

Perhaps the most disturbing single piece of data in this book comes from a massive survey of parents and teachers and shows a worldwide trend for the present generation of children to be more troubled emotionally than the last: more lonely and depressed, more angry and unruly, more nervous and prone to worry, more impulsive and aggressive.

If there is a remedy, I feel it must lie in how we prepare our young for life. At present we leave the emotional education of our children to chance, with ever more disastrous results. One solution is a new vision of what schools can do to educate the whole student, bringing together mind and heart in the classroom. Our journey ends with visits to innovative classes that aim to give children a grounding in the basics of emotional intelligence. I can foresee a day when education will routinely include inculcating essential human competencies such as self-awareness, self-control, and empathy, and the arts of listening, resolving conflicts, and cooperation.

In *The Nichomachean Ethics*, Aristotle's philosophical enquiry into virtue, character, and the good life, his challenge is to manage our emotional life with intelligence. Our passions, when well exercised, have wisdom; they guide our thinking, our values, our survival. But they can easily go awry, and do so all too often. As Aristotle saw, the problem is not with emotionality, but with the *appropriateness* of emotion and its expression. The question is, how can we bring intelligence to our emotions—and civility to our streets and caring to our communal life?

PART ONE

**THE
EMOTIONAL
BRAIN**

What Are Emotions For?

It is with the heart that one sees rightly; what is essential is invisible to the eye.

ANTOINE DE SAINT-EXUPÉRY,
The Little Prince

Ponder the last moments of Gary and Mary Jane Chauncey, a couple completely devoted to their eleven-year-old daughter Andrea, who was confined to a wheelchair by cerebral palsy. The Chauncey family were passengers on an Amtrak train that crashed into a river after a barge hit and weakened a railroad bridge in Louisiana's bayou country. Thinking first of their daughter, the couple tried their best to save Andrea as water rushed into the sinking train; somehow they managed to push Andrea through a window to rescuers. Then, as the car sank beneath the water, they perished.¹

Andrea's story, of parents whose last heroic act is to ensure their child's survival, captures a moment of almost mythic courage. Without doubt such incidents of parental sacrifice for their progeny have been repeated countless times in human history and prehistory, and countless more in the larger course of evolution of our species.² Seen from the perspective of evolutionary biologists, such parental self-sacrifice is in the service of "reproductive success" in passing on one's genes to future generations. But from the perspective of a parent making a desperate decision in a moment of crisis, it is about nothing other than love.

As an insight into the purpose and potency of emotions, this exemplary act of parental heroism testifies to the role of altruistic love—and every other emotion we feel—in human life.³ It suggests that our deepest feelings, our passions and longings, are essential guides, and that our species owes much of its existence to their power in human affairs. That power is extraordinary: Only a potent love—the urgency of saving a cherished child—could lead a parent to override the impulse for personal survival. Seen from the intellect, their self-sacrifice was arguably irrational; seen from the heart, it was the only

choice to make.

Sociobiologists point to the preeminence of heart over head at such crucial moments when they conjecture about why evolution has given emotion such a central role in the human psyche. Our emotions, they say, guide us in facing predicaments and tasks too important to leave to intellect alone—danger, painful loss, persisting toward a goal despite frustrations, bonding with a mate, building a family. Each emotion offers a distinctive readiness to act; each points us in a direction that has worked well to handle the recurring challenges of human life.⁴ As these eternal situations were repeated and repeated over our evolutionary history, the survival value of our emotional repertoire was attested to by its becoming imprinted in our nerves as innate, automatic tendencies of the human heart.

A view of human nature that ignores the power of emotions is sadly shortsighted. The very name *Homo sapiens*, the thinking species, is misleading in light of the new appreciation and vision of the place of emotions in our lives that science now offers. As we all know from experience, when it comes to shaping our decisions and our actions, feeling counts every bit as much—and often more—than thought. We have gone too far in emphasizing the value and import of the purely rational—of what IQ measures—in human life. For better or worse, intelligence can come to nothing when the emotions hold sway.

WHEN PASSIONS OVERWHELM REASON

It was a tragedy of errors. Fourteen-year-old Matilda Crabtree was just playing a practical joke on her father: she jumped out of a closet and yelled “Boo!” as her parents came home at one in the morning from visiting friends.

But Bobby Crabtree and his wife thought Matilda was staying with friends that night. Hearing noises as he entered the house, Crabtree reached for his .357 caliber pistol and went into Matilda’s bedroom to investigate. When his daughter jumped from the closet, Crabtree shot her in the neck. Matilda Crabtree died twelve hours later.⁵

One emotional legacy of evolution is the fear that mobilizes us to protect our family from danger; that impulse impelled Bobby Crabtree to get his gun and search his house for the intruder he thought was prowling there. Fear primed Crabtree to shoot before he could fully register what he was shooting at, even before he could recognize his

daughter's voice. Automatic reactions of this sort have become etched in our nervous system, evolutionary biologists presume, because for a long and crucial period in human prehistory they made the difference between survival and death. Even more important, they mattered for the main task of evolution: being able to bear progeny who would carry on these very genetic predispositions—a sad irony, given the tragedy at the Crabtree household.

But while our emotions have been wise guides in the evolutionary long run, the new realities civilization presents have arisen with such rapidity that the slow march of evolution cannot keep up. Indeed, the first laws and proclamations of ethics—the Code of Hammurabi, the Ten Commandments of the Hebrews, the Edicts of Emperor Ashoka—can be read as attempts to harness, subdue, and domesticate emotional life. As Freud described in *Civilization and Its Discontents*, society has had to enforce from without rules meant to subdue tides of emotional excess that surge too freely within.

Despite these social constraints, passions overwhelm reason time and again. This given of human nature arises from the basic architecture of mental life. In terms of biological design for the basic neural circuitry of emotion, what we are born with is what worked best for the last 50,000 human generations, not the last 500 generations—and certainly not the last five. The slow, deliberate forces of evolution that have shaped our emotions have done their work over the course of a million years; the last 10,000 years—despite having witnessed the rapid rise of human civilization and the explosion of the human population from five million to five billion—have left little imprint on our biological templates for emotional life.

For better or for worse, our appraisal of every personal encounter and our responses to it are shaped not just by our rational judgments or our personal history, but also by our distant ancestral past. This leaves us with sometimes tragic propensities, as witness the sad events at the Crabtree household. In short, we too often confront postmodern dilemmas with an emotional repertoire tailored to the urgencies of the Pleistocene. That predicament is at the heart of my subject.

Impulses to Action

One early spring day I was driving along a highway over a mountain pass in Colorado, when a snow flurry suddenly blotted out the car a few lengths ahead of me. As I peered ahead I couldn't make out

anything; the swirling snow was now a blinding whiteness. Pressing my foot on the brake, I could feel anxiety flood my body and hear the thumping of my heart.

The anxiety built to full fear: I pulled over to the side of the road, waiting for the flurry to pass. A half hour later the snow stopped, visibility returned, and I continued on my way—only to be stopped a few hundred yards down the road, where an ambulance crew was helping a passenger in a car that had rear-ended a slower car in front; the collision blocked the highway. If I had continued driving in the blinding snow, I probably would have hit them.

The caution fear forced on me that day may have saved my life. Like a rabbit frozen in terror at the hint of a passing fox—or a protomammal hiding from a marauding dinosaur—I was overtaken by an internal state that compelled me to stop, pay attention, and take heed of a coming danger.

All emotions are, in essence, impulses to act, the instant plans for handling life that evolution has instilled in us. The very root of the word *emotion* is *motere*, the Latin verb “to move,” plus the prefix “e-” to connote “move away,” suggesting that a tendency to act is implicit in every emotion. That emotions lead to actions is most obvious in watching animals or children; it is only in “civilized” adults we so often find the great anomaly in the animal kingdom, emotions—root impulses to act—divorced from obvious reaction.⁶

In our emotional repertoire each emotion plays a unique role, as revealed by their distinctive biological signatures (see [Appendix A](#) for details on “basic” emotions). With new methods to peer into the body and brain, researchers are discovering more physiological details of how each emotion prepares the body for a very different kind of response:⁷

- With *anger* blood flows to the hands, making it easier to grasp a weapon or strike at a foe; heart rate increases, and a rush of hormones such as adrenaline generates a pulse of energy strong enough for vigorous action.

- With *fear* blood goes to the large skeletal muscles, such as in the legs, making it easier to flee—and making the face blanch as blood is shunted away from it (creating the feeling that the blood “runs cold”). At the same time, the body freezes, if only for a moment, perhaps allowing time to gauge whether hiding might be a better reaction. Circuits in the brain’s emotional centers trigger a flood of hormones

that put the body on general alert, making it edgy and ready for action, and attention fixates on the threat at hand, the better to evaluate what response to make.

- Among the main biological changes in *happiness* is an increased activity in a brain center that inhibits negative feelings and fosters an increase in available energy, and a quieting of those that generate worrisome thought. But there is no particular shift in physiology save a quiescence, which makes the body recover more quickly from the biological arousal of upsetting emotions. This configuration offers the body a general rest, as well as readiness and enthusiasm for whatever task is at hand and for striving toward a great variety of goals.

- *Love*, tender feelings, and sexual satisfaction entail parasympathetic arousal—the physiological opposite of the “fight-or-flight” mobilization shared by fear and anger. The parasympathetic pattern, dubbed the “relaxation response,” is a bodywide set of reactions that generates a general state of calm and contentment, facilitating cooperation.

- The lifting of the eyebrows in *surprise* allows the taking in of a larger visual sweep and also permits more light to strike the retina. This offers more information about the unexpected event, making it easier to figure out exactly what is going on and concoct the best plan for action.

- Around the world an expression of *disgust* looks the same, and sends the identical message: something is offensive in taste or smell, or metaphorically so. The facial expression of disgust—the upper lip curled to the side as the nose wrinkles slightly—suggests a primordial attempt, as Darwin observed, to close the nostrils against a noxious odor or to spit out a poisonous food.

- A main function for *sadness* is to help adjust to a significant loss, such as the death of someone close or a major disappointment. Sadness brings a drop in energy and enthusiasm for life’s activities, particularly diversions and pleasures, and, as it deepens and approaches depression, slows the body’s metabolism. This introspective withdrawal creates the opportunity to mourn a loss or frustrated hope, grasp its consequences for one’s life, and, as energy returns, plan new beginnings. This loss of energy may well have kept saddened—and vulnerable—early humans close to home, where they were safer.

These biological propensities to act are shaped further by our life

experience and our culture. For instance, universally the loss of a loved one elicits sadness and grief. But how we show our grieving—how emotions are displayed or held back for private moments—is molded by culture, as are which particular people in our lives fall into the category of “loved ones” to be mourned.

The protracted period of evolution when these emotional responses were hammered into shape was certainly a harsher reality than most humans endured as a species after the dawn of recorded history. It was a time when few infants survived to childhood and few adults to thirty years, when predators could strike at any moment, when the vagaries of droughts and floods meant the difference between starvation and survival. But with the coming of agriculture and even the most rudimentary human societies, the odds for survival began to change dramatically. In the last ten thousand years, when these advances took hold throughout the world, the ferocious pressures that had held the human population in check eased steadily.

Those same pressures had made our emotional responses so valuable for survival; as they waned, so did the goodness of fit of parts of our emotional repertoire. While in the ancient past a hair-trigger anger may have offered a crucial edge for survival, the availability of automatic weaponry to thirteen-year-olds has made it too often a disastrous reaction.⁸

Our Two Minds

A friend was telling me about her divorce, a painful separation. Her husband had fallen in love with a younger woman at work, and suddenly announced he was leaving to live with the other woman. Months of bitter wrangling over house, money, and custody of the children followed. Now, some months later, she was saying that her independence was appealing to her, that she was happy to be on her own. “I just don’t think about him anymore—I really don’t care,” she said. But as she said it, her eyes momentarily welled up with tears.

That moment of teary eyes could easily pass unnoted. But the empathic understanding that someone’s watering eyes means she is sad despite her words to the contrary is an act of comprehending just as surely as is distilling meaning from words on a printed page. One is an act of the emotional mind, the other of the rational mind. In a very real sense we have two minds, one that thinks and one that feels.

These two fundamentally different ways of knowing interact to

construct our mental life. One, the rational mind, is the mode of comprehension we are typically conscious of: more prominent in awareness, thoughtful, able to ponder and reflect. But alongside that there is another system of knowing: impulsive and powerful, if sometimes illogical—the emotional mind. (For a more detailed description of the characteristics of the emotional mind, see [Appendix B](#).)

The emotional/rational dichotomy approximates the folk distinction between “heart” and “head”; knowing something is right “in your heart” is a different order of conviction—somehow a deeper kind of certainty—than thinking so with your rational mind. There is a steady gradient in the ratio of rational-to-emotional control over the mind; the more intense the feeling, the more dominant the emotional mind becomes—and the more ineffectual the rational. This is an arrangement that seems to stem from eons of evolutionary advantage to having emotions and intuitions guide our instantaneous response in situations where our lives are in peril—and where pausing to think over what to do could cost us our lives.

These two minds, the emotional and the rational, operate in tight harmony for the most part, intertwining their very different ways of knowing to guide us through the world. Ordinarily there is a balance between emotional and rational minds, with emotion feeding into and informing the operations of the rational mind, and the rational mind refining and sometimes vetoing the inputs of the emotions. Still, the emotional and rational minds are semi-independent faculties, each, as we shall see, reflecting the operation of distinct, but interconnected, circuitry in the brain.

In many or most moments these minds are exquisitely coordinated; feelings are essential to thought, thought to feeling. But when passions surge the balance tips: it is the emotional mind that captures the upper hand, swamping the rational mind. The sixteenth-century humanist Erasmus of Rotterdam wrote in a satirical vein of this perennial tension between reason and emotion:⁹

Jupiter has bestowed far more passion than reason—you could calculate the ratio as 24 to one. He set up two raging tyrants in opposition to Reason’s solitary power: anger and lust. How far Reason can prevail against the combined forces of these two the common life of man makes quite clear. Reason does the only thing she can and shouts herself hoarse, repeating formulas of virtue, while the other two bid her go hang herself, and are increasingly noisy and offensive, until at last their Ruler is exhausted,

gives up, and surrenders.

HOW THE BRAIN GREW

To better grasp the potent hold of the emotions on the thinking mind—and why feeling and reason are so readily at war—consider how the brain evolved. Human brains, with their three pounds or so of cells and neural juices, are about triple the size of those in our nearest cousins in evolution, the nonhuman primates. Over millions of years of evolution, the brain has grown from the bottom up, with its higher centers developing as elaborations of lower, more ancient parts. (The growth of the brain in the human embryo roughly retraces this evolutionary course.)

The most primitive part of the brain, shared with all species that have more than a minimal nervous system, is the brainstem surrounding the top of the spinal cord. This root brain regulates basic life functions like breathing and the metabolism of the body's other organs, as well as controlling stereotyped reactions and movements. This primitive brain cannot be said to think or learn; rather it is a set of preprogrammed regulators that keep the body running as it should and reacting in a way that ensures survival. This brain reigned supreme in the Age of the Reptiles: Picture a snake hissing to signal the threat of an attack.

From the most primitive root, the brainstem, emerged the emotional centers. Millions of years later in evolution, from these emotional areas evolved the thinking brain or "neocortex," the great bulb of convoluted tissues that make up the top layers. The fact that the thinking brain grew from the emotional reveals much about the relationship of thought to feeling; there was an emotional brain long before there was a rational one.

The most ancient root of our emotional life is in the sense of smell, or, more precisely, in the olfactory lobe, the cells that take in and analyze smell. Every living entity, be it nutritious, poisonous, sexual partner, predator or prey, has a distinctive molecular signature that can be carried in the wind. In those primitive times smell commended itself as a paramount sense for survival.

From the olfactory lobe the ancient centers for emotion began to evolve, eventually growing large enough to encircle the top of the brainstem. In its rudimentary stages, the olfactory center was