being. Your nervous system responds in an entirely different manner when you face the demands of life voluntarily. You respond to a challenge, instead of bracing for a catastrophe. You see the gold the dragon hoards, instead of shrinking in terror from the all-too-real fact of the dragon. You step forward to take your place in the dominance hierarchy, and occupy your territory, manifesting your willingness to defend, expand and transform it. That can all occur practically or symbolically, as a physical or as a conceptual restructuring.

To stand up straight with your shoulders back is to accept the terrible responsibility of life, with eyes wide open. It means deciding to voluntarily transform the chaos of potential into the realities of habitable order. It means adopting the burden of self-conscious vulnerability, and accepting the end of the unconscious paradise of childhood, where finitude and mortality are only dimly comprehended. It means willingly undertaking the sacrifices necessary to generate a productive and meaningful reality (it means acting to please God, in the ancient language).

To stand up straight with your shoulders back means building the ark that protects the world from the flood, guiding your people through the desert after they have escaped tyranny, making your way away from comfortable home and country, and speaking the prophetic word to those who ignore the widows and children. It means shouldering the cross that marks the X, the place where you and Being intersect so terribly. It means casting dead, rigid and too tyrannical order back into the chaos in which it was generated; it means withstanding the ensuing uncertainty, and establishing, in consequence, a better, more meaningful and more productive order.

So, attend carefully to your posture. Quit drooping and hunching around. Speak your mind. Put your desires forward, as if you had a right to them—at least the same right as others. Walk tall and gaze forthrightly ahead. Dare to be dangerous. Encourage the serotonin to flow plentifully through the neural pathways desperate for its calming influence.

People, including yourself, will start to assume that you are competent and able (or at least they will not immediately conclude the reverse). Emboldened by the positive responses you are now receiving, you will begin to be less anxious. You will then find it easier to pay attention to the subtle social clues that people exchange when they are communicating. Your conversations will flow better, with fewer awkward pauses. This will make you more likely to meet people, interact with them, and impress them. Doing so will not only genuinely increase the probability that good things will happen to you—it will also make those good things feel better when they do happen.

Thus strengthened and emboldened, you may choose to embrace Being, and work for its furtherance and improvement. Thus strengthened, you may be able to stand, even during the illness of a loved one, even during the death of a parent, and allow others to find strength alongside you when they would otherwise be overwhelmed with despair. Thus emboldened, you will embark on the voyage of your life, let your light shine, so to speak, on the heavenly hill, and pursue your rightful destiny. Then the meaning of your life may be sufficient to keep the corrupting influence of mortal despair at bay.

Then you may be able to accept the terrible burden of the World, and find joy.

Look for your inspiration to the victorious lobster, with its 350 million years of practical wisdom. Stand up straight, with your shoulders back.