1 THE MOST ORIGINAL OF ORIGINAL SINS

Now the serpent was more subtle than any beast of the field which the Lord God hath made. . . .

Genesis 3:1

THE SOCIAL PROBLEM: CHEAT OR COOPERATE?

If only Adam and Eve had not eaten that tempting fruit, then God would have let them live in the Garden of Eden in eternal peace and happiness. Whether the fruit was knowledge, sexual desire, consciousness or, in one even more basic account, our need to steal protein from other living things, it was irresistible.[1] Eve, and then Adam, ate it, God evicted the pair from paradise, and the rest was sin-laden history.

The choice that Adam and Eve faced – whether to cooperate with God or cheat – is a choice humans have faced since our emergence, not as a choice between cheating and cooperating with God but as a choice between cheating and cooperating with each other. We evolved in small groups of mostly related individuals, which gave us enormous survival advantages, and therefore enormous incentives to cooperate with one another. As a result, we have deep emotional ties to our groups, and a powerful hunger for social belonging. But because natural selection was operating at the individual level, it also gave us a paradoxical incentive to cheat. After all, if we could cheat and not get caught, we could still enjoy all the advantages of social living and yet get a leg up on everyone else. This deeply embedded tension between cooperation and cheating, between community and individuality, between selflessness

and selfishness, is what I will call The Social Problem.[2] It has been the central challenge of our species since our emergence.

The Social Problem leads to another problem – what to do with the cheaters we catch. God banished Adam and Eve, and banishment from the group is in many ways the most serious punishment any group can impose on a cheater. Banishment wrenches the wrongdoer from all his physical and emotional ties to his community, in a way that no other punishment does, perhaps even execution. But of course not every cheater deserves the ultimate or even penultimate punishment. Just as we have been struggling forever with the individual problem of whether to cooperate or cheat, so too have our groups and societies been struggling forever with the institutional problem of whether, and how, to punish cheaters.

The Social Problem is hardly unique to the human species. Every social animal faces it, since by definition living in social groups means giving up some measure of selfishness in exchange for some measure of cooperation. The lines that nature has drawn between individuality and community are dizzying in their variety.

At one end of the spectrum are the social insects, which mindlessly cooperate for the common good with virtually no cheating, because they are all genetic twins. What is good for all is good for each. Or, to put it in more proper evolutionary and entomological terms, the only way an individual sterile worker bee's genes get passed down to future generations is through the queen, so doing everything possible to protect the queen *is* the way worker bees are "selfish." This kind of extreme socialization, called "eusociality" by biologists, is most common in insect species, but it is not unique to them. There are even some mammals – two species of mole rat, to be precise – that are eusocial. The females are all sterile, except for the queen, and the queen rat alone produces the next generation.[3]

At the other end of the spectrum are the solitary animals – such as some species of sharks – who have little or no social connections at all and who, but for mating and in some cases spending a short time with their mothers after birth, treat other members of their species pretty much like any other source of food or danger.[4] The list of solitary animals is quite long, and includes many mammals as diverse as cougars, giant anteaters, grizzly bears, and even a few primates.

But most primates are social to varying degrees, and their sociality is complicated and sometimes magnified by complex brains that can change their cheat/cooperate decisions as changing circumstances might warrant. And there's the rub for humans. Not only are our brains the most complex in the animal kingdom, powerful enough even to turn an eye inward to contemplate things such as free will, but we are also more intensely social than any genetically heterogeneous (that is, non-eusocial) species. These two facts are not unrelated. We needed massively networked brains just to be able to keep track of each other. And we needed to keep track of each other in order to survive the drastic environmental changes that were happening all around us.

The warm, wet, and rich Southern African jungles in which our predecessor primates lived were giving way to colder, drier, open savannahs. This not only drove us upright, so we could survey long distance threats and opportunities, it also put a premium on guile and cooperation. We are intensely social because being intensely social gave us significant survival advantages in areas such as mutual defense and hunting. None of this would have been possible if we had the selfish brains of sharks.

But our powerful social brains, built for cooperation, were also that much better at cheating. We could imagine being punished for cheating, but we could also imagine a thousand ways to get away with cheating. All of this has left us with a terrible, and terribly significant, neural paradox. Our cooperation is of a limited, grudging sort. We are constantly probing for chances to cheat, and just as constantly on the lookout for cheaters. Our brains have sophisticated and sensitive systems for detecting opportunities to cheat – so that we can decide whether other members will catch us if we steal that food the group worked so hard to gather, and, if so, whether and how they will punish us. We have equally sophisticated and sensitive systems to detect signals of cooperation and cheating in others, so that we can decide whether to trust or be wary of that other fellow. We are born cooperators and born cheaters, both versions living simultaneously inside our brains. We are born punishers and born forgivers, again torn between conflicting instincts.

We also evolved language, which was an important glue of our intense sociality. The gift of gab bound us together in a way analogous

to how identical genes bind social insects. Our brains could not only imagine the future, we could convey that imagination to each other through language. We could talk to each other about cheating and about punishing cheating. We could standardize all this talk into rules. Suddenly, social cooperation was not just a matter of trial and error – seeing what you could and could not get away with, as a young preverbal child does with a parent. Rules could now be conveyed *ex ante*, as the legal philosophers put it, meaning everyone in a group could know ahead of time exactly where the group drew the line between acceptable and unacceptable behavior.

The rules not only memorialized a compact for behavior, they also memorialized a compact to punish. No longer could a strong member prey indiscriminately on a weak one with the confidence that the only punishment risked was some tepid resistance by the victim. Now every member was enforcing the rules. Punishment itself had been socialized.

But of course language also allowed us to become better rule-avoiders, for now we could conspire with each other, using words, to beat the rules. Social conspiracies have a long evolutionary pedigree. Chimpanzees, in particular, have a well-documented proclivity to form and break alliances as the circumstances demand, and they do this even without the gift of an explicit language.[5] By comparison, our giant social brains, armed with language, give us conspiracy capabilities that make chimp alliances seem amateur. We are constantly tussling with each other in a strategic social dance, hiding our intentions and seeking to unmask the intentions of others. Those strangers coming over the hill may be a trading party or a war party, and our brains are armed with a package of strategies to help us decide which.

OUR NATURES LOST AND REDISCOVERED

We have, of course, known about our moral schizophrenia forever. It's what gives the human story its richness, and has been told and retold countless times. It is no exaggeration to say that our version of The Social Problem is what makes literature literature and art art, because in the end it is what makes humans human. Whether it is Homer's *Odyssey*, a painting by Caravaggio, or a symphony by Beethoven, all

great art traces humanity's journey of self-discovery, and ends on the shores of these unavoidable dilemmas about group and individual, right and wrong, punishment and forgiveness.

And yet one half of this moral schizophrenia seemed to have gone lost for the past several hundred years. Fueled by classical economists such as Adam Smith and political philosophers such as Thomas Hobbes, and burst into conflagration by a misunderstanding of Darwin, this new vision of human nature saw humans only as relentlessly selfish creatures. If you were Hobbes, governments had to be strong to prevent the worst excesses of unbounded cheating.[6] For the classical economists, markets worked only because people could always be counted on to do the abjectly selfish thing. Adam Smith's unseen hand was in fact the assumption that every human acted like a solitary shark. *Homo economicus* was the tongue-in-cheek description of our new self-discovery.[7]

In fact, for the past 100 years or so the social sciences in general, especially anthropology, have denied the existence of *any* human nature. Culture, in this view, is what drives human behavior, and culture is unique and unpredictable. For a century, an abiding faith in this kind of cultural relativism drove two generations of anthropologists to focus on the *differences* between human cultures, largely ignoring any behaviors shared across cultures. Our brains were blank slates, waiting to be filled by experience.

But we were wrong – both about how culture drives all our behaviors and about how humans are essentially selfish. With no small amount of irony, it was the economists, along with some psychologists, who helped us see that we were wrong.

One experiment was particularly effective in exploding the myth of *Homo economicus*. Called the One-Shot Ultimatum Game, it is a real experiment that has now been played by researchers millions of times.[8] Here's how it works. There are two players, A and B. The investigator gives Player A some amount of money, let's say ten dollars, and instructs both players on the following rules of the game. Player A must offer Player B some portion of the ten dollars, anything from one dollar to ten dollars, at Player A's complete discretion. Then, after Player A makes the offer to Player B, Player B gets to decide whether to accept the offered amount or not. If he accepts the offer, then the

money is divided as Player A has proposed, and the game is over. But if Player B rejects the offer, then neither player gets any money, and the game is over.

Notice that if humans are truly one-dimensional short-term self-interest machines, if we really are *Homo economicus*, then Player A should always offer the minimum of one dollar, not just because he is a selfish brute but also because – and here's the profound elegance of the game – he assumes Player B is also a selfish brute who will always prefer even just one dollar to nothing.

This idea of picking the strategy that is most immune to the other actors' decisions was first formally described by the mathematician John Nash, of *A Beautiful Mind* fame, and won him the Nobel Prize in Economics in 1994.[9] Nash proved that in every sufficiently complex game there is at least one such strategy, now called a "Nash equilibrium."[10] Offering one dollar is Player A's Nash equilibrium in the One-Shot Ultimatum Game.

But when the One-Shot Ultimatum Game is actually played with real people, they do not play at the Nash equilibrium, or even close to it. As you might imagine, if Player A offers just one dollar, Player B is almost always insulted by the low offer and will punish Player A by rejecting it, even though by doing so Player B ends up also punishing himself by being one dollar worse off.[11] Player A can anticipate this rejection, which drives his offer up above one dollar.

Researchers all over the world have conducted the One-Shot Ultimatum Game. In industrial societies, Player A offers an average of a little less than four dollars, with a surprisingly small amount of variance from that average, and Player B overwhelmingly accepts at that level. These results not only hold cross-culturally, they are also largely independent of the relative amount of the stakes.[12] They even hold in preindustrial societies, although in those societies Player A plays slightly closer to the purely selfish level, offering on average a little less than three dollars.[13]

To classical economists, these numbers are staggeringly "unselfish." But they are not as unselfish as they could be. You might think, because Player A can anticipate that Player B is willing to cut off his nose to spite his face if the offer is too low, that Player A will judge that Player B will insist on a "fair" division of half and half, and thus make his

offer at or close to five dollars. But Player A does not do that. He may offer three dollars or four dollars but he does not move all the way up to five dollars, because he knows he doesn't have to. He knows Player B will most likely be insulted by a one-dollar offer, but most likely will not be insulted by a three-dollar or four-dollar offer.[14] Why doesn't Player B insist on a "fair" division of 50–50, and why doesn't Player A expect Player B to so insist?

One explanation is that both players recognize that Player A feels a kind of ownership interest in the whole ten dollars because he was given the ten dollars to begin the game. This is a form of what economists call the "endowment effect," which we will see more of later in this chapter, and it operates even when the players flip a coin to decide who gets to be Player A and who gets to be Player B. Possession, it turns out, may be nine-tenths of the law, but it is about six-tenths in the ultimatum game.

In any event, these are astonishing results, from both players' perspectives. Despite some cultural variations in the average offer and in the average offer that is accepted, no human Player A from any society or demographic routinely offers just one dollar, even though that is the most selfishly "rational" offer, and no human Player B routinely insists on five dollars, even though that is the "fairest" offer.[15] We simply are not the relentless self-interest machines of classical economic theory, nor the selfless do-gooders of the Romantics. Moreover, we know that the other player isn't either of these things, and he knows that we aren't. Remarkably, all of this reverberating knowledge about our natures effortlessly passes between Players A and B in those two instants when Player A decides on his offer and Player B decides whether to accept or reject.

Another influential game that helped us rediscover the guardedly cooperative half of our natures is called The Prisoner's Dilemma.[16] Imagine you and a confederate rob a bank, and are picked up for questioning. The police interrogate you separately, and you've not had time to agree on your stories. If you admit the crime, you will receive a short jail sentence, whether your confederate confesses or not. If you both hold firm and deny any involvement, you will both walk free because there is insufficient evidence. But if you hold firm and your partner confesses, then he will get the short jail sentence and you will

be sent to prison for a very long time. That is, the best result is that you both hold firm and deny your involvement, the next best result is that you confess, but the very worst result is that you hold firm when he confesses.

The beauty, and power, of The Prisoner's Dilemma is that it shows that our decisions about whether to defect in a social context are bound up with, and indeed largely defined by, our best guesses about what the other social members will do, and about how they in turn will guess about what we will do. If I am sure my partner will hold firm, then I should hold firm. The same goes for him. That is, being "selfish" in a social context might, in the right circumstances, mean being cooperative. But if either of us is unsure whether the other will hold firm, then, depending on the magnitude of that uncertainty, the next best decision would be to confess. Confessing is the Nash equilibrium of The Prisoner's Dilemma. It is not always the best play, but it is the safest play if we have no confidence in what our confederate will do.

These kinds of strategic decisions about whether to cheat or cooperate faced our ancestors over and over, and shaped the way our brains were built to handle the original sin of social defection. Even Jean-Jacques Rousseau, the quintessential Romantic, recognized that these tensions between cooperating and defecting were palpable whenever our ancestors engaged in important tasks, such as group hunting. He articulated one of the first versions of the so-called stag hunt game, although without any of the sophisticated mathematical or social psychological overlays that the game has since commanded.[17]

In Rousseau's version, he assumes a stag, say, is a prize catch, big enough and tasty enough for our ancestors to have devoted the considerable resources of a group hunt to try to catch it. But it is also an elusive prey, and it will take the cooperation of many hunters to catch it. During the hunt, Rousseau imagines that one of our ancestral hunters stumbles on a hare that he can easily capture and eat himself, but that by dropping out of the hunt even for a few moments the stag will be lost to the group.

Like the ordinary prisoner's dilemma, the decision whether to defect (abandon the hunt to catch the hare) is informed not just by the relative risks and payoffs of the decision itself, but also by a hunter's strategic

guesses about the decisions of the other hunters. After all, even if a loyal hunter decides to cooperate and stay with the hunt, he will still lose the stag if even one of his colleagues decides to grab the hare, and for his loyalty he won't even get to share in the hare. This is a critical point: even a single defector ends up being much better off than all the other cooperators, although admittedly not as well off as if everyone cooperated. That means that without some assurance that *no one* will cheat, everyone will be sorely tempted to cheat. And of course knowing that everyone else faces the same temptation means that we'd probably all be fools not to grab the hare and abandon the group's efforts at the stag. In such an environment, how could we have ever had a successful hunt?[18]

And yet we know that our ancestors somehow managed to be able to cooperate enough to render living in small groups advantageous, because in fact we evolved in small groups. For small group living to have been a net survival advantage we somehow had to suppress our individual desires to cheat. We did that by evolving punishment. If the putative defector faced severe punishment for grabbing the hare and abandoning the hunt for the stag, suddenly the hare doesn't look so good. Punishment deterred enough cheating so that living in groups was possible. Having brains that punished allowed us to have brains that cooperated. To see more clearly why we needed punishment to survive, let's consider another famous model of The Social Problem, called The Public Goods Game.

The Public Goods Game is an important kind of generalization of the stag hunt and other social cooperation games, with an overlay of The Prisoner's Dilemma. There can be as many players as the experimenters want, but for simplicity let's say we have four. Each player is given some stake, let's say ten dollars. He or she must then decide how much of the ten dollars to contribute to the public good. Whatever is contributed to the public good is then doubled and, here's the catch, divided equally between all four players without regard to who made the contributions. So the Nash equilibrium is zero – a player who contributes nothing keeps the original ten dollars and even has an upside of sharing in the other players' public generosity.

If each player had sufficient assurance that the other players would cooperate, the best result for each would be to contribute all ten dollars,

have the forty dollars doubled to eighty dollars, then share that total in equal payments of twenty dollars. Members of a perfectly cooperative group thus end up doubling their money. But a player could do even better if he were the only one to defect, keeping his ten dollars and refusing to make any public contribution. The other three each contribute their ten dollars, the thirty dollars is doubled to sixty dollars, and the sixty dollars shared in equal fourths of fifteen dollars. Our sole defector ends up with twenty-five dollars – the original ten dollars he kept plus his fifteen dollars share of the public goods – five dollars more than he could have gotten if everyone cooperated and ten dollars more than the three suckers who did cooperate. The rub, of course, is that all the players know they can do better by defecting, but only if there is a limited number of defectors. In our example, if even just two players decide to defect, they cannot do better than if they had all cooperated.[19]

When real people play The Public Goods Game, they play it like the other social games – not at the Nash equilibrium but also not with unbounded cooperative optimism. They play instead with a skeptical presumption that everyone else will cooperate, contributing a large chunk of the ten dollars but keeping some back as a hedge against defection. When the game is played over and over, as opposed to single-shot exchanges, cooperation tends to begat cooperation, but defectors are also quickly identified. With no punishment options, the public goods game quickly degenerates into selfish anarchy, with all players eventually driven to the Nash equilibrium by the fear that if they are the only one to cooperate they will do worse than all the defectors.

The Public Goods Game suggests that some kind of punishment was necessary for the long-term value of cooperation to have exceeded the short-term value of cheating. Whatever its form, we needed some deterrence to reduce the payoff from cheating. How much deterrence, and what kinds, no doubt depended on the details of the particular social challenge we faced. Hunting a valuable but elusive stag may have required more cooperation, but offered more benefits, than, say, gathering berries. Cheating in these various endeavors therefore required varying degrees of deterring punishments.

In almost all models of human social interaction, the difference between cooperating and cheating is often a matter of whether the

other fellow can be trusted. Economies of any complexity depended, and still depend, on individuals' willingness to trust one another. If I lend you my spear in exchange for your promise to let me share in the kill, I am trusting that you will follow through and keep your promise. Many well-known economic games examine the phenomenon of trust.

One of the simplest and most well-known starts out like an ultimatum game – the researcher gives ten dollars to Player A and asks him to decide how much to give Player B. But the researcher then tells both players he will triple whatever amount A gives B, and that B will then get to decide how much of the tripled amount to give back to A. The "selfish" play for A – the Nash equilibrium – is still to give B just one dollar, keeping nine dollars. He may be giving up the prospect of sharing in the tripling, but he is also avoiding having B defect and keep the entire tripled amount. On the other hand, the most trusting, the most "pro-social," play for A is to give B all ten dollars, with the hope that once it is tripled to thirty dollars B will return a fair amount (say, fifteen dollars). But in fact, Player A on average behaves somewhere in between these two extremes – exhibiting some trust that Player B will return some of the tripled amounts, but, as we saw with The Public Goods Game, holding some back as a hedge against B's defection.[20]

Notice that from B's perspective the issue is not whether to trust A but whether to act in a way that justifies A's trust. Player B's most "selfish" and "rational" play – his Nash equilibrium – is to keep all the money and not share any with A, because in this version the game ends when B defects, and A cannot retaliate. But B does not act in this selfishly rational way. He typically divides the tripled amount, and in general the closer A was to showing complete trust in B the more likely it is that B will reciprocate by dividing the tripled amount equally. With some differences across cultures, up to 66 percent of Players B reciprocate Player A's trust to some extent, with the other 34 percent regularly playing selfishly and keeping all the tripled money no matter how trusting Player A has been.[21]

It is not entirely clear what prevents up to 66 percent of Players B from acting like the other 34 percent and keeping the entire tripled amount. After all, the game ends with Player B's decision, and there

is no downside to him if he keeps everything. Yet two out of three Players B reciprocate A's trust. Why? The most accepted explanation is that our brains are built to play these games as if they were repeat games, because of course living in a social group is one giant repeat game. In the artificial game, Player B knows in some rational part of his brain that he will never see Player A again, and that his best play is to defect and keep all the tripled funds. But his brain is a gnarl of embedded rules that are highly sensitive to the behaviors of others, and, especially when A exhibits unwarranted trust in him by giving him all ten dollars, B is driven by that gnarl of social rules to reciprocate that trust. This is a kind of guilt, an emotion that compels us to live up to the expectations of others even if, and especially if, they are in no position to punish us. It is part of the guilt and conscience I call "first-party punishment."

Player A of course anticipates this kind of "irrational" trust. If he didn't think there was a significant chance that B would return some part of the tripled amount, A would play at his Nash equilibrium and give B just one dollar.

That all of these guardedly cooperative and trusting behaviors are in fact driven by our social natures has been elegantly shown in experiments in which humans play these same games against computers or, more deviously, are *told* they are playing against computers when they are really playing against other humans. Armed with information that the opponent is not human, players revert to the predictions of classical economics and play selfishly, at or near the Nash equilibrium.[22] Conversely, the extent to which human players are allowed to communicate or even just see each other before the game begins, as opposed to playing anonymously, strongly predicts their degree of cooperative departure from the Nash equilibrium.[23]

Language immeasurably strengthened the cooperative bonds of humans, but it also gave us an entirely new way to cheat – by lying. Now, we could steal then lie about it afterwards. Our lies could even happen before our bad actions: we could, for example, make promises we had no intention of keeping, or send others on wild goose chases so we could pilfer their property. So powerful was this new tool of language, and so critical to our social networks, that it could even be its own defection: we could kill rivals by using words to send them into

danger, without lifting a finger. Not surprisingly, it seems we lie pretty much the same way we cheat; that is, we are presumptive but guarded truth tellers.[24]

The proposition that our guarded tendency to cooperate is an evolved predisposition finds some support in the mixed evidence of cooperation in other species. Some of our nearest evolutionary relatives are also guarded cooperators, although others are much more classically selfish. The amount of cooperation a species exhibits does not appear to have anything to do with how evolutionarily close it is to humans. Chimpanzees, who along with bonobos are our closest living primate relatives, are the very epitome of asocial selfishness when they are faced with versions of these games. They play at or very near the Nash equilibrium, and are rarely cooperative even in repeat games.[25] Bonobos seem to be a bit more cooperative, at least in some circumstances.[26] And yet capuchin monkeys – who are our much more distant relatives – engage in widespread cooperation and reciprocal sharing when they are faced in experiments with the problem of retrieving food that can only be retrieved cooperatively.[27] Capuchins are also exquisitely sensitive to unfairness in experiments involving unequal rewards for performing the same task.[28]

That the degree of social cooperation exhibited in a species does not vary exactly according to that species' evolutionary age is a perfect example of the phenomenon that natural selection is haphazardly practical, and not at all ideological. Social cooperation is not an abstract good. When it gave a particular species in a particular environment a fitness advantage, as with capuchins, then it was selected for; when, as with chimpanzees, it offered no selective advantage then it was not selected for.

A word of caution. These generalizations – chimpanzees are selfish and capuchins are cooperative – are just that, generalizations, and quite gross ones at that. Chimpanzees are indeed less cooperative than capuchins in many circumstances, but in fact all nonhuman primates, and indeed all social animals, regularly exhibit some cooperative behavior. That is, after all, the very definition of being a social species. As Frans de Waal has so aptly noted, in-captivity experiments purporting to test complicated notions such as cooperation, or even general intelligence, are often handicapped by a kind of anthropocentrism that can

produce inaccurate caricatures. Chimpanzees in captivity may be rational maximizers in experiments using a sliding apparatus that allows them to share food, but in the wild, like all great apes, they engage in a myriad of cooperative behaviors, including coming to the defense of others being attacked by leopards or consoling distressed companions with tender embraces.[29]

The biochemistry of cooperation also suggests some deep and old evolutionary core. Oxytocin, an important mammalian hormone that gets released in females in large amounts during labor and breastfeeding, plays a significant role in the mediation of cooperative human behaviors in both sexes. The level of naturally occurring oxytocin in human subjects, male and female, is a strong predictor of how cooperatively they will play these economic trust games. And when subjects have their oxytocin levels artificially increased they play the games more cooperatively than the control group.[30] Not only does oxytocin increase trusting behavior, but trusting behavior releases oxytocin. Any kind of gentle touching – massage, stroking, grooming – causes oxytocin to be dumped into the brain and bloodstream. Even a remote and symbolic act of economic trust – say, in a trust game – releases oxytocin, both in the person doing the trusting and the person being trusted.[31]

Oxytocin seems, literally, to be the soup in which our social natures, and the trust that is required for social living, are bathed. But it is not an ordinary kind of soup. It works to increase trust only in the presence of social cues. When human subjects play asocial versions of these games – that is, when they are given cues suggesting they are not playing against other humans – artificially increased levels of oxytocin actually drive us to become *more* selfish rather than less.[32] Maybe this is because in these asocial contexts the only message we are getting from the oxytocin is an ancient cue that we are pregnant, nursing, or otherwise in charge of a baby, and need to act to maximize our resources to take care of that baby.

The role of oxytocin in mediating cooperation also goes a long way toward explaining an important observation from primatology – that as primate groups get larger and larger, they spend more time per member grooming each other. The grooming releases oxytocin, which increases cooperation to the levels needed to overcome artificially high

group numbers. When our groups are too big, we don't see each other often enough to feel comfortable trusting one another, but as soon as we fondle each other's scalps looking for fleas, or stick out our hands and shake them, or slap each other on the back, oxytocin gets pumped into our brains and bloodstreams and partially recreates the feelings we would have had if we were members of a smaller, more intimate, group.

The hormone testosterone, also present in mammals in both sexes, seems to have the opposite effect. That's not surprising, given that one of the things testosterone does is block the effects of oxytocin. In the ultimatum game, high-testosterone Players B reject low offers much more frequently than do low-testosterone Players B. It also seems that high-testosterone Players A offer less than low-testosterone Players A.[33] As with oxytocin, the trust/testosterone pathway seems to be a two-way street. Being mistrusted releases testosterone precursors.[34]

The role of oxytocin in social cooperation, and its older role in mother-child bonding, is a beautiful example of the way in which natural selection can take existing material and mold it to new conditions. Even asocial mammals already had a system to encourage bonding between mother and child, and when new environmental challenges forced some mammals into cooperative groups, evolution recruited those existing cooperation channels to bind unrelated adults. When humans added language to strengthen our cooperative bonds even further, we became the most intensely social of all genetically heterogeneous animals.

These ruminations about cooperating, cheating, and punishing are not just guesses about how our brains might have worked 100,000 years ago. We still have those brains today, because natural selection typically acts so excruciatingly slowly. Our modern brains are a kind of behavioral fossil record in which we can see the strategic leftovers of our emergent struggles. Indeed, a large part of the modern human dilemma comes from the fact that our brains were built to operate in an environment that largely no longer exists. The miracle of culture has changed our world so rapidly and so profoundly that our poor Pleistocene brains, built to solve yesterday's problems, can sometimes hardly recognize today's. But some problems are forever. We will always be torn between cooperating and cheating, there will always be cheaters

among us, and we will therefore always be faced with the problem of what to do with cheaters. The powerful predispositions we evolved to deal with The Social Problem remain salient because The Social Problem remains salient.

These behavioral observations about our natures as reluctant cooperators faced one giant theoretical hurdle: how could evolution ever select for a behavioral trait that by its very nature reduced the short-term advantages to the individual? This is a more generalized version of what biologists called the "altruism problem." There are many species of animals that engage in a wide variety of altruistic and cooperative behaviors, including sacrificing their own lives for the benefit of kin. If natural selection proceeds blindly, guided only by the calculus of individual self-interest, how could such altruistic and cooperative behaviors ever have evolved, when such tendencies make an individual less fit rather than more fit?

There were three big conceptual breakthroughs that helped solve this problem. The first two came from the British evolutionary theorist W. D. Hamilton. He had the insight that what natural selection really cares about are genes, not individuals.[35] Hamilton also recognized that if genes are the real units of natural selection, then in making the calculation of whether a behavior helps or hurts that gene we must consider not just the individual's gene, but copies of that same gene carried by others. That is, it may be perfectly adaptive for a parent to sacrifice itself for many offspring, even though by doing so the gene in the parent is lost, if enough copies of that gene are saved in the offspring. This proposition became known as "kin selection" and Hamilton also quantified it. The amount of altruism and its targets should be predicted by the degree of relatedness between the sacrificing and benefitted individuals. In his famous rendition, a parent should sacrifice itself for three or more children but not for two or less, because on average a child carries one-half of the parent's genes.

The third contribution to solving the problem of altruism and cooperation came from the American evolutionary theorist Robert Trivers, who showed that in the right social milieu these altruistic and cooperative behaviors could be adaptive even if they were aimed at non-kin, and indeed even at other species.[36] These insights cleared the theoretical path to the notion that socially cooperative behaviors not only

could have evolved in our species, but that they almost certainly did in fact evolve.

Anthropology has also belatedly played its part in this rediscovery of human nature. Sparked by a series of books questioning the evidence on which Margaret Mead and other cultural relativists had grounded their views,[37] these new anthropologists began looking at common behaviors shared by all human societies, rather than focusing on their differences. They have found a breathtaking number of human universals, including, most significantly for our purposes, living in groups larger than the immediate family, notions of individual responsibility, rules against murder, rape, and other kinds of violence, rules against breaking promises, and rules about punishing rule-breakers.[38]

Of course, the interplay between culture and biology is complicated, in exactly the same way that the relationship between nurture and nature is complicated, or the relationship between the inherited predispositions in our brains and the brain's ability to soak up new information from the environment to overcome those predispositions. Not only that, but these complications played out over a history in which, in general, the small groups in which we evolved our social tendencies grew larger and larger. Brains built to address the challenges of living in small groups of mostly related individuals now had to face the very different challenges of larger bands and tribes. Culture – with its ability to convey rules quickly across generations – played an important role in meeting this new challenge of size.

CULTURE: OUR SMALL GROUPS BECOME LARGE

Language not only raised our social stakes, binding us more tightly and tempting us more deeply, it also bloomed into culture, and culture has spun its infinite variations onto this basic dilemma of cooperating and cheating. Every human every day in every society has been and always will be faced with the question of whether to cheat or cooperate. How we answer that question in any particular circumstance depends in large part on cultural norms. A Waukegan realtor might return a lost wallet; a Bantu tribesman might not return a lost knife. Every society has likewise faced the same punishment dilemma, with infinite

cultural variations. Even in England, and even as late as the eighteenth century, death was the punishment for many crimes that today are not even considered felonies. The central problem of punishment may have been the same for 100,000 years, but it seems we've tried to solve it in 100,000 different ways.

In fact, these economic games and experiments also showed how complex the interplay can be between culture and human nature. Not only are members of preindustrial societies a tad closer to pure selfishness than members of postindustrial societies, but the extent to which they depart from pure selfishness seems to depend on a variety of cultural factors, including the degree to which their societies are economically integrated (markets needing a certain level of trust in order to work) and even the degree to which a given society participates in religions that contain fairness-based codes.[39]

Our modern culture may make us more cooperative in some dimensions, but it makes us less so in others. The modern myth of rugged individualism pervades Western culture, but is often quite a puzzle to primitive man. The anthropologist Ronald Cohen tells a story about the Kanuri of Northern Nigeria, with whom he had spent a year in the field. One day he went off by himself to the edge of the tribal lands to reflect about his project. He was sitting on the edge of a log for only about twenty minutes when a young boy from the village appeared and sat down at the other end. Cohen asked the boy why he had come. The boy said, "The Chief sent me." Cohen asked why, and the boy replied, "He said you were alone and therefore must be ill."[40]

On the other hand, the bucolic picture of small groups of humans presumptively getting along and cooperating, and punishing occasional cheats, ignores one giant and significant evolutionary fact: our brains were built to presumptively cooperate only with members of the our own group. Out-group members triggered exactly opposite presumptions. Strangers walking over the hill were presumed not to be trusted or trusting. We were not primed to cooperate with those strangers or they with us. When it came to dealing with outsiders, our social brains switched largely over to shark brains.[41]

The story of civilization is in many ways the story of how our small groups got bigger and bigger, and the problems our shark brains caused during those periods of expansion. Language, law, religion, and many

other kinds of social institutions helped keep our shark brains in check, and helped our social brains add new members to our definition of who was in the group. Still, in-out rifts have always run deep, and have been difficult to overcome. Especially when there are physical markers of being a member of this group or that – racial or ethnic differences, for example – these rifts have driven much of our sorry history of violence. But within our small emergent groups we remained highly cooperative.

Indeed, human-on-human violence, with a few exceptions, has been in steady decline as our groups have gotten bigger and the number of outsiders correspondingly smaller. Forensic archeologists estimate that before agriculture, when we were still living in relatively small nomadic tribes and regularly clashing with other tribes, 15 percent of us died violent deaths (homicide, suicide, and accidents). That compares to a 3 percent violent death rate in the earliest states, after agriculture settled us down in one place and those places began to aggregate with other places into states.[42] These rates of violence are almost incomprehensible when we compare them to modern rates. In Western Europe today, approximately 1 person in 100,000 (0.001 percent) dies a violent death; in the United States that number is approximately 6 in 100,000 (0.006 percent).[43] Even in the modern world's most dangerous places and times the rates of violent death are miniscule compared to our emergent and ancient rates. To use just three examples, violent death rates in the U.S. Civil War, in Afghanistan in 1979, and even in the Soviet purges of the late 1930s, reached "only" into the 400 per 100,000 level (0.4 percent). This is one-tenth the violent death rate in our earliest states, and one-fiftieth of our emergent rate.[44]

In fact, the myth of *Homo economicus* is in large measure an artifact of looking at human nature *across* groups rather than within them. It was an easy mistake to make. As our groups got bigger and bigger, and our brains lagged behind in recognizing those larger groupings, we killed and raped and enslaved "each other" with great aplomb. But we were not typically accosting our own clan or tribe members; we were accosting outsiders whom the march of civilization labeled insiders, but whom our brains still counted as outsiders.

THE CULTURE AND EVOLUTION OF LAW

So we really have two deep neural paradoxes, and two versions of The Social Problem. We want to cooperate with other group members, but we occasionally also want to cheat them. We want to fight with outsiders, but we also occasionally want to cooperate with them. As our groups got bigger and bigger, these two visions of our natures came together like two images in a pair of binoculars. The rule of law was one of the ways that helped us integrate these two images. Laws automatically redefined the expanding social whole, and entitled, at least in theory, all members of the new groupings to the protections of the old ones. Protestants may not really treat Catholics the same as they treat each other, but when they are all Irishmen then Irish law expects them to, and punishes them when they don't. The ideal of community in groups too big to be real communities helped our shark brains switch back to more and more inclusive social brains.

No matter how The Social Problem is solved in a particular society – the cultural details of where the balance between selfishness and selflessness might generally be struck – the important point is to recognize that the problem is universal. In every human culture, humans must sometimes decide when to act in ways that may be beneficial to themselves but harmful to the group, because in every culture humans remain social animals, torn constantly between the short-term benefits of defection and the long-term benefits of cooperation, between the exhilarations of individuality and the comforts of community. In all cultures we are likewise torn between our feelings that outsiders are outsiders, and our cultural norms that demand we treat them as insiders.

It is no coincidence that our prisons mirror our dual natures, and take from us what we most deeply need and want. We want to be free, free even of the small group and its cloying rules that interfere with our short-term fitness, free to break the rules ourselves and even to leave the group.[45] Yet we also want to be part of the group, to relish in the long-term fitness advantages it confers. Prisons are designed precisely to deprive the worst wrongdoers among us of the very two things that

we most cherish: freedom and society. And we are often able to do that only by labeling our worst offenders as moral outsiders, monsters.

Law is not just one of the ways we have tried to solve The Social Problem by imposing a level of group-enforced deterrence, it is one of the few remaining modern reminders of our deeply embedded evolutionary schizophrenia over cooperating and cheating, over right and wrong. Law is about right and wrong, or at least about what we humans in any particular culture and setting *think* is right and wrong, or at the very least what we *say* to each other about what we think is right and wrong. It is also about what we do, once we settle on right and wrong, to the wrongdoers among us.

Law is *about* right and wrong, but the overlap between morality and law is not complete, either in terms of content or enforcement. English common law famously distinguished between acts that were *mala in se* (inherent wrongs) and those that were merely *mala prohibitas* (prohibited wrongs). Of course, many acts are both morally wrong and illegal, like most homicides. But many other acts have been made illegal, especially by a robust regulatory state, that have no intrinsic moral bite, such as selling pots and pans door-to-door without a required license. Conversely, some acts that are widely viewed as wrong may not be unlawful, such as adultery, at least in many Western cultures. Finally, some acts may be morally acceptable, indeed morally required, even if they are unlawful (Jean Valjean in *Les Miserables* stealing that loaf of bread to feed his sister's starving family).

For most of human history even *mala in se* were typically dealt with by way of private revenge. With just a few exceptions for things such as treason and regicide, most ancient and even medieval states simply did not get involved in the punishment of crimes, even *mala in se* like homicide. These were left to the victims and their family, clan, or tribe. Our small groups may have been accumulating into larger and larger political units, but we left the evolutionarily significant job of punishing miscreants to our smaller, more natural groups. In fact, one way to think about the development of the state is that over time it has taken on, among many other things, the punishment obligations of smaller antecedent groupings. As those groupings became larger and larger, the state not only began to enforce rules of behavior that had been the exclusive province of smaller groups, it also began to create

more and more *mala prohibita* as the state-as-family needed more rules to sustain it in an increasingly complex world.

In the end, though, big chunks of law, across all cultures, are about what our original small groups considered to be norms of cooperation, and how they thought we should punish various kinds of defections from those norms. Admittedly, there are three big problems with these kinds of narratives about the evolution of morality, and its instantiation into law.

First, we know virtually nothing about how our ancestral groups were really organized or how they really solved The Social Problem. This is a weakness common to the whole discipline known as evolutionary psychology. We can posit all the hypotheticals we want, and we can use evolutionary theory to try to reason backward in time to claim our current brains are based on past environments, but in the end we know very little about those past environments, especially when it comes to behaviors as complex as cooperating, cheating, and punishing. This critique is often called the "just-so" problem. Not knowing how our ancestors really behaved, it is easy to assume in hindsight a behavior that just-so happens to make evolutionary sense.[46]

However, one potentially important clue to how our ancestral groups may have solved The Social Problem is how existing primitive societies are solving it. There is little doubt that for most of our evolutionary history we lived in small nomadic forager bands, of which there still remain a few, mostly in Africa and Australia.[47] The consensus among anthropologists and evolutionary theorists is that these extant societies are the best evidence of what our ancestral groups might have been like.[48] There are many significant differences between these extant societies, but in general they are organized into small residential groups that anthropologists call "bands." These bands typically consist of about thirty mostly-related individuals. The bands break up into smaller parties to forage and hunt. Food is liberally shared, and centrally stored. About half of all food is gathered, the other half hunted or fished.[49] Most of these societies recognize individual ownership of small amounts of personal property – clothing, tools, cooking utensils – but because of their nomadic lifestyle few recognize real property.[50] They robustly trade with other bands, and even other tribes. They show a high degree of cooperation within the band, although they

also occasionally defect in the usual ways, including theft, assault, and homicide.[51] These core defections are all recognized as defections, and the most serious of them can result in third-party punishment.

So although the historical record is hazy at best, it is not complete guesswork. We can use evidence from existing primitive societies to make some reasonable inferences about how our ancestors lived 100,000 years ago.

A second problem with the idea that we evolved a presumptively cooperative ethos is the so-called first mover problem. It is difficult for some evolutionary theorists to imagine how those first cooperative genes could ever have given their owners a net survival advantage, in a world full of defecting *Homo economici*. This is the prisoner's dilemma writ large. Without some assurance that the other guy will cooperate, the rational play is always to defect. How did enough cooperators accumulate into a group large enough to achieve a fitness advantage big enough to overcome their inherent one-on-one disadvantage when dealing with a bunch of other cheaters?

It turns out that cooperators who were sufficiently *related* to each other could in fact achieve sufficient net advantages. As we have already seen, when we cooperate with relatives, we not only benefit our long-term survival but also the long-term survival of the genes we share with those relatives. We are thus much more likely to trust other group members if they are related to us. Just like in The Prisoner's Dilemma game, that trust gave us the ability to achieve a great advantage by cooperating. And in fact, our earliest groups, like current nomadic foragers, were likely composed of largely related individuals.

The third criticism of the notion of an evolved morality is that even if cooperative behaviors gained some selective traction in groups of mostly related individuals, it is hard to see how they sustained themselves. Our small groups gave us a net survival advantage – that is, the *average* benefits of cooperation exceeded the *average* costs of defection. But these are only averages. In any given situation, an individual member might calculate that he would be better off defecting. "I will steal that food because I have more children than anyone else, and we are hungry. It seems to me that the remote group advantages I enjoy, say, from mutual defense, hardly matter at this moment, when my children and I may all die from hunger." Or, less sympathetically, "I will

steal that food because I see that everyone is gone and they will never discover it is me." Because such situations undoubtedly occurred to many of our ancestors at some time, how did natural selection solve the problem of groups unraveling over time because individual members' cost/benefits necessarily drifted outside the averages?

The answer is that it was just too costly to have brains completely blank on the cheat/cooperate issue, and armed to decide everything on a situation-by-situation basis. That's because even in an environment as complex as our ancestors' group living, there were just a handful of really important and common challenges in which the cheat/cooperate decision had to be made. The solution, then, was to have brains armed with a few predispositions to solve the most common problems. Such brains could solve those common problems at little or no computational cost, enjoying a significant fitness advantage over agnostic brains waiting to calculate every possible social dilemma.

Among the biggest sources of social tension were disputes over materiél – food, shelter, clothing, tools, weapons, mates – the very stuff of fitness. This is what the law of course calls property.[52]

THE PROBLEM OF PROPERTY[53]

We needed many kinds of things to survive in our new harsh environment, including shelter from the openness of the savannahs, clothing to protect our hairless bodies from cooling temperatures, and weapons to hunt and to ward off out-groups. Living in groups necessarily created deep and fundamental tensions about the use of those things. Who had the right to use them, and on what conditions? Every parent knows that there's nothing more likely to cause an eruption between children than fights over toys. Imagine if we needed the toys for our survival.

Territoriality – the possession of one kind of property, namely space (what lawyers call real property), coupled with the willingness to defend that space against competitors – is one way to solve the problem of property. Many animal species, though an overall minority, are territorial. Creatures as diverse as birds, lizards, elephant seals, cats, dogs, gibbons, and even a handful of insect species, mark and defend territories. Territories often, though not always, contain nests or dens and

sufficient surrounding resources to enable survival. Thus, the exclusive possession of real property is almost always also bound up with the possession of personal property, the stuff of survival. In fact, even species that exhibit remote territoriality – areas they will defend that are distant from nesting sites – do so to protect some kind of remote resource, whether certain feeding territories (as in the case of some types of birds) or special mating areas (some types of antelopes).

Possession of real and personal property, both in law and nature, generally requires two elements: physical control of the property and the expression of a willingness to defend it. In nature, the expression of an intention to defend property typically involves signals to potential squatters or thieves that the possessor is willing to fight to retain control over the property. But if a resource is equally valuable to the possessor as it is to a challenger, then the challenger should be just as willing to fight for it as the current owner. In fact, not having the property might well give the challenger more incentive to take it, all other things being equal. You can imagine what kind of chaos would result from such a generalized willingness to fight over property, especially in social species that depend on certain levels of cooperation.

Nature's solution was to invest the brains of first possessors with an overvaluation of their possessed property, giving them more incentive to keep it than challengers have to take it. This is what biologists, and property professors, call the first-in-time rule. Both with territoriality and the possession of things, it is quite common for the first possessor to be able to defeat a challenger who is significantly stronger, so common in fact that the challenger will often recognize the asymmetric incentives and back down. This happens not just with mammals, which might be able to communicate their incentives to one another with gestures, but even with some insects. Some species of butterflies, for example, exhibit the first-in-time rule when they compete for sunny spots.[54]

The first-in-time rule is an elegant solution to the problem of property. If the individual who first acquired the property values it more than all other strategic actors (whether other group members in the case of social animals or competitors in the case of nonsocial animals), and assuming the costs of fighting over the property are sufficiently high, then those other actors will be unwilling to pay the fight costs

required to wrestle that property from the possessor. With no external "rulemaking" whatsoever, and therefore just as effective in birds and butterflies as in humans, the first-in-time rule greatly reduces fights over property.

As with most evolved behavioral traits, however, the first-in-time rule is not absolute, and its adaptive value required flexibility. It is a strategic predisposition only, which must be able to give way when tactical circumstances demand it. So, for example, the magnitude of the first-in-time advantage must not be so large that property never changes hands. A given property in a given circumstance may be so much more valuable to a challenger than it is to the original owner that it would make no sense for the original owner to fight to keep it. The magnitude of the first-in-time advantage thus can vary over time and circumstance. For example, the willingness to fight to keep property generally increases the longer the possessor is in possession of it.[55]

The first-in-time rule is a general version of the endowment effect mentioned earlier in this chapter in connection with the ultimatum game. Humans, and in fact several species of nonhuman primates, value property possessed more than identical property not yet possessed but easily available, in the case of humans, in markets. The moment property is acquired, it suddenly becomes more valuable to the owner than the owner was willing to pay for it just moments before. The endowment effect causes theoretical economists all sorts of fits because it clogs up the mathematics of market exchange. But it is a beautiful thing to evolutionary biologists, because it is yet another example of how natural selection can sometimes recruit an existing trait and put it to new uses. The first-in-time rule, followed by butterflies and birds, gets recruited by higher order social animals to serve as a kind of check on relying too much on market-based promises of future performance by fellow group members. The very same internal sense of inflated value that reduced fights over property in nonsocial species can now do double duty in social species. It not only cuts down on fights over property, it protects members from over-relying on the promises of others, whether within or between groups.[56]

That extra function became especially valuable to humans because of the institution of the promise. The human animal needed forward-looking property strategies because we can imagine the future and

communicate with each other about it. It was not enough for us to be equipped with the endowment effect; we needed strategies for acquiring and then distributing property within the group. A central tool in dealing with this distributive problem was the promise.

THE PROMISING ANIMAL: HOMO EXCHANGIUS

It may not be too much of a stretch to say that the single most significant human invention of all time was the promise. It freed us from on-the-barrelhead barter economies, allowing us to exchange goods and services today for goods and services tomorrow. It eventually allowed us to exchange promises for promises, to develop currency as a conduit of those mutual promises, and ultimately to engage in the divisions of labor that led, even early on and at least compared to our primate cousins, to the creation of enormous wealth and a resultant freedom from want. We really shouldn't even call the promise an "invention." It seems as deeply embedded in our humanity as any other trait. Language itself, that defining of all human characteristics, may have evolved principally to allow us to convey promises to one another – anything from "you cover the left flank on this hunt and I'll cover the right," to "we, who have more food than we need but not enough skins, will exchange with your group who has too many skins and not enough food."[57]

Promising is so much a part of us it is sometimes hard to notice. I often ask my law and biology students to try to use a single word to describe humans, and they've come up with many over the years, including "conscious," "talkers," "imaginers," and "worriers." But the one word I think is best, and one no student ever suggests is: "traders." We are, and always have been, incessant traders. Watch any children play with toys, and you will see endless trading. They don't have to be taught how to do it or see others do it; they *know* how to do it. *Homo economicus* is really *Homo exchangius*.

Promising is a sentient, language-based version of what biologists call reciprocity, and although there is only weak evidence of market-type promises in existing nonhuman primates, there is no doubt that trading, and the promises it required, was one of the glues that kept

our groups together. Trading also propelled us, or at least assisted us, to overcome our fears of out-groups.

When we search for a common challenge from our emergence, a challenge so frequently faced that natural selection would likely have armed our brains with some presumptive solutions, promises have to be near the top of the list. Every promise creates its own kind of Promisor's Dilemma. I am incurring a cost today in the hopes of a future benefit, and that hope is grounded in nothing more than the word of a fellow human. How can I be sure he will not defect? If I am insecure about his performance, that insecurity will reduce the price I am willing to pay for the promise, which will only further reduce his likelihood of performing.

We can escape this Promisor's Dilemma the same way we were able to escape the destabilizing problem of fighting over property – with solutions that give us an instinct that avoids, or at least greatly dampens, the problem. Having brains that instinctively value possessed property more than non-possessed property helped us overcome the problem of property, and having brains that instinctively believe promises should be kept helped us with the Promisor's Dilemma.

TWO SOLUTIONS TO THE SOCIAL PROBLEM

So I propose that these are the two core rules of right and wrong bequeathed to us by natural selection and driven by the common problems of property and promise:

Rule 1: Transfers of property must be voluntary.
Rule 2: Promises must be kept.

Our brains were *built* to respect others' property, to expect them to respect ours, to keep our promises, and to expect others to keep theirs.

As with all instincts, culture shaped these two solutions to The Social Problem, molding them over time to fit new conditions. Who "owns" what property, even what property is "ownable," are details that are very much culturally dependent. One of the epic struggles in the early Church was over the question of the nature of property, both real and personal, and eventually whether the Church itself could

own property. More generally, the ownability of real property seems to depend in many societies on the extent to which agriculture, or the presence of other kinds of sustainable resources, has tied them to place. As we have seen, our nomadic forager ancestors most likely had no concept of real property; when resources ran out they just moved on.

The contours of an enforceable promise have likewise been shaped significantly by culture. Some promises enforceable in one culture are unenforceable in others, usually because of differing views about the legality of the act being promised. The promise to do an illegal act is not only typically unenforceable, the promise itself is often illegal. Solicitation to commit murder is one example. Even where the object of the promise is legal, there can be tremendous cultural differences in the extent to which promises are deemed worthy of enforcement. For example, the promises of rulers to marry their offspring to one another was not only widespread throughout most of human history, it was an important tool of political alliance. The remnants of that practice survived in the common law "heart balm" action, a suit under which broken promises to marry (in modern times, only between the marrying couple, not their parents) entitled the jilted party to damages. Both in England and almost all U.S. states, however, anti-heart balm statutes have now abolished the common law right to sue for a broken promise to marry.[58]

The remedies for a broken promise can also vary significantly across time and societies. Ancient law enforced promises the way our small groups likely did – by forcing the wavering promisor to perform on pain of serious sanction (often death). Under Roman law, for example, if someone breached a contract to pay money, the creditor had the right to chain the debtor and drag him around the market on three successive days. If the debt remained unpaid, the creditor had the right to cut the debtor up into tiny pieces.[59] In other contexts, the group or ruling authority might simply confiscate the object of the promise from the breaching party and turn it over to the party who suffered the breach. If John entered into a contract to sell Mary a goat, and Mary paid John the purchase price but John then simply refused to part with the goat, the ancient remedy was to have the group confiscate the goat and turn it over to Mary. Today, by contrast, there are only a few special

categories of promise – for example, promises to sell real estate – that are deemed special enough to justify actions for specific performance. All other breaches of contract are remedied by substitute performance in the form of money damages.[60]

Despite these cultural differences surrounding remedy, the law of contract remains at its core the law of the moral imperative of the promise. Promises have always carried with them a moral component, even though modern law has come to recognize the utility of substitute performance.[61] It is *wrong* to break a promise to sell you widgets, even if I later compensate you completely by giving you the money you would have been able to make from reselling them. Our brains have been built to disapprove of one who breaks a promise, whether or not one later makes the other party whole.[62]

The same is true of the rule against taking property. Theft is not simply the law's artificial prediction that a thief will be punished if he is caught. It is a reflection of our deepest instincts that tell us stealing is wrong. And if we stretch the idea of property a little bit – to include one's own life and health – then Rule 1 covers virtually all of the criminal law and the law of torts as well. When you physically injure me you have "taken" my well-being without my consent, whether by intentionally shooting me or by negligently crashing into me.

Our evolved rules against stealing and breaching seem to be encoded in specific areas of our brains. Human subjects show a characteristic activation pattern on functional Magnetic Resonance Imaging (fMRI) when they engage in the endowment effect. The neurological signatures are so robust that in a 2008 experiment researchers were able to predict quite successfully, by *first* looking at fMRI results, which human subjects would be most likely to exhibit strong endowment preferences.[63] By valuing our own property more than others do, we are in some primitive way recognizing that it is wrong for others to take that property. There is an even richer literature exploring the neural correlates of keeping promises and breaking them, showing significant brain differences between the two.[64]

So we need to adjust our model of human nature from *Homo economicus*, selfish man, and *Homo exchangius*, trading man, to *Homo juri*s, rule-following man. The two rules our brains have been built to presumptively follow are: don't steal and don't breach. Laws based on

these two rules, and civilization itself for that matter, are not cultural Johnny-come-latelys to the human story. We have been mostly following these two rules and occasionally breaking them forever, because our brains were built by evolution to do so.

But there is a third rule. And that's because, like our instinct to cooperate in general, our instincts not to steal and not to break promises are not overwhelming; they are weak enough that humans regularly violate them, as part of our overall tendency to defect occasionally. Neither of these first two rules could have done much evolutionary work if we did not also have rules for their enforcement.[65] So:

Rule 3: Serious violations of Rules 1 and 2 must be punished.

It is, of course, on this third rule that much of this book will be focused.

Before we turn to the specifics of Rule 3, including what natural selection might have had to say about how "serious" a violation had to be to justify punishment, and what kinds of punishment, we turn in the next chapter to the twin problems of how we discovered cheaters and what our brains made us feel about them when we discovered them.

Notes to Chapter 1

1. Joseph Wood Krutch, in his 1956 book THE GREAT CHAIN OF LIFE (U. Iowa Press 1956), devoted an entire chapter to this idea that the deepest of original sins is the animal need to steal protein from other living things:

   > [A]ll animals must eat something which is or was alive. It may be either a plant or another animal but only plant or animal matter contains protein and without it they cannot live. No animal, therefore, can be innocent as a plant may be. The latter can turn mere inorganic chemicals into living tissue; the animals cannot. All of them must live off something else. And that, perhaps is the deepest meaning of Original Sin.

   Id. at 41.

2. The Social Problem goes by many different names, and comes in many different flavors, often depending on the particular discipline describing it. Economists and political scientists typically call it the "commitment" or "collective action" problem, whereas biologists and anthropologists usually call it the "trust," "reciprocity," or "altruism" problem. In his wonderful book, PASSIONS WITHIN REASON: THE STRATEGIC ROLE OF EMOTIONS (Norton 1988), Robert Frank describes the commitment problem