
Human revolution and the origins of language



Anthropologist [Chris Knight](#) explores the role of women in throwing off our pre-human chains, lampoons prudish Marxists and takes Noam Chomsky's "anti-political" science to task.

Chris Knight is a professor of anthropology at the University of East London, and the author of the highly acclaimed and controversial book, [Blood Relations: Menstruation and the Origins of Culture](#), which outlines a new theory of human origins. Chris gives regular talks at the [Radical Anthropology Group](#) in Britain, and will also be speaking at the [Communist University](#) in London in August. Chris was talking to bloggers [Stuart Watkins](#) and [Dave Flynn](#).

SW/DF: Chris, you have been politically active on the left for more than 40 years and you have dedicated a great deal of that time to the study of anthropology. Why do you think an understanding of anthropology is so important politically?

CK: Anthropology is the study of what it means to be human. It explores the different ways of being human that can be documented from around the world. It also asks what it might be like to be almost but not quite human – to be a chimpanzee, for example. Finally, anthropology roams across time as well as space, attempting to decipher the past. Who were the Neanderthals? Did they have language? What is language anyway, and why don't other animals have it? Is private property natural and inevitable? Must women always be oppressed? Has communism ever worked? These are anthropological questions. Anthropology is where the humanities interface with the natural sciences. In fact, I think of anthropology as a kind of Clapham Junction – the place where, more than anywhere else, all routes to understanding intersect. Marx said there should be just one science and I agree with that. If we are not doing anthropology, we are not getting the big picture – not putting it all together.

SW/DF: Of course, you haven't just studied anthropology, but have contributed, in your book Blood Relations, an original theory of human origins. Could you say a little bit about what your theory is? What does it tell us about what it means to be human?

CK: Human language, consciousness and culture emerged out of a revolution – known by archaeologists as 'the human revolution'. Where consciousness is concerned, to be human is to see yourself as others see you. It means adopting the perspective of others in evaluating your own personal actions. Everyone who's been involved in an industrial dispute – everyone who has stood on a picket line – knows about this. There are immense material incentives to scab, but you know that if you did cross that line, you could never face your comrades or face yourself in the mirror again.

Based on this kind of consciousness, human solidarity stretches back to the moment when our species was born. As the human revolution broke out, it wasn't about capitalists and workers. Capitalism isn't the first exploitative system in history. Long before workers were exploited by capitalists, evolving human females were being exploited by evolving human males. In resisting such exploitation at the beginning of time, females took collective action. The first mass strike action in history was a sex-strike. When it turned into a general strike, it culminated in revolution – the most successful revolution in all history.

SW/DF: Your theory can sound totally off the wall to people who aren't familiar with the evidence it's based on. Could you briefly explain what kinds of evidence you are drawing on for your claims? Let's start with the idea that evolving human females were being exploited by males, and that they revolted against this. How do you know?

CK: If the human revolution was social, as most people would accept, then this has certain logical implications. The social dynamics we're talking about can't have been class politics for a simple reason – as yet, there were no social classes. This leaves us with sexual politics as the only logical possibility – which is why *Blood Relations* was so centrally concerned with sex.

I mention this because Marxists sometimes worry about that emphasis. I have met Marxists who say I should have focused on tool-making and labour, not sex. To this I can only reply that if you want to extend Marxism to embrace biology, as Engels advocated in [The Dialectics of Nature](#), your focus has to be procreation. Procreation is labour (the young Marx called it species-life) in its natural or pre-human form. To put this in another way, we humans are materially productive not on one level but two – one sexual, the other economic. As Marx wrote in the opening pages of [The German Ideology](#):

"The production of life, both of one's own in labour and of fresh life in procreation, now appears as a double relationship: on the one hand as a natural, on the other as a social, relationship".

Engels later elaborated:

"According to the materialistic conception, the determining factor in history is, in the last resort, the production and reproduction of immediate life. But this itself is of a twofold character. On the one hand, the production of the means of subsistence, of food, clothing and

shelter and the tools requisite therefore; on the other, the production of human beings themselves, the propagation of the species." ([Origins of the Family, Private Property and the State](#))

The underlying principle of ape or monkey social organisation is nowadays known as dominance. An animal is said to be dominant to the extent that it can physically displace a rival from its position. Among most apes, dominant individuals are likely to be male. But female dominance is also possible.

Bonobos are a rare and especially intelligent species of ape. The females bond with one another, form coalitions and generally exercise dominance over males. These females have sexual swellings virtually all the time and love to engage in what is termed genital-to-genital rubbing. Once bonded in this way, two or more females are in a position to gang up on any male who might otherwise have proved violent or aggressive. The outcome is a relatively harmonious society – harmonious because individualistic male violence under these conditions doesn't pay.

Among common chimpanzees, it is all very different. Females forage in relative isolation from one another and tend not to bond very closely. Instead, it is kin-related males who form the most stable alliances. Males are mainly interested in sex – or at least, in dominance potentially leading to sexual access. But most females for most of the time are not available: they are pregnant or nursing and so lack sexual swellings. Against this background of sexual scarcity, pandemonium breaks out whenever a female begins to come into oestrus.

As the males violently compete for the available female, one strong animal usually succeeds in intimidating his rivals and monopolising access to her, in this way keeping some kind of order. But chimp social life isn't harmonious. Any order that emerges is based on fear and intimidation. Whenever the so-called alpha male becomes ill or shows weakness, his rivals immediately take advantage, leading to a period of chaos. For the females – especially those nursing infants – all this can be dangerous and threatening. When sexually aroused males are on the rampage, infants can easily get killed.

A central feature of human evolution was an extraordinarily rapid expansion of the neocortex – that part of the brain which is responsible for sophisticated intelligence. Large brains confer obvious benefits but also involve heavy production and maintenance costs. It takes mothers a lot of time and energy to nurture to maturity a large-brained human baby. This fact alone tells us that mothers, in the human case, must have been tapping into a novel source of energy. All anthropologists agree that they must have begun tapping into the spare capacities of the evolving human male. In other words, females were beginning to induce males to assist with food-gathering or hunting. If males had control over relatively subordinate females, on the model of primate dominance, it's hard to see how they could have been induced to help. Following the normal primate pattern, it's more likely that dominant males would have got females pregnant only to abandon them in favour of some new sexual opportunity. That is the typical primate system and it had to be overthrown.

SW/DF: For proto-human females to have overthrown male dominance collectively, as you argue, they must have formed some sort of coalition. Was this similar in any way to the Bonobo coalitions you mention above? Is the formation of this coalition the point at which you imagine language and consciousness became possible? On what evidence is this based?

CK: Yes, I think it is quite similar. Just how sexual ancestral females were with one another is anyone's guess, but we certainly can't exclude an element of lesbianism. On the other hand, in the human case females don't have sexual swellings. Instead, the whole body has evolved to send males quite an ambivalent signal.

To the biological human male, the female body appears potentially interesting in a continuous way, without the irresistible oestrus signal found in so many other primates. To put this in another way: the human female can always say 'no' or alternatively 'yes'. In this respect, she differs from, say, a chimpanzee, whose whole body signals 'no' quite automatically for most of the time, switching to an uncontrollable 'yes' around the time of ovulation. More than any other primate, the human female is able to exert cortical control at any time.

The bonobo example illustrates how, in a species closely related to our own, females can exert power over males. They can do it on condition they can bond sufficiently closely with one another, using sex as a mechanism of bonding. In the human case, it was especially important to be able to resist dominant males. This is because human mothers needed to exploit their male partners on an economic basis.

I should stress here that bonobos don't need to do any of this. Any bonobo mother has the ability and local resources to rear her offspring without support from a male. Partly this is because a bonobo mother can find all the food she needs in the immediate vicinity; partly it is because, relative to humans, bonobo babies are just not that large-brained or demanding.

The most striking feature of recent human evolution is the dramatic increase in the size of the brain. Modern Darwinism doesn't just say, 'Oh, that's good!' It doesn't just say, 'Large brains are better than small ones'. While recognising the benefits of any adaptation, it also takes account of the costs. As I've just said, brains are enormously costly things to produce and maintain. The reason other animals don't have outsize brains lies here: the production and maintenance costs would outweigh any conceivable benefits. The costs of the large human brain fall first and foremost on mothers who, in the human case, must give birth to (and subsequently nurture) massively burdensome, slow-maturing, helpless and demanding babies. There is no way our species' characteristic brains could have evolved unless our female ancestors - the producers of those brains - found some way of tapping

into a wholly new source of energy.

We know what that source of energy was: it was the spare energetic capacity of the evolving human male. In the human case, females began inducing males to bring them provisions. What bargaining power did they have? Well, it's obvious. No human female is automatically obliged to say 'yes' to a male who happens to want sex. The answer can always be 'no'. To obtain a regular income, mothers had to band together in deciding which answer to give, depending on the circumstances. Drawing on support from one another, they had to defy those males who were motivated to get females pregnant without staying around or without bringing provisions in return.

Of course, there's always the possibility that a male might get violent. Quite clearly, such problems had to be dealt with. In that sense, resistance to rape may be regarded as the most fundamental condition of human development. From this idea, it's but a small step to the idea of females banding together to defend themselves - in other words, to the concept of the world's first picket line. My argument is that out of the solidarity experienced on that picket-line, language, consciousness and culture together emerged.

SW/DF: Indeed, your argument is that language could not possibly have emerged without that solidarity. Why is that? Have animals not evolved a kind of language?

CK: Animals don't have language because they don't inhabit our world. They inhabit the natural and biological world and only that world. In the physical and biological world, you can make a difference only with your body, with muscular effort of some kind. For example, you might hit someone or threaten them with your fist; alternatively, you might sexually attract them through a courtship display. Animal signals are in this sense always body language. No animal restricts signalling to its head. It puts its whole body into any signal. Picture a songbird perched in a tree. Assuming the singer to be fit, it will occupy a strategic position which is part of its territorial display. The message is in this sense inseparable from the medium - bound up as it is with the singer's stamina, size, sex, position and so forth. Suppose the bird decides to substitute a low note at a certain point for a high one. It can certainly do this, but no change of this kind could possibly switch the overall meaning of the entire signal. In animal communication, what 'speaks' is the body in its material setting. The receiver observes this and evaluates its significance, relying on the evidence of its senses. Nothing is communicated on an abstract, immaterial plane - from inside the sender's mind to inside the mind of the receiver.

Noam Chomsky's point is that language is quite different and I agree with him. Language is not a form of behaviour. It is different from body language. To emphasise the contrast, we might even call it 'head language'. In any event, what is distinctly odd about language is the extent to which it's all in the mind. When we talk about, say, songbirds, no songbird need be there at all. To a super-intelligent chimpanzee, it would all seem very strange. 'Why do these creatures talk about things which aren't there?', the super-chimp might well ask. When we humans converse, we're wrapped up in another world - a world not accessible to the senses.

SW/DF: Humans occupy another world? What do you mean by that exactly?

CK: Well, I don't know about you, but my friends often tell me I'm living in another world! Maybe they're being unfair and confusing me with some absent-minded professor. But anyway, my excuse is that absent-mindedness is part of human nature. We walk along footpaths, cross roads and sometimes risk accidents while thinking about other things - memories, dreams, regrets, anticipated problems and so forth. Other animals, as far as we know, spend their waking hours focused and engaged with their immediate inclinations and environment. We could say that they've evolved under pressure to be realists, not idle dreamers. Of course animals too have memories and can think ahead - that's what brains are for. But they don't play around with their ideas, as if in a vacuum, each thought triggering others unconnected with what's occurring right now. Even when young animals are playing with one another, their cognition remains bound up with the here-and-now.

The animal brain, fully connected to the body, is conscious in the sense that we humans are conscious when staying balanced on our legs as we walk. You don't need distinctively human, distinctively abstract cognition to do that. As we all know, getting consciously self-aware on a bicycle is in fact a recipe for losing confidence and falling off. To avoid interference it's often best to let our two levels of consciousness - the animal one and the uniquely human one - run independently. So-called 'absent-mindedness' is one manifestation of our ability to do this.

I think it's fair to say that most evolutionary psychologists would attribute this ability to social selection pressures. That is, we humans became capable of intervening consciously in our own thoughts as a by-product of intervening in one another's. I should perhaps mention here that Marx and Engels had similar views about where 'consciousness' in the human sense came from.

It seems that chimpanzees have the ability to guess at one another's mental states and then seek to influence them by making appropriate gestures. All too often, however, the purpose in mind is some kind of deceptive trick. Because the consequences of deception can be costly, chimps have no interest in making things easy for liars and cheats. Instead of allowing its focus of attention to be externally manipulated, a chimp has every reason to remain suspicious, retaining control over what's currently in its mind. While a chimp may strive to mind-read in order to anticipate and influence the behaviour of others, it has little motivation to reciprocate - to make such mind-reading easy for its rivals. The result is that chimp minds don't meet or interact with one another internally. Chimp minds never really get inside one another, the way ours do.

To 'explain' this difference between our minds and theirs it's always tempting to invoke psychology. But appeals to psychology are futile – to do this is simply to state the puzzle in a different way. The Darwinian question is why ape minds and human ones evolved to be qualitatively different. My suggested explanation is very simple. In a competitive world, any chimp is likely to resist having its perspective divulged or its attention manipulated by others. In a conflict-ridden society, no chimp has any interest in viewing its behaviour from the perspective of others. Quite often, chimps co-operate - for example, in hunting tree-dwelling monkeys. Even then, however, any convergence in behaviour or perspectives is stimulus-bound. Chimps are not capable of checking out whether their perspectives converge. They don't point or use other gestures to ensure that joint attention is being maintained.

By contrast, humans are brilliant at doing just this. The psychologist Michael Tomasello calls distinctively human mental reciprocity by a special term: intersubjectivity. Whenever two of us are interacting in this way, a curious situation emerges in which I am mindreading you while at the same time you are mindreading me. Hence I can see my thoughts in yours, just as you can see yours in mine. Thanks to our ability to get outside ourselves - to see ourselves from another's perspective - our thoughts are made visible to ourselves. Not only can we see our own thoughts - we can intervene in them, just as we can intervene in one another's. What I earlier called 'absent-mindedness' - thoughts triggering more thoughts independently of the world - is well under way.

Tomasello has found that children of our species start seeing the world from the perspective of others from soon after their first birthday. He uses the term 'cognitive revolution' to describe how each child's egocentric perspective becomes dramatically reversed around this age. I love this idea, but would like to take the argument a step further. The revolution undergone by children in each generation has a social basis. In fact, it re-enacts a primordial social revolution - the one in which our species was born.

SW/DF: You seem to be saying that language is an irreducibly social phenomenon. Doesn't this contradict the position of theorists such as Noam Chomsky and Steven Pinker? They would say that our capacity for language is hard-wired into our brains and is not socially learned. Have they got it wrong?

CK: Chomsky long ago legislated that as a scientific concept, language is absolutely non-social. He had little choice in the matter because his entire institutional position depended on his ability to define himself as a natural scientist. In Chomsky's terms, the only proper science is natural science. If you claim to do social science, that makes you (according to Chomsky) an intellectual fraud. For Chomsky, so-called 'social science' – for example, the kind of thing Marxists do – is not science at all. It's manipulative political ideology.

Projecting backwards from this axiomatic stance, Chomsky is forced to say that language as a scientific topic cannot be social in any way. After all, if language were social, then Chomsky as a linguist would necessarily find himself having to do social science.

I do admire the way Chomsky sticks ferociously to his own absurd principles. If language has nothing to do with social interaction, then logically it must have nothing to do with social communication. Language, Chomsky concludes, is a biological organ inside the individual head. If it's 'for' anything, it's for enhancing private thought. You might protest that possessing language seems to enable us to communicate our thoughts. That's irrelevant, says Chomsky. To make his point, he draws an analogy with hair. The fact that you can make a point with your hairstyle, says Chomsky, is true. But, he continues, such a fact is irrelevant to the scientific study of hair. Hair isn't 'for' communication, any more than language is. Communication is just one possible use you might find for your hair - or for anything else. Language is just one of many things you can communicate with, if you choose.

Now let's turn to Steven Pinker. As a former disciple of Chomsky, Pinker sets out from the very same 'natural science' ideological assumptions. That is, he sees language as a natural instinct, viewing linguistics correspondingly as a topic within biology. But in Pinker's case, he wants to have his cake and eat it. He wants the status of a natural scientist without having to look completely mad. Prepared to abandon Chomsky at certain points, he concedes that language must have been shaped by evolutionary selection pressures for rapid and efficient communication.

But Pinker still doesn't want to do social science. His solution is to locate the specific strategies of co-operation responsible for language in a mythical and unknowable age. In the distant 'environment of evolutionary adaptedness', Pinker says, humans (for some unknown reason) became a co-operative species. This made it useful for individuals to share information - whereupon language duly evolved. This is as far as Pinker is prepared to go. He knows perfectly well that if he engaged in debate on the concrete social and cultural strategies necessary for language to evolve, he would be forced to abandon the whole project of conducting linguistics as a branch of biology.

SW/DF: Does Chomsky not have a point about political ideology? Presumably he's thinking of the dangers of Lysenkoism. Is it possible to be committed to both objective science and to a given political position? Have these ever come into conflict in your own scientific and political practice?

CK: The Lysenko affair is certainly a warning. Wherever science gets internally reshaped to serve political interests, the result will inevitably be rubbish.

Science has to come first. It has to be self-organised and autonomous, bending to nothing and nobody.

Yet several questions arise. If scientific activity is to be self-organised, what relationship must it have to political activism? Chomsky says none. In his view, there must be no bleeding from science to politics or from politics to science. From his perspective, science and politics are two quite separate kinds of activity, drawing on different types of thinking and formulated in quite different - indeed, incommensurable - terms. In this spirit, Chomsky goes out of his way to tell his activist political supporters not to expect any special inspiration from his linguistic science. Reciprocally, of course, he tells his scientific audience that his political views are a purely personal matter, irrelevant to scientific linguistics.

If you think in individualistic terms, as Chomsky invariably does, the logic of this argument appears irrefutable. It would be quite wrong for a scientist to use his professional status as a way of adding authority to his private political opinions. Just because you're a scientist, that doesn't give you special license to pronounce on political matters. Likewise, when a political activist invokes 'science' in support of some pet ideological scheme, it's important for the rest of us to remain sceptical. Political proposals should be evaluated in political terms, regardless of so-called 'science'.

But what applies on an individual level can't be applied mechanically across the board. Science is ultimately the work of a community - in this case, the international scientific community. To dictate to this social constituency 'don't get active' is utterly reactionary. The effect is to perpetuate a myth - the myth that science is or can ever be politically neutral.

The truth is that insofar as scientists remain passive and politically unaware, they are powerless to prevent themselves from being manipulated by those external forces responsible for funding and determining the priorities of science. Fragmented, internally inconsistent, politically de-activated science ends up being its opposite - not science but political ideology.

The solution is not to replace bourgeois ideology by an equal and opposite ideology from the left. On the contrary, in my view we urgently need to introduce humanity to a new form of politics --the self-organised political activism of the scientific community itself.

Since I have no other intellectual allegiance, I consider myself part of the international scientific community. This community is extremely concerned about global warming. Of course, the oil companies also have their scientists, whose allegiances are in that sense alien. The oil companies and other corporate forces today exercise a form of political dictatorship. This poses an intellectual as well as social and political problem. Insofar as autonomous, activist scientists come up against corporate attempts at scientific distortion and control, we must naturally find for ourselves an appropriate social counterweight. No ready-made political class is representative enough to assume that role. This being the case, our natural constituency in the struggle for science must be what Marx called an 'anti-class' - that mass of productive, creative, thinking humanity which is today excluded from political power. To find our political voice, in other words, we don't need to look outside ourselves. We just need to stand up and be counted - every one of us, wherever we are.

In my own view, that's what Marx and Engels meant when they talked about 'scientific socialism'. Lysenko was a character they would have despised. Engels put it well when he explained that *"the more ruthlessly and disinterestedly science proceeds, the more it finds itself in harmony with the interests of the working class"*. ([Ludwig Feuerbach and the End of Classical German Philosophy](#)) The 'working class' in Engels's sense isn't something which exists 'out there'. It can't corrupt you. You can't ask it to fund your research. Either we ourselves get organised and help constitute that class - or it doesn't exist. We can exist only insofar as we are a political force - science made active, activism made science.

I would add that if what we call 'science' isn't active - if it's not the conscious self-organisation of productive and creative humanity as a whole, struggling to preserve the conditions of life on this planet - then it isn't accountable, isn't collective and isn't science. It's just reactionary bourgeois ideology. Chomsky's linguistic work, I'm afraid to say, falls into that category.

SW/DF: Finally, on to robots! An objection we commonly hear to your theories is that they are too speculative and there's no evidence for them. Hopefully this interview will give people some idea of the kinds of evidence you are drawing on, and we haven't even mentioned archaeology or mythology! But a much more direct piece of evidence has recently come from the work of Luc Steels, who is one of the world's leading experts on artificial intelligence, and who has done work on the origins of language and intelligence. Can you tell us some more about his work and how it backs up what you've been saying?

CK: Let's step back a bit and put Luc Steels in perspective. To explain what's at stake, I need to contrast his achievements with those of Chomsky.

In his first book, *Syntactic Structures*, Chomsky promised the design specifications of a machine capable of generating grammatical sentences in all the world's languages - past, present and future. Half a century later, we're still waiting. Despite quite extraordinary investments of time and money, no convincing formula for Chomsky's "Universal Grammar" has yet emerged.

Luc Steels was once a student of Chomsky's. Unlike Chomsky, however, Luc always wanted to translate any theory he came up with into practice. He wasn't satisfied with blueprints. He wanted to know if they'd work.

Noting that Chomsky was forever changing his blueprints for the language device, Steels suspected that his teacher's fundamental assumptions might be wrong - spectacularly so. In particular, he questioned the two premises most central to Chomsky's entire program: (a) the insistence that Universal Grammar must be hard-wired into the electronic device in advance and (b) his

definition of language as a component of individual cognition, not communication. Steels decided he'd try standing these hallowed dogmas on their head. Why dictate that the principles of Universal Grammar must be fixed forever in the initial wiring of your machine? Luc suspected that this would never work. If you tried to specify all those features in advance, it would be far too complicated and the effort would simply defeat you. Secondly, why specify a completely isolated language device - a machine designed to mimic just one component of one individual brain? Why not build whole communities of robots capable of moving and interacting in real physical environments?

It seemed worth a try. Steels dreamed of sophisticated robots that could learn from their own experience. No grammatical constraints would be specified in advance. Instead, Steels envisaged robots capable of proceeding by trial and error. As they sought to communicate, they would remember what worked and forget what didn't. In this way, Steels reasoned, a system resembling language might spontaneously evolve. If this were to happen, the emergent grammars might display all sorts of unexpected features - details so complex that no human engineer could possibly have fixed them in advance.

Steels is today perhaps the most celebrated robot-maker in the world. His machines have limbs, sense organs and sophisticated brains; they move around and navigate in pursuit of various objectives; finally, they co-operate and communicate in what would appear to be ingenious and creative ways. The minds of these robots are not hard-wired for language in advance. Rather, they actively configure one another as they socially interact, recruiting for linguistic purposes whatever cognitive capacities and procedures are available. Naturally, the languages which emerge are not quite as complex as, say, English or Warlbiri. But as they evolve, they do embody those principles of 'discrete infinity' which, according to Chomsky, constitute the generative source of every human language.

One of Steels' most significant findings is this. His robots must co-operate fully and unconditionally. In fact, the latest models routinely achieve what is termed 'egocentric perspective reversal'. One robot comes up to another, observes that other's direction of gaze, examines the context, computes what the other might be 'seeing' and 'wanting' - and then puts itself in that other's shoes, relating to the world from its neighbour's perspective. Of course, these robots can afford to be so self-effacing for a very simple reason - they are non-biological. Unlike Darwinian entities, they don't have to compete in order to stay alive. Their energy supplies are guaranteed: Luc gives them free bed and board. As machines lacking a self, they have absolutely no motivation to exploit one another or tell lies. The good news is that when such biologically bizarre conditions are met, language will start to evolve. The bad news is that if these robots were living creatures, they would be too nice to be competitive. In a Darwinian world, they wouldn't survive.

In the animal world, co-operation certainly occurs, but it's always mixed up with conflict and competition. As animal listeners guard against being deceived by misleading signals, they select against (i.e. they tend to ignore) anything which might possibly be a fake. Hence the signals which remain effective turn out to be those which are least language-like - irrepressible barks, screams, cries and so forth. Expressive of emotional states, these are beyond cognitive manipulation or control. It's this 'hard-to-fake' feature which makes successful communication possible. If apes could play around with their vocalisations the way humans do, no-one would take any notice.

Aware that his robots are unrealistically co-operative, Steels once redesigned a particular batch. He designed a certain number of robots to be occasionally selfish, capable of manipulating one another for competitive ends. Disaster struck. As soon as that kind of possibility was introduced, reliability became an issue - whereupon language-like communication came to an abrupt stop. Steels discovered that even a small amount of selfish, egocentric motivation would suffice to kill language stone dead. Unless his robots could automatically assume honesty and co-operation, language of any kind wouldn't work at all.

Precisely how much co-operation is required? The answer is: much more than you'll ever find in nature. The philosopher Wittgenstein's metaphor of a board game is really helpful here. Imagine you're playing chess. In making moves, you're being competitive - but only in conformity with the rules. In order to win, you can be as ruthless as you like. But you're not allowed to pick up a piece and throw it at your opponent. So for the game to be playable, it's not a question of mixing up competition and co-operation in certain proportions. As far as the rules are concerned, conformity has to be total. Even an occasional violation would threaten the whole game. So no compromise is possible on this score. Language is like that. It's always part of a wider co-operative game. Speakers and listeners don't have to be angelic in every way, but for language to work, people do have to respect the basic rules.

The great Darwinian theorist Richard Dawkins rightly points out that at the end of the day, nature is 'red in tooth and claw'. Over and above survival and reproduction, there are no rules. Humans would feel extremely uncomfortable if we were plunged into such a Darwinian world. Steels has clarified that in such a world, language just cannot evolve.

So how did language ever get off the ground? This is where my work comes in. My theory of the human revolution shows how our ancestors pursued Darwinian logic to its conclusion - to the point where biological determinism was transcended. As Engels pointed out long ago, language emerged as and when humans came to be on speaking terms. Labour brought our species to that point. Only with the establishment of group-level co-operation - co-operation right across the board, regardless of genetic kinship - only then could our ancestors trust one another sufficiently for words to carry weight.

Let me sum up by saying that Chomsky promised a language machine but never succeeded in designing one. Luc Steels has

succeeded where Chomsky so spectacularly failed - not by following his teacher's instructions but by turning them upside-down.

Comments

[Mike Newman](#) Says:

There is another excellent interview of Chris carried by the Ready Steady Book site. It gives a different focus - with an insightful background to his time at Sussex Uni (UK) and his switch from studying Russian to becoming an anthropologist, together with a focus on his personal political activism in the UK. But the best sections are kept for Noam Chomsky - one great quote should be enough to get readers clicking on the link - "Chomsky is the most virulent imaginable opponent of social science in general and of Marxism in particular. Since the late 1950s, bourgeois hostility towards Marxism in western intellectual life has found its most extreme and articulate champion in Noam Chomsky." Enjoy... and thanks to Stuart Watkins for another great interview of an important marxist scientist <http://www.readysteadybook.com/Article.aspx?page=chrisknight>.

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