

## I

## The Alien's Challenge

This book is about the strangest animal in the world – the animal that’s reading these words and the animal that wrote them: the human animal. Because we’re so used to being human, and to living with humans, we sometimes don’t notice what a peculiar creature we are. As a corrective, I want to begin by looking at our species from a new perspective. This perspective might initially seem somewhat alien to you... but so it should because that’s the perspective we’ll be using. We’ll be looking at our species through the eyes of a hypothetical, hyperintelligent alien – an anthropologist from the planet *Betelgeuse III* – as it visits the Earth on an intergalactic *Beagle* and studies us “as someone with a microscope studies creatures that swarm and multiply in a drop of water.”<sup>1</sup> But this isn’t just any old hyperintelligent alien. It’s a gender-neutral, asexual, asocial, amoral, areligious, and amusical alien. It is, in other words, a stranger to many elements of human life that are so familiar to us that we simply take them for granted. And that’s why its perspective is useful. The alien’s uncomprehending eyes will make the familiar seem strange, waking us to aspects of humanity that we normally overlook and which are so deeply ingrained that we don’t even notice require an explanation.

Before going any further, I should probably make clear that I don’t believe for a minute that extraterrestrials have actually visited Earth. It’s certainly possible that intelligent life has evolved elsewhere in the universe. But there’s no good evidence that any of it has traversed the interstellar darkness to spy on us, probe us, or otherwise interact with our civilization. (As Stephen Hawking once said, “I am discounting reports of UFOs. Why would they appear only to cranks and weirdos?”)<sup>2</sup> Nonetheless, it is still valuable to ask: If an alien *did* drop in on us, how would it view

our species? What would it make of our sex differences, our sexual behavior, our child-rearing patterns, our social behavior, our religions, our languages, music, and science? By way of an answer, here's how I imagine that an alien's report on our unusual species might read...

### The Alien's Report

Excerpted from the prestigious journal, *Proceedings of the Betelgeusean Academy of Sciences*.

Earth is a small and inauspicious planet orbiting an average star on the outskirts of our galaxy. It first came to the attention of the Great Galactic Counsel around twenty-five cycles ago, when one of our top otherworldologists, Seer Ram Tin, detected some strange happenings in and around the planet.<sup>3</sup> For most of its four-and-a-half-billion-year history, the Earth changed only slowly, other than an occasional shakeup caused by asteroid impacts or volcanic activity. A few thousand years ago, however, the pace of change suddenly and dramatically quickened. Forests began disappearing, to be replaced with fields of “corn,” and “rice,” and “wheat.” The ground started sprouting strange structures, now known as “cities,” which spread across the planet's surface like bacterial molds. The land surrounding the cities divided itself into rectangles and other geometrical shapes. Then, in the last century, the process went into overdrive. The Earth suddenly became a major emitter of radio waves. Weird metallic objects jumped into orbit around the Earth, or left the Earth altogether and traveled to other worlds. These lonely wanderers sent a continuous stream of information back to their home planet, leading some Betelgeuseans to suggest that the Earth was growing a sensory system, thereby becoming aware of itself and its surroundings. It was this possibility that first drew the attention of the Great Galactic Council.

After three nanoseconds of in-depth discussion, the Council decided that a senior otherworldologist should be dispatched to the Earth to investigate more closely. As the most brilliant and distinguished otherworldologist available on short notice, this great honor went to me, and I charted a course for the Earth. Upon arrival, I quickly ascertained that some of the metal machines orbiting the planet contained meat creatures. This confirmed what many already suspected: that evolution by natural selection was taking place on Earth. At first, it was unclear what role the meat creatures (or “humans”) played in the

strange events we'd detected. One suggestion was that they were the sex organs of the cities or maybe of the metal machines – the means by which the cities and the machines reproduced themselves.<sup>4</sup> Another suggestion was that the meat creatures were slaves of the corn, the rice, and the wheat. Perhaps, these plants had somehow tricked the humans into launching a genocidal culling spree on their main competitors – the trees – and figured out how to get the humans to sow and spread them instead.<sup>5</sup>

Although we haven't completely ruled out any of these hypotheses, most otherworldologists now believe that the humans themselves were the driving force behind the strange events on Earth. The most plausible computer simulations suggest that this fragile planet recently suffered a plague of technology-wielding humans. By accident or by design, these crazy meat robots discovered ways to convert more and more of the matter of the Earth's biosphere into more and more human beings. In doing so, they rapidly overran the Earth. They enslaved the plants, built the cities, and ordered the metal sense organs into orbit. Based on this assessment, the humans became the primary focus of my investigation. What follows is a summary of my observations to date.

**Trigger-Warning!** Human beings are so extreme and bizarre that some Betelgeuseans were initially unwilling to accept that they genuinely existed. Perhaps, they suggested, the whole thing was a hoax set up by the Grimmies of Sector Four. Alternatively, perhaps humans were selectively bred as a practical joke by the Narbo people of the D-Star region, well known for their overenthusiastic application of the techniques of selective breeding to inferior life forms. In light of these allegations, I must stress that everything here reported has now been verified by the Great Galactic Council. Human beings really do exist, and there's not a shred of evidence that they've been tampered with by any extraterrestrial intelligence.

### **The Strangest Animal**

Let's start at the beginning. Human beings are collections of atoms organized into self-replicating systems or "life forms." Most life on Earth consists of single-celled organisms: free-living, solitary cells. Every human being starts out this way as well – as a cell so small it would barely be visible to its own adult eyes. But this original cell

soon begins to divide and multiply, and before too long, the expanding society of cells arranges itself into the shape of a human being. An individual human organism, therefore, is actually a vast colony of single-celled organisms. Human cell colonies belong to a family of cell colonies known as “animals.” Periodically, these cell colonies establish new cell colonies – in other words, they reproduce. Like most animals, humans reproduce in a strange and inefficient manner. Rather than simply cloning themselves, pairs of humans merge their hereditary material to create offspring that are mere “half-clones” of each parent. Not just any pairing will do, though. For some reason, humans come in two basic morphs: male and female. One of each is required to establish a new human cell colony. Most animals live in the sea. Humans, in contrast, live at the bottom of the sky on slow-moving rafts called “land masses.” Like all land animals, however, humans are the descendants of sea creatures. To be precise, humans are modified fish – land fish, one might say. Their arms are modified fins; their jaws are modified gills.<sup>6</sup> Like most land fish, and indeed like most animals, humans hibernate once or twice a day, ultimately spending around a third of their brief lives in this plant-like state. No wonder it took them so long to establish their civilization, such as it is.

The more closely I looked at these tiny monsters, the more confused I became. By this time, I’d established that humans are products of natural selection, not some weird lab experiment. As any well-educated life-form knows, natural selection produces entities designed to keep themselves alive and create more of their kind. In many ways, humans fit this description: They suck up bits of the environment as fuel; they run away from threats; they make and care for new human cell colonies. In many other ways, though, humans defy the ancient biological imperative to survive and reproduce. For one thing, they crave substances that are bad for them. People everywhere have a strong, almost irresistible appetite for foods that make them unhealthy, and which drastically shorten their lives. This makes about as much sense as having an appetite for poison. How could it evolve? Another mystery is that human fears are poorly matched to the dangers in their environment. Many humans are afraid of animals such as snakes and spiders, even though most humans live in cities where these creatures pose little threat. Similarly, many miniature humans (or “children”) are terrified of the dark, even though most humans live in boxes that keep them safe from night-lurking dangers. As well as

fearing things that pose little threat to their survival or reproductive prospects, humans show no natural fear of many things that genuinely do pose a threat. This includes items as diverse as “junk food,” “cigarettes,” and “driving too fast without a seat belt.” It also includes items such as “condoms” and “the pill.” Not only are most humans unafraid of these fertility-harming contraptions, many use them deliberately to block their own fertility. Why on Betelgeuse would natural selection design them to do *that*?

As mentioned, humanoids come in two main varieties: male and female. Some don't fit easily into these categories, but the vast majority do. Males and females not only look somewhat different, they behave somewhat differently too. The larger ones (males) tend to be more aggressive, more sexually reckless, and more willing to take life-threatening risks. The smaller ones (females) tend to be more selective about their sexual partners, more involved in childcare, and somewhat longer lived. On spotting these differences, I immediately became curious about how they'd come to exist. Are they programmed into the humans' necktop computers (or “brains”) by their families and the people around them? Or do the differences go deeper than that? Are they part of the bedrock nature of these upright, furless apes?

With these questions lodged firmly in mind, I quickly scanned the entire animal kingdom with my Animascope 5000, and made two profound discoveries. The first was that the same kinds of sex differences I'd spotted in the humans are found in many other animals as well, including most mammal-fish. This led me to suspect that the human sex differences are not purely products of cultural programming. The second discovery, however, was that the human sex differences are not nearly as pronounced or polarized as those found in most other species. In most mammal-fish, for instance, males alone compete for mates, and females alone choose from the males on offer. Among humans, on the other tentacle, *both* sexes compete for mates and *both* are choosy about their mates, at least when it comes to long-term pairings. Similarly, in most mammal-fish, the females alone care for the young and the males are mere sperm donors. Among humans, in contrast, *both* sexes commonly care for their hideous young – an arrangement more often found in bird-fish than in mammal-fish. Certainly, male humans tend to compete more fervently, and female humans tend to be choosier and more parental. But these differences are much more modest than those seen in most other species. What in the name of Kurtron the Destroyer is going on?

(Incidentally, should you ever have the misfortune of meeting a human being, don't mention any of these sex differences. Many humans find them strangely upsetting. At the risk of being vaporized, I must admit that I was unable to work out why.)

The human reproductive process is exceedingly bizarre, even by Earthling standards. Humans size up potential mates by visually inspecting the outermost layers of their bodies, and especially the front parts of their heads. To Betelgeuseans, all humans look the same. To one another, however, the subtlest differences in appearance – a slight deviation from symmetry, for instance, or the slightest hint of a wrinkle – can make the difference between being “beautiful” and being “aesthetically challenged.” Why do they have these seemingly arbitrary preferences?

Once a suitable mate is located, humans engage in various peculiar mating rituals. The male, for example, may give the female a bundle of plant genitals (or “flowers”), or the pair may take turns making noises at each other while imbibing fermented plant juice. Every now and then, these mating rituals trigger an intense two-person madness called “love.” Humans in the grip of the love-madness become obsessed with each other, and idolize each other in a way that seems unlikely to survive rational scrutiny. Stranger still, if a love affair collapses, this can usher in months or even years of misery and moping. It's hard to imagine that this is a biologically useful way for a human to spend its time. And love can even be actively dangerous. Humans sometimes kill over love – themselves, a former lover, a rival for a lover's affection. At first, I wondered whether the love-madness is a maladaptive glitch or perhaps the product of a mind-controlling virus. But after discreetly scanning a sample of humans with my trusty Animascope 5000, it became clear that love is built into the basic structure of the human animal. Why would natural selection favor such an irrational and potentially debilitating syndrome?

Every now and then, the humans' strange mating antics lead to the production of half-clones – or “babies,” as the humans more often call them. To Betelgeuseans, human babies are gruesome and frightening. For the humans themselves, however, babies are the cutest, most intrinsically important aggregations of matter in the entire visible universe. Indeed, I'm not exaggerating when I say that the bond between parents and their offspring is stronger than a Martian mud wrestler. Parents will risk life-and-modified-fin to protect their offspring, and should one of their offspring die, parents will regularly leak salt water

from their eyeballs for the rest of their natural lives. To be clear, I'm not suggesting that humans act this way toward *all* the young they encounter. People are vastly more likely to feed, clothe, and love their own offspring than they are the offspring of others. For an impartial Betelgeusean like myself, this makes little sense. Wouldn't it be better for the species if everyone just cared for everyone?

I know what you're thinking. You're thinking: "Listen here, you multi-tentacled fool! Human beings are in the pre-singularity phase of their evolution. During that phase, which mercifully we passed through eons ago, the only individuals that survive and leave descendants are those that ruthlessly pursue their own interests. So *of course* humans care more about their own offspring than they care about anyone else's!" It's a fair point (although the "multi-tentacled fool" comment was a little out of line). However, when we look at things from this perspective, it simply flips the mystery on its head. Humans clearly care a lot about themselves and their offspring. But that's *not all* they care about. To begin with, they care as well about other relatives, including siblings, cousins, nieces, and nephews, none of whom could continue their line. Why would that be? Whatever the answer, it's not unique to humans. *Most* animals are nicer to their relatives than to unrelated life forms. In fact, compared to other animals, the thing that really stands out about human beings is how nice they can be to *non*-relatives. Humans cooperate with non-relatives to a degree unmatched by any other species on Earth. And not only do they cooperate, they often care deeply about them. Sometimes they leak from their eyeballs if they spot images of non-relatives suffering or starving half-a-world away. Sometimes they help non-relatives even when the non-relatives could never return the favor, and when nobody else is watching. And sometimes they risk life-and-modified-fin to help unrelated humans – or even members of other species. This selfless behavior once again makes humans a puzzling exception to every known rule. Why don't they just look out for themselves and their nearest relatives, like any other self-respecting Earthling?

I should add that, nice though they can be, humans are also quite capable of treating each other abysmally. Young male humans periodically coalesce into groups and start maiming or killing members of other groups. People have been known to incinerate each other, slice off each other's body parts, and call each other hurtful names. They imprison other animals by the millions, torture them, and then heat and eat their corpses. And yet still it has to be said: Despite their many,

*many* flaws, human beings are among the most cooperative and altruistic carbon-based life forms in this neck of the galaxy.

### **Infested with Ideas**

They're also among the most baffling. Human beings devote extraordinary quantities of time and energy to activities that, as far as this Betelgeusean can tell, do nothing to help them survive or reproduce. I'll give you some examples. First, humans spend many hours of every day making noises at each other through the holes in their faces. Indeed, except when they're hibernating, humans just don't shut up! It took me quite some time to determine what function their funny face noises served – a full nanosecond, to be precise. For the most part, they use the noises to transmit ideas between their tiny brains. But here's the peculiar thing: Most of these ideas are entirely unrelated to matters of survival or reproduction. Often they're designed simply to elicit the weird “ha-ha” noises that humans regularly emit. Otherwise, they tend to be about the weather or other people's failings. Strange.

Second, most humans believe in invisible beings called “ghosts,” or “spirits,” or “gods.” Many spend vast amounts of time thinking about these beings and attempting to communicate with them telepathically, and many gather together regularly to perform costly and elaborate rituals, aimed at persuading the beings to be nice to them. On top of that, many make strenuous efforts to persuade *others* to believe in the invisible beings and to engage in the costly rituals. And they do all of this despite a relative paucity of evidence that the invisible beings exist or that the rituals actually work.

Third and finally, humans everywhere devote significant chunks of their lives to stimulating their brains in various inexplicable ways. Many, for instance, while away the hours making or staring at colored splodges on canvass or cave walls – splodges that resemble items in the world such as nude humans, other animal cell colonies, or plant genitalia. Many deliberately hypnotize themselves with rhythmically patterned noises – simple, repetitive sounds which, for some strange reason, evoke strong emotional responses in humans, and produce weird side effects such as foot tapping, head bobbing, and even full-body rhythmical spasms. And many spend hour after hour and day after day sitting in a peculiar trance-like state, staring at flickering images on flat screens – images, for example, of simulated events they



know full well never happened, of other human beings mating, or of baby mammals behaving incompetently.

Consider how bizarre this all is. If humans devoted, say, 20 percent of their time to the chattering, the beliefs and rituals, or the splodges and rhythmical noises, this would mean that every fifth mouthful of food they ate would be siphoned off to fund these seemingly pointless activities. Why don't they devote this time and energy instead to manufacturing as many babies and grandbabies as possible, like every other species on Earth? At this stage, I have only one firm conclusion: I'm stumped. Truly, humans are strange fish.

And I've yet to discuss the strangest thing of all! As you've probably gathered, humans are far from mental giants. Their brains take years to master even simple ideas, such as relativity theory and quantum electrodynamics. Their memories are leaky, such that they rapidly forget most of the moments of their short and troubled lives. And they need intellectual prostheses, such as calculators and computers, to solve mathematical problems that Betelgeuseans solve unaided in mere picoseconds. Yet for all their intellectual foibles and frailties, these odd bio-robots have somehow come to possess knowledge far in advance of their powers. Needless to say, their knowledge is primitive compared to the glories of our own. But it still vastly outstrips their paltry intellects. How did a species whose brightest members can't even do differential calculus in their heads come to acquire such an intricate knowledge of reality? How did meat robots come to glimpse, however dimly, the nature of the Big Bang that birthed the entire universe, the evolutionary process that created them from dust, and the physical laws that govern all matter and energy? You're probably thinking: "It's obvious! These lowly creatures were visited by the Lokies of the Third Quadrant, long suspected of breaking Galactic Law and giving the sacred knowledge to primitive life forms." But the Lokies have watertight alibis spanning the last three thousand years, so that can't be it. Thus, the question remains: How did this hapless creature come to possess such an impressive body of knowledge? How did a mere ape come to understand the vast universe of which it is but a tiny, fleeting fragment?

### Meeting the Alien's Challenge

As you can see, the alien scientist would be entirely confused by our species. Hopefully, having read its report, you're confused about a few

things too. It might sound strange to say that we could be confused by ourselves; after all, we *are* ourselves, and surely if anyone's going to understand human beings, it's going to be us. But a moment's reflection reveals that this can't be right. History presents us with an endless parade of conflicting ideas about human nature and the human condition: the traditional Christian view that humans are fallen angels tainted by original sin and bound for heaven or hell; the Hindu view that we're karma-collecting souls living out one life after another; the Cartesian view that we're immaterial minds piloting mechanistic animal bodies; the materialist view that we're soulless arrangements of matter; Hobbes's view that we're violent and selfish creatures tamed by civilization; Rousseau's view that we're kind and peaceful creatures *corrupted* by civilization; Freud's view that we're conflicted beings driven by childhood traumas and powerful unconscious urges; Skinner's view that we're learning machines shaped almost entirely by reward and punishment – and so on. Logic dictates that not all of these ideas can be the whole truth and nothing but the truth. At the most, one can be. But none of them has been held by more than a fraction of the world's population. Thus, over the course of human history, *most* human beings must have held false beliefs about the nature of human nature and the causes of their own behavior. Being human is no guarantee that we'll understand human beings. Even in the age of science, we understand the motions of the distant, ancient stars better than we understand the organism observing them: ourselves.

Still, we may find ourselves at a unique moment in history: a moment in which it's possible for the first time to sketch out an explanation for human behavior and human culture that has at least a reasonable chance of being accurate. That's the aim of this book. Given that so many have failed before me – the bulk of humankind, to be precise – this might seem like a somewhat over-ambitious aim, if not a delusional one. But the answers I'll give are not mine alone. They're based on the cumulative efforts of thousands of philosophers, scientists, and psychologists working over many centuries. These thinkers and tinkerers haven't just been spinning their wheels. They've made some real progress. Since the mid-twentieth century in particular, science has made enormous strides toward answering our deepest questions about human nature – much more than most people realize. My job is to piece together some of the best answers, and to try to solve the mysteries highlighted in the Alien's Report.

The guiding assumption of the book is that the alien's questions can be answered using two broad theoretical frameworks, both of which are

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children of evolutionary theory. The first uses evolutionary theory to shed light on the human mind and behavior.<sup>7</sup> The second uses evolutionary principles to shed light on human culture.<sup>8</sup> The approaches go by various different names, but I'll refer to them as *evolutionary psychology* and *cultural evolutionary theory*. Between them, these approaches provide us with a toolkit of ideas and hypotheses to help us to answer the alien's questions.

The starting point for evolutionary psychology is the idea that human beings are animals, and that like all animals, we're products of natural selection. This is true of our bodies, but it's also true of our minds. To see what this means, we can start by looking at our pets: our cats, our dogs – even our pet snakes or tarantulas. As different as we are from these creatures, we also have a lot in common: We eat; we retreat from threats; we mate with members of our own species. Clearly, these are things we evolved to do. Equally clearly, however – at least in the case of the humans, cats, dogs, and snakes – conscious mental states play a crucial role in orchestrating these behaviors. Hunger motivates eating; fear and pain motivate retreat from threats; sexual desire motivates mating. These basic feelings, desires, and drives are just as much a product of natural selection as the behavior they help to generate. The same goes for the various general-purpose psychological abilities that we all possess and without which no behavior would be possible, including our basic sensory abilities, the capacity to learn and remember, and the capacity to move our bodies. Just like eyes and wings, teeth and claws, these elements of human psychology are adaptations crafted by natural selection.

At this basic level, no sane psychologist would deny that selection has helped shape the human mind. What distinguishes evolutionary psychologists from other psychologists is that they take this line of thought much further. Natural selection, in their view, doesn't just explain our most basic drives and abilities, or the things we obviously have in common with other animals. It also helps to explain many things that psychologists traditionally ascribed solely to learning, socialization, and culture. This includes various sex differences, a range of mate preferences, complex emotions such as love and jealousy, and the tendency to favor our relatives over unrelated individuals. For much of the twentieth century, psychologists failed to spot the evolutionary underpinnings of these phenomena, for two main reasons. First, they didn't know enough about other animals and thus didn't realize that similar traits and tendencies are found in other species. And second, they didn't know enough about evolution. To truly understand ourselves, argue evolutionary psychologists,

we need to understand the process that created us. What did natural selection design us to do?

To cut a very long story very short, selection designed us and all other organisms to do one thing and one thing only: to pass on our genes to future generations. The rationale for this is simple: If you were a gene and you helped to build an organism that *didn't* pass on its genes, or that did so less competently than its neighbors, you would quickly disappear from the gene pool. The only genes that have staying power are those that help to build “gene machines” – organisms that act as if their one true goal in life is to make sure that their genetic endowment is passed on to as many new organisms as possible. The three main ways they do this are by staying alive, having lots of offspring, and helping their relatives to stay alive and have lots of offspring as well. Obviously, things get a lot more complicated in the human case. But the complications don't nullify the importance of the gene machine perspective. It's the foundation of the evolutionary approach to psychology.

As we'll see in later chapters, evolutionary psychology answers many long-standing questions about human nature and human behavior. Why are men the main consumers of action movies, pornography, and prostitutes, whereas women are the main consumers of romance novels and health advice? Why, when choosing sexual partners, are close relatives almost always off the menu? Why do we fall in love and why doesn't it always go smoothly? Why do women do the lion's share of child rearing? Why do men do any at all? (In most species, they don't.) Why is blood thicker than water? And why are people so much more cooperative than virtually any other animal on Earth? In each case, these tendencies are not merely products of learning or culture. They're woven into the very fabric of human nature.

Evolutionary psychology represents a profound shift in our view of ourselves and the wellsprings of our behavior. Many argue that it's the biggest paradigm shift in psychology since the cognitive revolution of the 1950s. Indeed, the biologist Richard Alexander once went as far as to describe the application of evolutionary principles to social behavior as “the greatest intellectual revolution of the century,” on a par with relativity theory and quantum mechanics.<sup>9</sup>

But it's not enough!

It's enough for goats and jellyfish and hummingbirds, but it's not enough for us. The reason is simple: culture. Culture is our real gimmick as a species. It's not our big brains, our opposable thumbs, or our facility for finding new and improved ways of killing each other. It's our capacity

for culture. Humans are as dependent on culture as we are on oxygen; without it, we're as naked and vulnerable as a crab without a shell. True, we're not the only animals with culture. But no other animal does it quite like us. Ten thousand years ago, the pinnacle of chimpanzee culture was using twigs to extract termites from termite mounds. Today, the pinnacle of chimpanzee culture is... using twigs to extract termites from termite mounds. Humans, on the other hand, went from Stone Age technology to Space Age technology in less than 10,000 years. The gaping chasm between our cultural achievements and chimps' has a lot to do with the fact that we're smarter than they are. But it has at least as much to do with the fact that human culture is *cumulative*: It advances through the accretion of a thousand little improvements, and then a thousand more. As soon as we evolved the capacity for cumulative culture – as soon as we opened that Pandora's Box – culture began to evolve in its own right, independently of biology.

To illustrate, consider Plato and Aristotle. Plato and Aristotle were almost certainly more intelligent than most people living today. And yet most people living today have a vastly more accurate view of the universe than these Ancient Greek philosophers. Indeed, most *preschool children* have a more accurate view, because most know that the world is a spinning rock orbiting a great ball of fire (to paraphrase the physicist Richard Feynman). In a certain sense, then, today's preschoolers are smarter than the greatest sages of the ancient world. This has nothing to do with biological evolution, and everything to do with our ability to stockpile knowledge and add to the common pool of knowledge over time. Of course, human biology makes culture possible in the first place. Our dogs and cats are no better informed than they were in Plato or Aristotle's day, despite being at our sides throughout the great expansion of our knowledge. But although culture is, in that sense, a biological phenomenon, it's one that has come loose of its biological moorings. Culture is a semi-autonomous evolving system, made out of ideas.

What drives the evolution of culture? How did we get from hunting and gathering in small nomadic bands to building skyscrapers and catapulting ourselves to the moon? Intelligence no doubt played a large role. But intelligence turns out to be a lot less important than we'd always assumed. Culture is shaped as well by the blind, mindless process of natural selection. As we'll see later, this applies to everything from languages to businesses and even to teddy bears.

To be clear, the claim is not that cultural evolution is a result of natural selection operating on genes. The claim instead is that cultural evolution

is a result of natural selection operating on what the evolutionary biologist Richard Dawkins called *memes*: ideas, beliefs, practices, tools, and anything else that gets passed on via social interaction.<sup>10</sup> To understand cultural evolution, we need to understand which memes natural selection favors and which it discards – in other words, which memes survive in the culture and which go extinct. Often the memes that survive are those that benefit the individuals who hold them or the groups to which they belong. Sometimes, however, memes survive even when they *don't* benefit the individual or the group, purely because they're good at surviving. Buzzwords and irritatingly catchy tunes (also known as *earworms*) are innocuous examples of memes that survive despite not being good for us. As I'll argue in Chapter 6, other examples are not so innocuous.

The parallels between biological and cultural evolution run deep. I mentioned earlier that natural selection operating on genes gives rise to gene machines: organisms designed to pass on their genes. Natural selection operating on *memes* doesn't give rise to "meme machines" exactly, but it does do something similar. It gives rise to ideas and ideologies that, in effect, convert human gene machines *into* meme machines – that is, into beings that devote their time and energy to passing on their memes: their values, their religions, their love of modern art.<sup>11</sup> Again, the rationale for this is simple: Any memes that *didn't* somehow motivate their hosts to pass them on would quickly vanish from the culture, leaving only those that did.

What are we, then – gene machines or meme machines? The philosopher Daniel Dennett put it best. Human beings, argued Dennett, are *gene-meme hybrids*: morphs of the sometimes conflicting agendas of our genes and our memes. This is the perspective we'll adopt in this book in our quest to answer the alien's questions. To get the ball rolling, let's turn to the much loved, much maligned field of evolutionary psychology.