

INSIGHT & OUTLOOK

"Science, Evolution and the Human Quest" with Roger Bingham

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This is INSIGHT & OUTLOOK. I'm Scott London. With all the talk about multiculturalism and diversity these days, there is a lot of attention on the qualities that make us different from one another. But what makes us so alike? What do all human beings have in common?

One answer to this question is a human brain. Cultural differences can't override the fact that we all laugh when we're happy, cry when we're sad, and crave the same foods that guarantee our survival. In fact, because all of us, despite our cultural differences, all share the same legacy of cognitive programs – or brain circuits specialized for solving problems – we share a universal human nature.

This fact is at the center of a burgeoning new field known as evolutionary psychology. It's also the focus of a new four-part public television series called "The Human Quest." The creator and host of the series is Roger Bingham, a writer and documentary film-maker. He's created numerous television documentaries, including "The Addicted Brain," "Chronobiology," and the award-winning "Inside Information: The Brain and How it Works."

Roger Bingham was born and educated in England and came to the United States in the early 1970s. Before turning to television, he devoted himself to writing about science, and even co-authored a popular novel called Wild Card which came out in 1974. For the past decade or so, he has worked closely with KCET, the public television station in Los Angeles, hosting and producing programs that explore the relationship between science and society.

His latest series, "The Human Quest," will air on public television in January in Central and Southern California, and nationwide in March.

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SCOTT LONDON: So, Roger, why your fascination with the human brain?

ROGER BINGHAM: The human brain, as far as we know, consists of about 100 billion neurons. With that fundamental piece of information processing equipment, you can do everything that human beings do – you can imagine God, you can imagine infinity, you can make a shopping list, you can sit down opposite somebody and talk on a radio show, and still have room to read a novel at night. It's an extraordinary piece of equipment.

LONDON: In *The Human Quest*, I think you call it the "star of the show."

BINGHAM: Yes. I think that what we try to get across in the series is that this is an evolutionary legacy that we carry around. We behave as if it's something we use afresh each day. But, in fact, it contains programs that come as a legacy from thousands of generations of people who went before us. So

our fundamental human nature, our psychological make-up, is essentially a compilation, if you like, of natural selection's greatest hits. Our bodies have got opposable thumbs and color vision and livers that detoxify and so on. Our brains are also natural selection's greatest hits. We've got specialized mechanisms in our minds, in our brain's, that do all these great tricks that we take for granted, like recognizing faces, seeing lines, processing information, having ideas, having dreams, and so on. It's a really wonderful piece of equipment.

But it contains all this old information as well. Most of those patterns that we have in the brain, most of those programs evolved during the period when we were hunter-gatherers in what is called the Pleistocene, from about 1.6 million through to about 10,000 years ago, when we discovered agriculture and started building cities.

So we are essentially living in the Space Age with brains from the Stone Age. That's why we have lots of appetites and instincts, to use an old term, that sometimes get out of hand or that we don't understand. One of the purposes of the series was to show to people that if we understood a little better those old programs we might be better able to deal more effectively with the present.

LONDON: Have you ever seen a human brain?

BINGHAM: Yes, I have. In some of the programs we did before *The Human Quest*, I in fact held human brains and brought them into the studio. Most people just went "yeech, what is that thing? Take it away," almost without realizing that they have one inside their heads, it's what makes them operate.

LONDON: A lot of the things you are talking about have more to do with human consciousness than with the actual brain, don't they? It seems to me that you are drawing a parallel between consciousness itself and the brain as an organ.

BINGHAM: Well we could spend hours just talking about what people mean by trying to define consciousness. There is two ways of coming at this. Let me say what they are and then tell you the way I come at it. You can either say, as an Indian Vedanta scholar would, that the universe, all creation, reality, is consciousness, and that individual brains are a kind of local condensation from that massive information field. Or, you can say that the brain, like the body, as a *part of* the body, is a product of evolution, of natural selection. Consciousness – since that is what minds "do" – is a product of the brain and is therefore also a product of natural selection. It is a kind of emergent property of the complexity of the human mind. That doesn't mean, incidentally, that I don't think that other creatures are not conscious – I do – but I think that human beings have a particular kind of self-reflexive consciousness, which is off-the-scale.

LONDON: Is this what you mean by the "second Darwinian revolution" – that our brains have evolved just like our bodies have?

BINGHAM: That's exactly right. Let me give you an example. I was reading a newspaper the other day, and it was for a chain of fitness or diet centers. It said, "New scientific breakthrough: scientists have discovered the fat instinct." And it had a little circle next to it with a C which means they copyrighted the phrase "the fat instinct." It means that evolutionary psychology is getting into popular discourse.

What they were effectively saying was, "Look, would you rather have carrot sticks or hamburgers? Would you rather have french fries or celery leaves?" The answer is obvious. They are saying,

"Don't worry about that because you are, in a sense, programmed to do that. It's your fat instinct." To a degree, they are correct about this. In the environment of evolutionary adaptiveness, as the scientists call it – the place where we evolved in the Pleistocene as hunter-gatherers – it was crucial to our survival that we had adequate access to fats, sweets, and salt. So we have evolved mechanisms, like taste buds, which predispose us to seek those things out. Colloquially, you say you have a "sweet tooth," for example – that is why we love sweets and love french fries and so on. These are crucial to our survival.

But as you move into the 20th century, of course, you now have access to excesses. We still have the same mechanisms predisposing us to want those particular nutrients, but of course those are now bad for us. Now our "instincts" are still predisposing us to seek out those things which are now, in this century, maladaptive – or at least *can be* maladaptive.

That is an instance of knowledge about our biological make-up, our evolutionary heritage, being of use in at least allowing us to think our way out of a problem.

LONDON: You talk a lot about how we learn language and develop our cognitive abilities and so on – you explore a lot of this in the series. But a lot of the theorizing in this field, it seems to me, is just speculation, isn't it? How can we understand something that we can't see?

BINGHAM: You mean the brain?

LONDON: Yes, the brain.

BINGHAM: We are moving to a position where, in fact, you can see what's going on in the brain. There is two answers. One is the one I've just given you which is that you are beginning now with machines like functional magnetic resonance imaging technology to actually be able to see which parts of the brain are at work when certain tasks and behaviors are taking place.

I'll give you an example. In November, the journal *Nature* carried a paper detailing and showing pictures of a schizophrenic's brain when they were hearing the sounds of somebody speaking. They effectively took photos inside the brain as the schizophrenic heard voices and you could see which areas of the brain lit up and which parts of the brain were responsible for producing this "representation," as scientists call it.

So we are in fact moving toward a position where it's not speculation at all. It's not a black box, you can see what is going on inside.

The other answer is that also tell from behaviors; you can infer function from what is going on from behaviors. So I don't think it is that mysterious. The idea that the brain is somehow a particularly special organ and that, unlike the liver, and unlike the kidney, and unlike other organs, we will never find out what it's for or how it works, I think we have a long way to go before we throw up our hands and give up on the brain.

LONDON: Darwinism has always encountered a lot of criticism, especially from the religious community. But even some scientists are beginning to reassess some of Charles Darwin's ideas, suggesting that they may be appropriate to a mechanistic idea of the universe, but not to an understanding of complex and dynamic living systems. I'm thinking of the work of biologist Rupert Sheldrake, for instance, and his theory of morphogenic fields. What's your response to that?

BINGHAM: I think it's important to realize that there is nothing at this point, there is no other mechanism which has been shown which is capable of producing the complex adaptations that we are assemblies of. Nothing works in alternative to natural selection.

In fact, there is a wonderful example of this. Darwin, as you may remember, went on a voyage in the beginning of his career to the Galapagos Islands. He saw there a number of things, including turtles and tortoises, but also finches – 13 species, I think there were, of finches. The myth has grown up that it was seeing the different finches with their different beak-shapes and different beak-sizes that made him think that natural selection was operating. In fact, that is not what happened. He didn't really notice the finches very well until he got back to England and somebody else pointed this out to him. But here is the important thing: those finches have over the past 30 years been studied by a couple of English scientists, Peter and Rosemary Grant. They have watched the finches go through extraordinary climatic upheavals. On the various different islands, they went through drought, then periods of incredible plenty in terms of rain and so forth. They actually saw evolution – natural selection – operating over a matter of a few years. A drought would come, most of the seeds would go away and they would be very hard to get, and all that would be left were a few, tough seeds that were very hard to get. They discovered that by the time the next season came around many of the finches that had small beaks had died out, and the ones that survived were the ones with the tough, broad beaks that were still able to crack those few remaining nuts. So the ones with the broad beaks began to take over; they spread more effectively, produced more offspring, and became the "fittest" surviving species on some of the islands. The climate changed again a few years later and the opposite happened.

So you can actually see natural selection working. This is not some figment of people's imagination. It is the only contender for explaining how living, complex adaptations form at this point.

LONDON: My guest is science writer and documentary film-maker Roger Bingham. He is the host and creator of the four-part public television series *The Human Quest*. I'm Scott London, and this is INSIGHT & OUTLOOK.

You give the example in the series of how Newton's theories were later subsumed by Einstein's theories. That didn't mean that Newton's theories were incorrect, it meant that they became part of a larger body of theories, of knowledge, about how the universe works. And what you are talking about here, basically, is that we are expanding Darwin's original ideas and adding such concepts as complexity and so on, is that right?

BINGHAM: I'm saying that science is, as I think Lewis Thomas once said, a moving target. Science is not a closed game, it must change whenever the evidence demands it. In the beginning of the fourth program I talk about science being essentially story-telling – the search for truth, the search for meaning.

LONDON: You use it in the same breath as mythology, which I thought was rather interesting.

BINGHAM: To contrast the two and also to remind ourselves that pre-scientifically the best stories we could come up with were in fact myths. We still needed something to give us a sense of order and meaning about the universe – a search for patterns. Science retains some of those same elements – a search for patterns and an attempt to find meaning in the universe. However, the myths don't

change. The myths remain the same. The science must always change when the evidence demands it. There is nothing wrong with the myths. The myths have a place in people's belief-systems. But one of the things that I'm very concerned that we should try to do is to naturalize ethics, epistemology, knowledge-systems, and, where possible, to upgrade them with the latest data – solid, empirical data from science. That's what we are obliged to do.

I think of it as a kind of new common sense. The old common sense was the old folk wisdom that we have had for centuries. It's been *slightly* updated. People don't really believe any more that the Earth is flat. So there have been some amendments. But there is an enormous amount of territory now – basically evolutionary psychology and computational neuroscience, these ideas of how the brain processes information, how we construct the pictures of what we call reality, and how much of this is an evolutionary heritage. Most of that information has not made it into the public discourse and public consciousness (apart from that little ad about the fat instinct).

So what I'm suggesting is, and what I hope that *The Human Quest* series and people like me can do is to give people, as it were, a one-time software upgrade – to put all this information in it and inject it into them (put it on a floppy, if you like) and move them from the old common sense to the new common sense, including all this fascinating stuff from science.

LONDON: But if there's a resistance to doing that, it wouldn't be too surprising considering the fact that we live in a world where it's increasingly clear that science *doesn't* have all the answers. If anything, the whole scientific approach has voided the universe of meaning and purpose. It has managed to describe and define the world we live in, but at the price of some deeper significance. It seems to me that much of the human crisis that we now find ourselves in is a reaction to this very worldview – the idea of the universe as this neutral, mechanistic, and random place, where human beings exist merely for the sake of propagating their own species.

BINGHAM: Obviously, that's part of it. You begin imagining that you are the center of the universe and then along come Copernicus and Galileo and say, no, no, no, you're just living in the suburbs there, just a perfectly ordinary star in a corner of the galaxy in a perfectly ordinary galaxy, there are billions of them. So you say, well, alright, but we are still living at the top of the evolutionary tree, God's favorite creatures. And along comes Darwin and says, no, no, no, that's not the story; there is an unbroken continuum from early forms of life on up. We're very interesting and special creatures, but that doesn't give you the right to dis the other parts of creation at all. And you say, well, alright, but we've got these particularly interesting brains – we're rational, we make rational decisions, we're the creatures with reason. And along comes Freud and says, no, not really, you're being run by your unconscious.

So these great demotions take place and at each point some people feel as though they are being diminished. Now I believe we are actually being augmented, that the universe got bigger the first time around, that our kinship with other creatures was actually increased, that our understanding of what we do on a daily basis, our decisions, are in fact this product of reason and emotion in a great ferment of circuitry – often going on beneath the surface of consciousness – and that if we actually understood that a little better that we would be a lot better off.

I think all of these things add to the wonder of being alive and none of those things for me diminishes my sense of being a human in a perfectly extraordinary universe. I am not in the least bit disappointed when I see a rainbow. Even though Newton explained optics centuries ago, I still find a sense of awe. People who have children don't go into a delivery room and say, look, it's just a

bit of DNA – they are still amazed at seeing their own life. So I don't think science diminishes it, I think it increases it.

LONDON: E.C. Krupp, one of the scientists you interview in the series, says it so well when he remarks that "We have gotten so good at understanding nature that we don't understand it at all, at least not on an everyday personal level." I suppose the question is whether we can create a more all-embracing science that doesn't have to exclude so many other elements.

BINGHAM: I'm all in favor of that. I think that science is an inclusionary activity. One of the things that I am working on at the moment with my wife and with some other colleagues is the idea of setting up a center for science, human values, and public policy. I think that science can be tremendously important as an inclusionary event.

Don't forget that we evolved in groups of perhaps 150 people. We were close to each other all the time. We could read each other's faces, each other's emotions, we had a sense of what was going on. One of the things that I think makes us worried and leads us to talk about loss of meaning and loss of purpose, and blame science for it, is that we forget that a lot of those things are a result of technology. Technology produces, obviously, either good or bad. I'm very grateful for it when I go to the dentist; so I'm not in favor of going back. I think that is a romantically misguided notion. But the idea that this somehow produces a loss of meaning – I think that what we've lost is our sense of community. We are now so hugely populous in such widespread areas that our day-to-day connectiveness has completely changed. We have brains which were designed by natural selection to operate in those close Paleolithic Peyton Place kinds of environments. I think that is why we find soap operas so interesting and why we find gossip so interesting; that is why people watched that O.J. Simpson case so closely. We have mechanisms of the mind specialized for noting certain things – people's facial expressions, who is a leader in a group, who has status, and so on. So we are predisposed to see all these things. Yet the most access that most of us have right now to what we would call the big man or the hero or the king is in fact the celebrity or Diana. That's why those people who are in our homes regularly on a day-to-day basis, because we have televisions, we are so interested in their doings and we accord them all the trappings of what would be a leader or a high-status individual in a evolutionary hunter-gatherer band.

LONDON: Where does that leave a television-figure like yourself?

BINGHAM: I don't think I'm visible often enough to acquire that kind of status, nor would I want it, nor would I deserve it.

LONDON: I'm very interested in how you've managed to choose something so hi-tech as television to convey these complex ideas. Marshall McLuhan famously said that television is a "hot" medium and doesn't convey ideas very well.

BINGHAM: I think it does convey ideas. It conveys brief, concise ideas that people then have to go and unpack. Obviously, you have to go and either get the books or get onto the net and access the information that way. He is right in saying that it's a very emotional medium.

I like to think of what we do as recombinant information engineering. What we do is build thought viruses that can infect people with a sort of fever of questions. I don't know if you know this word *meme*. It was coined by the biologist Richard Dawkins. A meme is a unit of cultural information that can be passed on, in the same way as a gene is a unit of biological information that can be

passed on. I hope that science on television is one way of changing our cultural DNA, of passing on this information, sending these memes out so that we can literally infect people's minds with these kinds of ideas.

LONDON: It's been very interesting, Roger. To wrap up, tell me something about the sequel to the series, *The Human Quest 2*, which you've given some thought to. It will explore the connection between science, spirituality, and human values, is that right?

BINGHAM: That's the plan at the moment. I think what we need to do is keep the science, as I said, as a new common sense. So we need to be constantly feeding the new science into people's consciousness, but there are subjects like consciousness and belief that can be unpacked with new meaning now that science is beginning to address them. As you probably know, there is a growing interest in consciousness from all definitions.

I think we just have to keep an open mind and see what we can find. I think of it as the Hamlet caveat. You probably remember the part in Hamlet where Horatio and Marcellus are being asked by Hamlet to swear on the sword that they did not see Hamlet talking to the ghost. They both say, okay, fine, we will swear. But every time they move to swear on the sword, beneath the stage the ghost goes clickety-clickety-click and mutters along beneath them and scares them to death, and they wonder what on earth is going on. Horatio says, "this is wondrous strange." And then Hamlet delivers those lines which you will recognize: "And therefore as a stranger give it welcome," he says, "there are more things in heaven and earth, Horatio, than are dreamt of in your philosophy."

So I think we have to bear those two things in mind in that Hamlet caveat. First make welcome strange phenomena. Don't necessarily assume that they can't be solved by science; try to solve them by science. But accept with humility that there are more things than are dreamt of in our philosophy than we perhaps know at this point.

LONDON: Thank you very much.

BINGHAM: Thank you.