

LANGUAGE

THE

CULTURAL

TOOL

DANIEL L.

EVERETT

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Daniel L. Everett



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To my mentors and former officemates,

Marcelo Dascal and John Searle,
rare teachers both

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'Instead of notions borrowed from books and immediately changed into philosophical concepts, was confronted with the lived experience of native societies, by the commitment of the observer. My mind escaped from the claustrophobic steam bath to which it had been confined by the practice of philosophical reflection. Led to the open air, it felt refreshed by the new breath. Like a city-dweller released in the mountains, I became intoxicated, while my dazzled eyes examined the richness and variety of the scene.'

Claude Levi-Strauss, *Tristes Tropiques* (1955)

'If a man is offered a fact which goes against his instincts, he will scrutinize it closely, and unless the evidence is overwhelming, he will refuse to believe it. If, on the other hand, he is offered something which affords a reason for acting in accordance to his instincts, he will accept it even on the slightest evidence. The origin of myths is explained in this way.'

Bertrand Russell, *Proposed Roads to Freedom* (1918)

Preface

People of the twenty-first century are developing new technologies that have already altered the foundations of learning, teaching, art, science, politics, government, business, music, and literature. The most interesting aspect of these exciting innovations is that they are all made possible by a single tool, human language, *instrumentum linguae*.

The idea that language is a tool has been around for a long while. Lev Vygotsky, the great Soviet psychologist, was one of the first to make this claim explicitly in modern times, though Aristotle framed language in these terms more than 2,300 years ago.

But no one has quite gotten around to weaving together the findings of modern linguistics, psychology, and anthropology to flesh out the meaning of the hypothesis that language is an artifact, a *cultural tool*. An instrument created by hominids to satisfy their social need for meaning and community. This is our ambitious project.

Some experts say language is an instinct, rather than the invention of a community of minds. Most, however, believe that instincts are simple, unlearned reflexes. An instinct is a baby's desire to suckle. But language is learned and complex, a work of function and form developed and honed by human cultures since the dawn of our species.

THE GIFT OF PROMETHEUS

'Then Prometheus, in his perplexity as to what preservation he could devise for man, stole from Hephaestus and Athena wisdom in the arts together with fire – since by no means without fire could it be acquired or helpfully used by any – and he handed it there and then as a gift to man.'

Plato's Protagoras

The Greeks told a myth about one of mankind's greatest tools, fire. The story's hero was Prometheus, whose name means foreseer. Prometheus grew fond of the creatures that Zeus had asked him to help create, man and woman. He watched them with pity as they huddled cold and fearful of the dark, stumbling blindly after every setting of the sun. He knew the solution to their problem – fire. But Zeus did not want humans to have fire. Fire would give humans more power than Zeus intended. They might even rival the gods themselves. So Zeus forbade it.

Prometheus knew the risks of disobeying the king of the gods. Yet for pity and for love he smuggled a charcoal lit by Apollo's fiery chariot out of Olympus in a fennel stalk. No matter how pure his motives, Prometheus paid a horrible price for his charity. Zeus condemned him to an eternity of pain chained to a rock in the Caucasus, where each day his liver was consumed by a large vulture, regenerating every night in order to fuel his pain on the morrow. Only when the mighty Hercules slew the vulture and broke the chains was Prometheus freed.

The myth of Prometheus, like all good myths, encapsulates cultural values and offers answers to keep a group of *Homo curious* satisfied until a better answer comes along. In the myth we can take away the belief that fire originated once in the human story. We are given a glimpse of the problems that fire was meant to solve. And we are taught that the coming of fire was a momentous event in human history.

The Hebrews' myths also include a narrative about their gods coming to fear the growth of human power. But the Hebrew story differs dramatically from the Greeks'. The Hebrew scriptures recognize that the power of language is greater than that of fire. The Hebrew god was not threatened by humans' control of fire, but rather by their ability to talk to one another. From this appreciation for the power of language emerges the Hebrew myth of the Tower of Babel – the tower that was raised to threaten the gates (Bab) of god (El). In this myth God was not worried about the physical technology of his creation, whether picks, axes, fire, or the like. He is instead infuriated by humans' ability to work together. This threatens his power. And their cooperation rests upon their communication. So God scatters his people across the face of the earth. Or as the Bible puts it:

And the LORD said, 'Behold, they are one people, and they all have the same language. And this is what they began to do, and now nothing which they purpose to do will be impossible for them.' 'Come, let Us go down and there confuse their

language, that they may not understand one another's speech.' So the LORD scattered them abroad from there over the face of the whole earth; and they stopped building the city. Therefore its name was called Babel, because there the LORD confused the language of the whole earth; and from there the LORD scattered them abroad over the face of the whole earth.

Genesis 11: 6–9 New American Standard Bible

Ironically, the Hebrew god was not a linguist. He did not seem to realize that diversity strengthens *Homo sapiens*, and diversity in language and culture strengthens us the most. According to the Bible, God created one man, Adam, and gave him the charge of learning about and naming the flora and fauna of creation. By spreading Adam's descendants around the globe God in effect created a thousand Adams, learning about and naming not just the Garden of Eden, but the entire world – wherever the children of Prometheus have gone, they have taken fire and language to master and learn about their world. This means that no one of us speaks the 'right' language. We all speak the language(s) that helps us and the languages are formed to meet the needs of our culture and social situation.

The Hebrews were right about one thing, though. The uttering of the first noun or verb, as non-momentous as that sounds, was arguably of greater importance than the stealing of fire from the gods of Olympus. Nouns and verbs are the basis of human civilization. Without these and other words, we could not utter history and life-changing phrases like 'I now pronounce you man and wife,' 'This must be the place,' or 'I name this ship the *Titanic*.' If it were not for words, Founding Father Patrick Henry could never have uttered his famous sequence of two nouns, one pronoun, one disjunctive particle, and one verb, 'Give me Liberty, or give me Death!' With nouns and verbs society was founded. With nouns and verbs the growth of human knowledge began.

Naturally, therefore, a research question that captivates many modern thinkers is precisely the origin of nouns, verbs, sentences, stories, and other elements of human language. Did language and its parts come about suddenly or did they emerge gradually as cultural adaptations?

This book is about the development of this great linguistic tool of our brains and communities, the cognitive fire that illuminates the lonely space between us far more brightly than the light of flames ever could. Here we look at the story of mankind's greatest tool, its purposes, and how it might have come to be.

Unlike physical fire, the cognitive fire of language did not exist before humans called it into being. And every individual and culture in the history of our race places its own mark upon this tool. It is an invention that envelops all humans. It unites. It divides. It warms our hearts. It chills our souls. It invigorates our bodies and steels young men for battle. It gives us the greatest pleasure of all – focused and ordered thoughts. We have become *Homo loquax*, as author Tom Wolfe calls us, or 'speaking man'. We are the masters of this raging cognitive fire.

Language's contribution to our mastery of the world is one way in which it serves as a tool. It is our greatest display of cognitive technology. It is the basis for an arsenal that includes mathematics, science, philosophy, art, and music. Language enables our brains to do things they could not do without it, like solving arithmetical problems, following recipes, and thinking about where our children are going after school.

No linguist, psychologist, anthropologist, or philosopher would disagree that language

useful. But there is enormous disagreement about where this tool came from. Some say the language was discovered by chance, like fire. Others believe that one brilliant *Homo sapiens* might have invented it 75,000 years or so ago, as the Cherokee chief Sequoyia invented writing for his people. Still others claim that language is genetically encoded in the human mind, the fortuitous by-product of packing our skulls full of an unprecedented number of neurons.

Easily the most famous answer to this question, though, is that language is part of our genetic endowment and that, because of this, all human languages share an almost identical grammar –which includes sound systems and meanings. Under this view, the only significant differences between languages are their vocabularies. But this is not the only available explanation for the growth and presence of language in all humans. As I have said, I do not even think it is the best answer.

This is not a book about why one view of language is wrong and why another view is correct – although it does not shy away from stating its conclusions. Rather, this is a story about the joy of language, a joy that has filled my soul during more than thirty years of field research among indigenous societies of the Americas and life among my fellow *Homo loquaces*. From each of the nearly two dozen languages I have studied in the Amazon, Mexico, and the United States over the past decades, I have learned things about the nature of our species and our ability to communicate that I never would have learned by living a different life. I have learned about humans' relation to nature and about perspectives on living and speaking in a world delineated by the ancient cultures of the jungle. I have learned how words reach into my heart and change my life, from the poetry of e.e. cummings and the prose of William James to the fireside stories of the human family. Language gives humans their humanity.

But how did this marvelous artifact originate? How is it that all humans possess it? Why are there so many similarities between languages if each one is a tool for a specific culture? And what does it mean, finally, to say that language is a tool? Is this just a way of speaking?

The last question answers them all.

Most humans are fascinated by language, by our species' ability to talk, to inform, to persuade, to insult, to lie, and to praise – that is, to express the range of our thoughts and feelings through symbols in the form of sounds, gestures, marks on paper, drum beats, and the myriad of other ways we have found to use our senses and brains for communication. It is only natural that we should be so fascinated by this communicative technology, for nothing has more to tell us about what it means to be human than the forms, sources, and uses of which we put language. It is the foundation of every human advance, from Cro-Magnon cave paintings to Thomas Edison's light bulb to Mark Zuckerberg's Facebook. Upon it rests the 'information age.'

All human abilities, including language, derive from two sources – genes and environment. The idea that language is exclusively a product of our culture or social environment is as simplistic, unhelpful, and wrong as the opposite idea that language grows like hair, shaped by our genome with no significant learning involved. Language, like human reasoning itself, emerges at the nexus of our biological endowment and our environmental existence. The relative proportions of nature and nurture necessary for the creation of the language device

are agonizingly difficult to determine.

Yet it is the recipe for the alloy of language that has become the eye of an intellectual storm surrounding theories of human communication. Linguists, psychologists, anthropologists, biologists, and philosophers tend to divide into those who believe that human biology is endowed with a language-dedicated genetic program and those who believe instead that human biology and the nature of the world provide general mechanisms that allow us the flexibility to acquire a large array of general skills and abilities, of which language is but one.

The former often refer to a 'language instinct' or a 'universal grammar' shared by all humans. The latter talk about learning languages as we learn many other skills, such as cooking, chess, and carpentry.

The argument that we possess a language instinct usually relies on two observations: the commonality of language – all humans speak languages; and the conformity of languages – all languages share highly specific features. For the alternative proposal, that language was invented and transmitted culturally, empirical support comes from the general wiring of human neurology, our capacity for learning, and from the knowledge that many properties of language are forged by forces outside the brain. This latter proposal takes seriously the idea that the function of language shapes its form. It recognizes the linguistic importance of the utilitarian forces radiating from the human necessity to communicate in order to survive.

The purpose of what follows is both to inform and to debate. Many of the matters I discuss are controversial. But this does not make them less worthy of consideration. One of my goals here is to give alternatives a fair hearing, even if I ultimately reject them to return to the safe harbor of majority opinion. However, I will need to make a case against one view in order to make a better case for another. This is standard scientific discourse. I believe that, so long as we are civil and our evidence is worthy, it is healthy to speak negatively of one matter and positively of others.

Language: The Cultural Tool explores one simple idea: that all human languages are tools. Tools to solve the twin problems of communication and social cohesion. Tools shaped by the distinctive pressures of their cultural niches – pressures that include cultural values and history and which in many cases account in many cases for the similarities and differences between languages.

First, though, we need to have a definition of both language and culture, in order to comprehend how they work together. Language is how we talk. Culture is how we live. Language includes grammar, stories, sounds, meaning, and signs. Culture is the set of values shared by a group and the relationship between these values, along with all the knowledge shared by a community of people, transmitted according to their traditions.

I have written this for the reader interested in the nature of human language, the system that binds all of us together, the tool that allows us to communicate outputs of our minds to others. My discussion is directed at thinking about the broadest and most important issues. But there are times when it is necessary to confront the details. We need both a wide-angle lens and a microscope to view the composition and the context of language.

There are things that we need to know to come to an informed opinion about the nature of language – its use, its functions, and its forms. One such is its origin. So the discussion that follows begins on the African savannah. That can help us understand how language solved

problems – and how it kept our early ancestors alive and thriving. These problems must be confronted. We need to know how language is used by different societies. We have to understand what human bodies and brains must be like to produce language. We must examine the relationship between language and culture in numerous communities. And we need to see where the evidence lies for the conflicting ideas that language the tool is either innate or an invention.

As we get further into the issues, it will become clear that there is no unambiguous evidence for language being innate and that the very concept of ‘innate’ is too ambiguous to aid us in our quest to understand language.

But if language is a tool that is invented rather than an attribute of our genome, then the intriguing issue of similarity among the world’s languages arises. Why do languages have so many features in common if these features are not part of the genome? And if we can answer this, an equally difficult question arises. How dissimilar can one language be from another?

The latter question can stir people’s emotions. Even among many scientists it is supposed that all languages are ‘equal’ in some way. Most linguists, for example, will say that human languages are equally complex or that one language is as versatile as the next. Really? Are languages homogeneous then? But these stock answers confuse the equality of languages with the equality of human biology – human bodies and brains. I believe in the latter, but not in the former. The idea that ‘all languages are created equal’ seems grounded less in research than in a sense of political correctness. At times one gets the impression that if all languages do not share the same level of complexity or versatility throughout, then some languages must be inferior to others. People seem to worry that if we say a given language lacks grammatical devices that are found in other languages, then that this is tantamount to claiming that the speakers of one language are somehow inferior to the speakers of the other. But nothing could be further from the truth. I am not inferior to my son because he plays golf and therefore uses golf clubs, while I do not. I just don’t need golf clubs. In much the same way, languages are tools that fit their cultural niche. From an evolutionary perspective, creatures use what they need and not what they don’t. There is nothing politically incorrect in that.

At the same time, much of the emotion in the debate about relative language complexity is beside the point for the simple reason that we lack descriptions of too many of the world’s languages to know what the ‘standard’ level of complexity is for human languages. In fact, no one has given or even proposed a coherent definition of ‘linguistic complexity’ that is accepted by all scientists, though there is research being conducted on this topic now in several parts of the world.

But for some, the boundaries of language are not to be discovered by empirical research but rather by mathematical analysis. It is not necessary to conduct field research to discover the axioms of set theory. If language were solely mathematically based, we would not need to conduct field work to discover its properties, rather we would need do nothing beyond the deep contemplation of our own native language. If one adheres to this omphaloskeptic conception and its implication that the properties of languages can be deduced from a general theory without the need for spadework, then the idea that language is a cultural artifact would make little sense. But the evidence points away from the idea that languages are derived from axioms. Growing evidence leads to the conclusion that the differences and similarities of

the world's languages are outgrowths of neither mathematics nor genetics, though they have properties that are constrained by both.

This book is divided into four parts. In the first part, covering the material in [chapters one through four](#), I examine the problems of communication and survival that confronted our evolutionary ancestors. I talk about the absence of specialization of human biology for language and show how our skills at general reasoning and the formation of human communities and social interaction might have shaped the emergence of human language.

In the second part of the book, from [chapters five through eight](#), attention is focused on the solutions that nature and environment provided to the communication problem. I review the evidence that there are many solutions, not merely one, to the communication problem worldwide, considering the differences between languages of the world, as well as the similarities. I also look at the biological, mental, and socio-cultural platforms that are needed for humans to be capable of using, learning, and understanding languages. I delve deeply into the forms and functions of language, from sound structure to sentence structure and beyond. And I consider the single candidate for an instinct for language – Aristotle's proposed 'social instinct.'

[Part three](#) of the book – [chapters nine and ten](#) – looks in considerable detail at how the often invisible hand of culture shapes the forms and meanings of human grammars and languages.

In the fourth and final part of the book, my focus is on the diversity of solutions to the language problem, the importance of cultural and linguistic diversity to the survival of our species, and how human grammars can lead to happiness.

Many researchers are working today to understand how language and culture mold one another. The specific part of this question that I want to answer is how it is that the values that we hold as members of human societies shape the ways we communicate. Culture does not do it all, of course. But neither does the mind. Our cultures, linguistic forms, and minds evolve together from birth to death and even beyond the lifespan of any individual – each language is a history of the symbiosis of grammar, mind, and culture. This is why it threatens us all to see so many languages in the world threatened. The diversity of languages and their features set the perimeters of the human experience.

Language takes us through our human world. It is the theme of myths, philosophy, literature and science. In the vast majority of the world's literatures, both oral and written, humans have tried to explain the origin of their tools, abilities, and circumstances. In our early literary history, we used myths. Today we use science. Science is usually better than myths at explaining. But the myths arguably capture the grandeur of their subject better than science, because of the broad sweep of human emotions they portray, and the depth of the connection to the cultures from which they come.

PART ONE:
Problems

Chapter One

LANGUAGE AS A SOCIAL TOOL

‘To say that truth is not out there is simply to say that where there are no sentences there is no truth, that sentences are elements of human languages, and that human languages are human creations.’

Richard Rorty, *Contingency, Irony, and Solidarity* (1989)

Perspiring and exhausted, I stumbled through the Chiapan jungle looking for food. A bites had swollen into bulging, itching welts winding from my calves up to and very much including my crotch.

I was in this predicament in Mexico because I wanted to be a missionary in the Amazon. It was 1976 and I was training to be a member of Wycliffe Bible Translators. I wanted to translate the ‘word of God,’ the Christian (Protestant) Bible, for a group of Amazonian Indians. I believed then that the Bible’s words had the power to change lives for eternity. Part of the required training for this calling took my family and me to the jungles of Mexico where the Mayans once ruled, for a four-month survival training course. There we learned to live and function in an extremely primitive and rustic environment. Most of the new knowledge and skills I was learning revolved around new tools – compass, knots, machete, mud stoves and other things I hadn’t ever thought much about before.

My first task, after our initial few weeks of classes, was to build a house for my family in the jungle. I was prohibited from using nails, a hammer, or any other tools save my Swiss Army knife and a machete I purchased from the mission store. I constructed our ‘home’ from saplings and thatch from the jungle, tied together by jungle vines. I even made a bunk bed for my two daughters, Shannon (six years old) and Kristene (three years). I cut jungle wood to fashion a frame and supports for a mud stove. For the stove I used poles and vine to build a wooden box on posts I embedded into the ground. The contraption stood about three feet high. Then I filled it with wet clay and built the clay up into a chimney and a space in the base of the stove for firewood, covering it with a cast-iron cooking plate. Once I had my family set up and had purchased dry goods and a few live chickens from the mission to sustain them, I knew I would soon be called for the ‘final exam’ of all my jungle training: a survival hike.

On survival hike, which all prospective members of the Wycliffe Bible Translators had to experience, male or female, you were called out by surprise, allowed to take only what you happened to have on you at the time (except food, which was confiscated), and left on your own for three to seven days in a part of the jungle you had never been to. You never knew how long you would be there. In anticipation of the hike, I kept a canteen full of boiled water, fifty feet of rope in a tight coil, a rain poncho, fish hooks and line, a pocket knife, my machete, and some matches on my person at all times.

On the day that I was called, I felt ready. Several of us stepped into a dugout canoe with an outboard motor on the back and sped off across Lake Ocotul. (Our location was about fifty

miles east of the old Aztec settlement of Ocosingo, the nearest town. Ocosingo itself could only be reached by hiking out over the hills or flying above them from where we were.) On the opposite shore, we hiked several miles into the rain forest. From a certain point, the staff of the mission would look at one man and say, 'You stay here. We'll be back in a few days to get you.' My turn came and I was left as they walked on. I looked around me. Dense jungle. It was humid and very hot. I wanted to reconnoiter the area, find drinking water, and maybe gather some plants for dinner. But it was past 3 p.m. and I knew that night would fall suddenly around 6 p.m. I had to get to work. No time to worry about food. I would have to find water soon or dehydration would affect my ability to cope. So I began by finishing off the water in my canteen. There are many vines in the forest full of drinkable water. Next I successfully located the type of vine I had been trained to look for as it slinked down a tall tree in the jungle surrounding my campsite. I jumped as high as I could to cut it above my head, before cutting it again just above where it touched the ground. I knew that if you cut next to the ground first, the vine would suck up all of its water higher into itself. I placed my finger over the bottom end of the vine and opened my canteen. I then removed my finger and quickly inserted the end of the vine into the top. One good cut like the one I had just made from the right vine can produce nearly a quart of water. I had enough to drink for a few hours. And the water was pure and fresh. No need to boil it or treat it. Just drink it cool from the jungle.

Having secured my water, I set about building a bed and a campfire. First I cut four sturdy poles which I stuck into the ground, at the corners of an imaginary rectangle that was to become my bed. I bent the poles into asymmetrical X-shapes, with the longest ends downwards. Then I tied each pair of poles where they crossed with jungle vine. Next I notched each pole about an inch deep, two feet off the ground. Then, again with jungle vine I tied cross poles at the level of the notches I had cut. Following this, I fitted longer, sturdier poles into the notches and secured them with vine. The frame of my bed was done.

Now I needed a mattress. So I cut several saplings, six to seven feet long. These were much greener and thinner than the poles I had used for the support posts. Laying down the green shafts, I took my rope and tied it to one of the long poles in the notches. I then looped from there to the pole parallel to it, the loops all about three inches apart, until I got to the other end of the bed. Next, as though I were weaving, I worked the greener, more flexible poles up and over the rope, in and out of the loops I had made. When I finished, I had constructed, just as I had been taught by my survival teachers in the mission, a bed with a springy mattress. On one side of this bed I attached, again with vines, my rain poncho as a shelter. Then I went in search of firewood.

Gathering firewood is the most important task of the day, aside from finding water. The smoke from a fire, if the fire is built close enough to your sleeping platform, can keep mosquitoes from eating you alive while you try to sleep. The flames of the fire frighten away – in principle – most wild animals. You also need fire to cook your food (if you are fortunate enough to catch or find any). The fire gives you light at night. I spent hours cutting firewood. A base of dry wood and kindling is necessary to get the fire going. When it is hot enough, wet, green wood can be added to keep the fire going at a moderate pace, so that it burns neither too fast nor too slow. But while I was gathering firewood, I was unable to hunt, fish, or gather edible plants (my favorite and main food during this survival training was the

fiddle-head fern, which is rich in nutrients). Teamwork, I realized, would have been crucial for my long-term survival. I could get by OK for a few days, but for a longer period I would not likely have made it without someone else there to help find food and, perhaps more importantly, talk to.

During that first night, I awoke to the sound of a large creature of some sort stepping heavily near my bed. I immediately looked at my fire and saw that I had let it burn down to embers during the night. I hopped up quickly and placed more wood on the still live coals, blowing fiercely through a little rubber tube with a copper ending, which I could place directly under the coals, that another missionary candidate had loaned me just prior to my departure. With this fire-oxygenating tool, the dry wood I had placed on the coals quickly burst into flames. I clutched my machete and looked around me. Hearing nothing else, I went back to sleep. The next morning, after sleeping moderately well under the circumstances, I awoke to a rumbling stomach and with a determination to find food, be it vegetable or animal. I knew I lacked the talent and experience ever to become a serious hunter or fisher, but surely I could kill enough to stay alive if I kept at it all day?

I walked away from my campsite deeper into the jungle, careful to mark a path with my machete as I went, one small strip of bark removed on the side away from camp and two small strips on the side of the tree closest to camp (the problem, of course, being that if they were to accidentally turn perpendicular to my path, I would not see the markings I had made on the trees). Hunger cleared my senses and after a couple of hours I saw a small brown blur run towards a pile of dead leaves. It stopped – furry and big-eared. I recognized it as an agouti.

Ambitiously, I raised my machete and, in an attempt at stealth, approached the rodent. It bolted just a few feet ahead of me. I waited a couple of seconds, then moved towards it. Again it bolted. ‘I am never going to get close enough to this damned thing to kill it,’ I despaired. For a moment I wondered if I could hit it if I threw my machete at it. But then I realized the obvious: I could not risk losing my machete, my most valuable tool. As I tried to come up with an alternative plan, the sudden sound of cracking sticks and rustling leaves just off to my right startled me and broke my concentration. Another camper, Lloyd, broke out of the brush on my right, only a few feet from the agouti, even closer than me, and launched an arrow from a small bow. I turned towards the direction of the arrow and saw the agouti writhing on the ground. My colleague jumped for joy, laughing and yelling. He grabbed the still-moving dinner-to-be by the hind legs and turned towards his own camp, never noticing me standing in the jungle brush only a few feet away.

I made my way back to my little space, crestfallen. Along the way I stopped to pluck an agouti and eat my first food in two days, a handful of fiddlehead ferns.

A bow and arrow! Shit! Why didn’t I think of that. (I hadn’t even brought thinner rope to make one with.) Lloyd had planned ahead – he had brought light nylon rope, permitted by our rules, on his belt, to use as a bowstring. My survival depended on my ability to make tools to help me cope with my environment. And I had failed.

My friend and I shared a common problem: killing protein that moved faster than we did. He solved it. I didn’t. Long term, Lloyd would surely have out-survived me in the jungle unless I became more creative in my tool-making. My jungle-camp colleague was hardly a pioneer in this predicament, though. Throughout our emergence as a species, human societies

have faced this exact same 'protein mobility' puzzle. And for many millennia, the bow and arrow has been a common solution to it.

How did this wonderful tool come about? There are several possibilities. One idea is 'monogenesis,' a single (mono) origin (genesis). The bow might have been invented once and then shared by all the small bands of early humans before they left Africa. Evidence does suggest that a dozen or so millennia ago in Africa our ancestors were using bows and arrows. So the bow was probably invented even earlier. Because bows and arrows are made from biodegradable material for the most part (even today, wooden arrow heads and shafts are more common among Amazonian tribes than bone, stone, or metal heads), evidence for the bow in the fossil record is sketchy at best. Therefore it is possible that this invention, so crucial to human survival, might have been invented only once in human history. Maybe. Or perhaps several creative individuals independently invented the bow in response to the universal protein problem in various parts of Africa and the rest of the world. These questions get to the essence of what we are after.

It is possible that the impetus and general principles of bow construction were somehow made available by evolution through a specific configuration in the human genome. That could be the case and yet still be relatively recent. Or the basic genotype could be old but have been triggered into action suddenly and recently. It may have been the case that one day the growing number of connections between neurons in the evolving human brain crossed a threshold such that tool-making was a by-product of the new physics of the brain. Suddenly, a special 'tool' organ or area of the brain grew to include hard-wired knowledge for building bows when triggered by environmental problems to do so.

Our resources and time as researchers are limited. So it is important that we use care in selecting the hypothesis to investigate first. I choose the hypothesis that requires no unseen forces, whether gods or as-yet-undiscovered genes. I make this choice partially because the bow and arrow seems to be an obvious and relatively easy solution to the universal protein mobility problem. And it is a good idea to check out the most obvious solution first, for any problem. In this case, that would be the tool hypothesis. Therefore, I assume that the tool that enables me to halt mobile protein is the result neither of genes nor gods, but of human inventiveness.

But even though this might be the best hypothesis to begin with, it is not necessarily the most interesting one or the correct one. Nothing would be more exciting than to discover evidence that a god or alien showed an early human how to make a bow and arrow. Entirely unexpected information often produces the greatest learning experience. Instead of building our knowledge base up homeopathically, a little bit at a time, we make a giant leap. Big leaps are rarer than baby steps, both in evolution and in learning.

It would be nearly as exciting to discover that there *was* information in the human genome or otherwise to be found in the infant brain for making bows and arrows. Now I accept the existence of the human genome, but I do not believe that it encodes information on how to make specific tools. Maybe I am wrong. If it happened that there *were* evidence for a bow and arrow complex of genetic or cortical material, I would not only be astounded by the wrongness of my world view, I would be all the more excited and delighted by the lessons learned. To understand why I am skeptical about a genetic origin for the bow, consider this: humans are remarkable for their relatively small number of genes; humans have fewer genes

than corn. It is not clear what significance to attach to this gene differential. But it is not the possession of many highly specific genes that makes us smarter than a corncob. Rather, it is the symphony of these genes working together that makes human babies brighter than love yellow corn on harvest morning. Part of our strength as a species is that humans are more flexible and more variable than many other species. Our genes' effects may be less linear – that is, the connection between our genotype (the genes that we contain) and our appearance and behavior (our phenotype – the outworking of the genotype as it interacts with the environment) is less predictable, more likely to be the result of several genes working together, genes linked less tightly by the syntax of the human genome than the lock-step genes of corn and simpler organisms.

The point is that there is no evidence for strong matching between individual genes and the complex components of human nature. In fact there is evidence that culture can affect genes, thus enriching the process of natural selection. Anthropologists Peter Richerson and Robert Boyd have made the case that 'the process of cultural evolution has played an active, leading role in the evolution of genes.' If they are correct, then culture affects our biological evolution and our genes. And our genes are the alphabet by which their syntax writes the outline of our lives.

The discussion of bows and arrows gets us to the central hypothesis of this book: that language is a tool and, like the bow and arrow, it was invented. It might have been invented in the course of human history once or multiple times. But if I am right, language is in the first instance a tool for thinking and communicating and, though it is based in human psychology, it is crucially shaped from human cultures. It is a cultural tool as well as a cognitive tool. There are many such tools, including the concept of heroes, scientific theories, and the wheel. And yet it seems clear that language is arguably the most important of all the utensils of our brain. Like the bows and arrow, fire, and other tools, it is part discovery, part invention. Languages are the imperfect outputs of the thinking of bipedal primates, refined gradually by the tasks they perform.

Language is a cobbled-together set of answers to different facets of the problems of communication and cooperation among humans. It might not even be the best tool for communication that one can imagine.

Language is complicated. Perhaps it is the most complicated and astounding invention in the history of our species. It might help us, therefore, before we turn to tackle the hardest problem of all, to look first at some other tools of our species. The set of technologies that are either cognitive or cultural or biological is vast. To explore the range of tools, I would like to look at a series of items that many might not consider tools, from a culture of central Brazil: a game tool, a culinary tool, a set of song tools, and some decorative tools.

In 2004, I received research funding to lead a team to the Xingu (sheen-GOO) Park in Brazil for the first-ever documentation of the Suyá (soo-YA) language. I learned after my team's arrival that the Suyá preferred to be called the Kĩsedje (keen-SED-gee), the autodenomination, since Suyá is a term used by people outside their community. The Kĩsedje language is spoken by approximately 500 people in the Xingu reservation.

Kĩsedje is a member of the Gê linguistic family, which also includes the Kayapó (kai-ya-PA) and the Xavante (sha-VAN-chee), among others. Gê peoples are intimidatingly strong and vigorous – known for their ability to chase down wild game on an open plain, catch it, club

to death with a long hardwood war club, and carry it back miles away. They are so tall relative to other Brazilian Indians that when a Pirahã friend of mine from more than 80 miles away in the Amazon rain forest first saw a Gê Indian, he turned to me and asked indignantly, 'Why are we Pirahãs so short?' Gê peoples have become better known to the general public in recent years because the Kayapó chief, Raoni, toured with the rock singer Sting speaking about environmental threats to the Amazon.

After traveling to the Kĩsedjes' land I had to negotiate with the chief of the Kĩsedje Kuiussi (cu-yu-SEE), and his tribal council for permission to enter the official reservation and conduct research. Entering a tribal community is an honor and a privilege, carrying with it considerable responsibility. And most minority communities, like the Kĩsedjes, the Pirahã (pee-da-HAN), the Banawás (ba-na-WA), and others, have reason to mistrust outsiders, based on the history of violence, exploitation, and domination that characterizes western relations with indigenous Americans over the centuries. Negotiations are always delicate. Kuiussi agreed to meet with me to discuss my research project at a churrascaria – barbecue restaurant – in Canarana, the nearest Brazilian town to his village.

Kuiussi is famous in recent history for his long association with the legendary twentieth-century Brazilian explorers Orlando, Cláudio, and Leonardo Villas-Bôas, founders of the Xingu Park, adventurers extraordinaire, and tireless servants on behalf of the Indians of Brazil. I knew that he was in his late sixties, but as he entered the restaurant at noon the next day, I was struck by how much younger he looked. His long and thick, obsidian-black hair rested on broad, brown, heavily muscled shoulders. Like other Kĩsedje men, the definition of Kuiussi's biceps was accented by armbands of white cotton. Most days he wears nylon gym shorts and flip-flops, showing abundant evidence of sinew and muscle from neck to toe, but today he was wearing jeans, a polo shirt, and tennis shoes in honor of the occasion.

I was also surprised by his retinue – at least fifteen Kĩsedje men, women, and children came with him to enjoy the free lunch the gringo had promised to all (I didn't know I had). Kuiussi heaped his plate high with food, then directed his attention to me, because my research associates had told him that I, the single, nearly pigmentless American in the restaurant, was the director of the project. Kuiussi assured me that he was indeed going to allow us to work with his people and that he would facilitate this, but that first he should let us know what the restrictions were.

One of the first things that all of the Kĩsedje men were interested in was whether I was going to profit financially from this project. They had the idea that I could become famous and make considerable money publishing books and articles about their language. They made it clear that any money to be generated from their collaboration belonged to them. Fair enough, I said, but they should realize that the money was negligible, beyond academic promotions or raises that I might receive from my work. These things were important to me, I admitted, but they were not going to produce significant community wealth on their own.

Kuiussi seemed skeptical of that assessment, but he did not pursue it. He was more interested in discussing some of his principal concerns about our conduct in his village. First, no sex between us and his people. He did not want outsiders stirring up emotions and disturbing his people's social lives by sexual contact of any kind, from flirtation to intercourse. Second, no pictures without permission. Third, no naked foreigners in the village. Kuiussi explained that, although we might see Kĩsedjes *sans* clothes, that was part of the

culture. On the other hand, he stressed, public nudity is not part of the *cultura dos brancos* or 'pale people'. When whites go naked in public, he explained, they mean something very different by it than do his people. Kuiussi's understanding not only of cultural differences but of the very conceptual bases of culture itself struck me as deep and insightful. Indeed, he was right on many levels.

After talking for perhaps ten minutes, Kuiussi introduced me to his son-in-law, Nhokombe (nyo-kom-BEAR-ee). Nhokomberi, known as Nhoko, owned a home in Canarana because he was a full-time employee of the FUNAI, an acronym for the National Indian Foundation in Brazil, and so spent large periods of time outside the village. We chatted about families and such and then returned to our highly calorific and cholesterol-rich food. After lunch, we agreed to meet again in the evening at Nhoko's house to further discuss the goals of my linguistic project. Nhoko also promised to show me photos of the Kĩsedje village in which we would be working, some 200 miles away.

Upon my arrival at Nhoko's home later that afternoon, his lovely young wife came up to me, smiling sweetly the entire time, with a necklace in her hands that she wished to place around my neck. The necklace was of carved black seeds and had an unusual, shiny, and star-shaped white centerpiece. I later learned that this object came from within the brain cavity of a species of fish known to many tribes exactly for this decorative bit of calcified cranium matter.

I thanked Nhoko's wife (Kuiussi's daughter) and we all walked into the house. At Kuiussi's request, I had brought several liters of cold soft drinks for the people to sip as we talked business. After greetings all round, we sat in chairs and nine or ten men – warriors in the demeanor and expression – faced me in a semicircle, where I sat in the hot seat in the middle. I was undergoing a rigorous background check.

My inquisitors seemed satisfied after thirty minutes of questioning and everyone abruptly lightened up and the men began joking among themselves as they walked into Nhoko's backyard to get more soda. Nhoko himself retrieved some photos from his bedroom to show me. He told me that he had a house and a wife in the city and one more of each in the village, known in Kĩsedje as Ngorotire (en-go-do-TEE-re).

The pictures included images of houses, a river, Kĩsedje men and women, and different kinds of Kĩsedje food, as well as miscellaneous dogs and other animals. One of the pictures that caught my attention was of a flat disk of manioc (cassava root) bread lying on the coals of a cooking fire. The bread was layered with meat. I asked what this dish was called in Kĩsedje, thinking to begin research for a Kĩsedje dictionary. Nhoko looked intently at the picture, as several other Kĩsedje men also turned their attention to the photo I had inquired about. Then they grinned as Nhoko responded in perfect Portuguese, 'Pizza!' The Kĩsedje had adapted a native dish, **beiju** – manioc bread – to imitate a dish that has made its way around the world. Pizza makes an excellent tool for delivering food that is high in calories and taste. It is a cultural artifact, a culinary tool. This calorie delivery utensil is so effective that today many cultures worldwide have pizzas.

A Kĩsedje tool that is on its way out is the lower-lip plate. Gê men are known for lip and ear piercings. The Kayapó and the Kĩsedje used to wear plates in their lower lips. Older men still do. The Xavante men still pierce their earlobes with small wooden stakes that they rarely remove. Each of these forms of bodily alteration/decoration has its own set of meanings, a

anthropologists have discovered. Lip plates, ear piercings, and so on are cultural tools for communicating about the user's status.

A still thriving cultural tool is a clan-based competition used to promote group cohesion and clan pride. This tool is the famous 'log race' found in many communities of the Gê linguistic family, including the Kĩsedje. This event includes separate competitions for women against women and men against men. The people use logs that weigh in the neighborhood of 80–100 pounds for women and 170–200 pounds for men. The best analysis of a Gê log race comes from the leading authority on the Xavantes, the late David Mayberry-Lewis, former curator of South American ethnology for Harvard University's Peabody Museum. The village engaged in the race divides participants into two teams. Each team cuts a length of palm tree from a large log. Then a member of the team pulls a log on to his or her shoulder. Next, the log-carriers stagger down the trail, their team members running beside them, through the bushes, whooping and encouraging the person carrying the log. When a carrier tires or the team thinks it is wise, another team member offers a shoulder. By this relaying the two logs are brought back to the village and thumped down in the middle of the village. They are subsequently transformed into tools for a different purpose: forming the furniture for the men's meetings in the evenings.

Valuing toughness, village cohesion, and communication in a single activity, the log race is a notable social invention and tool, composed itself of various smaller tools (the log, the path, the village clearing, the village, and so on).

There are tools we use for a variety of purposes. Among the Kĩsedje there is even a kit of verbal tools that can be used to introduce the basic point that language is a tool, shaped in its form and function by culture. The most striking verbal tool kit of the Kĩsedje are their songs. Anthony Seeger's 2004 book, *Why Suyá Sing: A Musical Anthropology of an Amazonian People* brings the significance of music as a Kĩsedje cultural tool to life eloquently:

Kĩsedje singing creates euphoria out of silence, a village community out of a collection of houses, a socialized adult out of a boy, and contributes to the formation of ideas about time, space, and social identity.

The contribution of this study of Kĩsedje music is its view that music is an important cultural-cognitive tool for Kĩsedje society, used to perform tasks in building group cohesion and meaning.

The Kĩsedje themselves have their own explanation for the functions of each verbal form in Kĩsedje culture. These are: **kapérne**, used to refer to 'normal' speech; **sarén**, the label for speech that instructs (lessons from parents to children, from the chief to the community, from the shaman to the sick); **ngére**, referring to songs in general; and **sangére**, used for specific songs and speech invocations at specific ceremonies. Each of these genres of verbal tools in Kĩsedje has subgenres that the Kĩsedje recognize and label by descriptive phrases. For example, if you ask about 'normal' speech, the Kĩsedje will ask whether you are referring to 'plaza speech,' 'bad speech,' 'angry speech,' or some other type of speech. If someone is speaking publicly, in the open plaza of the village, their speech has both a different form and function from other types of speech.

Each of these Kĩsedje genres can take various forms. For example, **sarén** was once used by young men who were about to move from their parents' home to the men's house for a

initiation rite. Just before the ceremony began, the young man would learn a short, formulaic speech to recite at the appropriate time. Then, as the ceremony was under way, the celebrant would be decorated with bird down and ornaments. He would then *sing* a farewell in his mother's house, departing from the house slowly and dramatically as he made his way to the men's house. There he recited the instructional piece he was given, exhorting the entire village to prepare for the final ceremony. This sounds pretty familiar. We have similar rituals in weddings and graduation ceremonies in all western cultures.

Each type of song and speech in Kisedje is shaped by its function – the purpose it serves in their society, its place of performance, and its audience and performer. Kisedje songs not only exist to fulfill social functions, but their very form is constrained by the functions they fulfill. Such as the brevity of the young man's speech before the puberty ceremony – he must not delay the ritual, which applies often to many men at once, by a prolonged speech or song.

Modern western music is likewise shaped at least in part by its function. Rock 'n' roll, blues, jazz, classical and all other genres are recognized by their forms and functions. 'What does rock music do for me?' you might ask. Well, think about it. Rock does many things but it doesn't make you relax. Mainly it expresses energy, rebellion, and excitement. If we ask what any one genre is for, we are led to ask the same of others. So, what do the blues do? Classical music? These might not have obvious answers, but they are important questions.

I can illustrate this point here with the form and function of the blues, one of America's genuine contributions to the world.

First, what is the *form* of the blues? I am talking here about real, Blind Willie Johnson-Huddie (Leadbelly) Ledbetter blues. Here is a verse of my own composition to illustrate:

My heart is going down the drain.

My heart is going down the drain.

Somebody please relieve my pain.

All true blues is like this. The first line is sung twice, followed by a final line that provides a reason for sorrow, a plea, or some such. The music is equally formulaic. The first line of the verse is accompanied by a major chord (the 'tonic' chord). This line takes four bars of four beats each. The repeated version of the first line is then accompanied by a chord based on the fourth note of the scale – a C chord if the first chord was G, for example (this second chord is called the 'subdominant chord'). The second line is sung to two bars of the 'subdominant,' and followed by two more bars of the tonic. Finally, the last line, the plea, begins with two bars of the 'dominant' chord, corresponding to the fifth note of the scale, followed by two bars of the subdominant, and then ending with two bars of the tonic. That makes twelve bars in all. Hence the phrase 'twelve-bar blues.' Simple. But don't mess with the formula. Try to change it and you run the risk of ruining the blues, man. Somehow those twelve bars reach into your soul and paradoxically, since the words are about struggle and suffering, they make you happy. Blues masters from Robert Johnson to Joe Bonamassa have explored this small but beautiful musical land of the blues.

The formulae for producing lyrics and music for the blues (and rock and country – since both of these genres simply borrow a chord pattern that originated with the blues) are cultural products. The repetitive pattern of the blues is successful because it fits with what

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