

## In conversation with George C Williams



**For anyone who thought 1966 was famous only for England's victory in the World Cup, it may come as some surprise that the year also marked a major turning point in the history of ideas. The publication of *Adaptation and Natural Selection* finally killed off group-selection and set the foundations for three decades of progress in the evolutionary sciences. Considered by many to be one of Darwin's representatives on earth, George C Williams talked to the evolutionist about monkey morals, Stone Age slackers and**

**his new book.**

**the evolutionist:** Rachel Carson's book *Silent Spring* was a reaction to the over use of chemicals in farming. It struck me that *Evolution and Healing* could do for the medical establishment what *Silent Spring* did for the agricultural one.

**George C Williams:** Rachel Carson's perspective was that there was an awful lot going in agriculture that ought not to go on - that a major redirection of the whole approach to the control of pests and diseases in agriculture would be needed as a result of the harm that was being done. I think that while we might identify some potential sources of harm in current medical practices it would be too much to say that that was the main focus. What we want to do is not so much reverse or alter the direction of medicine, but simply to supplement the approaches that are now used with additional approaches and insights based on an understanding of human and pathogen evolution.

**the evolutionist:** But you are cutting across their direction, asking them to "calm down" a bit and not see *all* ailments as problems that need a magic bullet to knock them out.

**Williams:** If there are magic bullets that knock out ailments then that's good. But, for example, I don't think that there's going to be any magic bullet with really fundamental beneficial effects on the ageing process, senescence. No one in a laboratory somewhere is going to discover the fountain of youth.

**"No one in a laboratory somewhere is going to discover the fountain of youth"**

The evolutionary perspective indicates that the deterioration that we undergo as adults getting older and older has many causes, no one of which is over-whelmingly important. So there's no one solution to what we perceive as the general problem of old age deterioration.

**the evolutionist:** And there's not going to be lots of little ones?

**Williams:** There'll be lots of little ones but to the extent that one of the little ones enables us to extend the average life-span by, say, detecting a form of cancer earlier so that we can treat it earlier and prolong the lives of people who would otherwise have succumbed to it. But there'll be something

shortly thereafter that will cause the demise of the people who have been saved. My own preference with regards to research in gerontology, the diseases of old-age, is to work on the chronic diseases rather than the acute, life-threatening diseases. Things like arthritis, impairment of hearing and vision, dental problems, that make people's later years ever more miserable. It's purely an aesthetic approach to the problem, but I'd like to see a shift of emphasis towards that kind of problem even if it means a sacrifice of resources for research on the life-threatening problems.

***the evolutionist:*** Where does that leave the big drug companies - geared towards every ailment that comes along? You are coming from a different direction.

**Williams:** My guess is that if people really take to heart some of the things we say in our book - if they really understand their symptoms for minor medical problems like colds and coughs and minor bouts of influenza - they will spend a lot less money superficially treating the symptoms of these ailments. In most cases, if these treatments have an effect on the disease on the whole it's more likely to be a negative effect. It's more likely to prolong the illness. If people realise that this immediate relief from symptoms have long term costs there'll be a tendency for people to seek immediate relief less often, habitually. They'll want to know what these drugs are for and if something is for the relief of pain or the relief of fever or some other aversive symptom, they might ask, besides that, "What else is this drug likely to do? What will its long term effects be on the rate of recovery from this ailment?" This means lower sales of over-the-counter medications, which of course is not what the pharmaceutical companies would like to see. Randy Nesse and I also hope we'll have an influence directly on the medical profession and especially in medical schools. We are hoping that people who are teaching the next generation of physicians will introduce some evolutionary ideas into their courses.

***the evolutionist:*** So you're blurring the black and white distinction made between healthy and unhealthy, normal and abnormal. Given the standard distribution of attributes, "normal" really doesn't apply at all.

**Williams:** Well it depends how these terms are used. If you took the body temperatures of a random selection of healthy individuals you'd find a certain amount of individual variability. A head cold might increase your temperature by a fraction of a degree and there's a threshold above which, clinically, you'd be recognised as having a fever. And that's OK - they have fever and abnormality. But widespread research on a great variety of groups in the animal kingdom indicates that sick animals and people are better off if they're a bit warmer. You're making things a little bit more difficult for pathogens, parasitic bacteria, viruses and so on.

**"the concept of adaptation should loom a bit larger than the concept of normalcy"**

This is always at a cost: the metabolic rate goes up, energy consumption goes up and various kinds of adaptive performance go down. If you give a drug that reverses that - brings the temperature down to

what would be regarded as the "normal" range - this will also have costs in terms of fighting the pathogen less effectively. As well as prolonging the disease, lowering the effort put into defence may make it more likely for secondary infection to take over. I think what I'm saying here with regards to a normal temperature, is that the concept of adaptation - is this an adaptive response to the fever - should loom a bit larger than the concept of normalcy.

**the evolutionist:** So rather than saying 100% health is impossible, you're saying that being a healthy organism includes having adaptive "illnesses".

**Williams:** Yes. The restoration of health depends on our evolved defences, of which fever is one. But I don't think people really need to be told that 100% health is not to be expected.



**the evolutionist:** When you're talking about mental disorders such as depression, you say that emotions are psychological mechanisms that have evolved to alert us to certain things and motivate us to act. To what extent can we expect that other animals have the same emotions as us - and the same problems?

**Williams:** Inevitably they must. The difference between human biology and other kinds of animal biology is a quantitative thing. Certainly there are differences of medical significance between human physiology and rat physiology but still experiments on rats, mice and other primates such as the Rhesus monkey can give valuable insights into human medical problems. And this includes mental and emotional problems. There are psychopathic conditions which can be recognised in other animals that are very much like the conditions we have to cope with. Anybody who's acquainted with other animals, anybody who watches them carefully; it's very difficult to avoid the recognition of similar emotions. Hunger and anger and fear and so on that we experience.

**the evolutionist:** And love?

**Williams:** [laughing] Well, there's certainly interpersonal relationships of a sexual or familial kind, and coalitions - to use a more emotionally neutral term - are formed. You can call them friendships - a primatologist recently wrote a book on friendships between baboons. But it's a matter of how far you want to stretch the definition of 'falling in love' to recognise that it happens in other animals.

**the evolutionist:** But if you reverse the way you look at it in humans - it's not Cupid's arrow, but the product of evolved internal mechanisms - isn't it quite likely that they have similar ones?

**Williams:** Yes, but it's also the result of external stimuli. We perceive another individual for whom we feel an attraction and in many human contacts we describe this as 'falling in love', but analogous situations occur in other species. There are other species in which bonding between male and female can be more or less permanent - last as long as both individuals stay alive and remain capable of

continuing the relationship. In other species the interaction between the sexes is much more temporary and fleeting - much less individualised. There's a great variety of patterns of family life that can be found in the animal kingdom - a few rather similar to the human, many quite different.

***the evolutionist:*** Can apes experience moral dilemmas?

**Williams:** They can definitely experience emotional conflict - it's difficult to imagine how they could escape this sort of situation. They may be pursuing one line of activity, like feeding, but then they perceive something else that may or may not be worth interrupting the feeding for, like a predator. They might go on eating as long as the predator is far enough away. But beyond a certain level of proximity they'll interrupt their feeding and do something defensive. As this threshold is approached, it can certainly look as if there's an increasing level of anxiety and jitteriness that finally results in a major change in the behaviour pattern.

**"apes can definitely experience emotional conflict"**

And I'm sure there are conflicts between sexual urges and fear - a male wants to pursue a female but there's the possibility of retaliation or conflict with another male that may be damaging - so there'll be an ambivalence there, a hesitancy. If we observed the same thing in human behaviour we would call it an emotional conflict. If there's more than one behaviour pattern that an animal can show then there's a possibility of conflict between the motivations that give rise to those behaviours.

***the evolutionist:*** And "moral" dilemmas?

**Williams:** Yes. Like, "should you defend your relatives or offspring against some danger or should you be more concerned with your own safety?" This could be considered a "moral" conflict. For people nowadays it's less likely to be a threat by a predator but something more 'everyday'. You're coming home from work and you know that your wife or child wants something that you have to stop and get from a store somewhere. But you're worn out and you'd much rather go home and have a drink as soon as possible. So you could pretend that you forgot. This sort of moral dilemma happens all the time - should you do something for someone else or should you behave more in your own personal interest?

***the evolutionist:*** Well that leads onto my next question. It's easy to see pain as having an important function - it might be unpleasant to experience it but it's helping you in the long term. To what extent do you think that guilt is the psychological equivalent of pain in that it helps you in the long term. It's not nice to experience it but it might make you do things, in terms of reciprocal altruism, that will advance your long term success.

**Williams:** I think this is entirely correct. If you feel guilty about not having performed adequately for your spouse or your children, this can lead to improved behaviour in the future. So from that perspective guilt is a valuable emotion, an adaptive attribute of the human psyche.

***the evolutionist:*** So is guilt an unavoidable part of social life?

**Williams:** I would hope that everyone has the capacity for guilt and its occasional experience because it can lead to socially desirable alterations of behaviour. But like every other emotion, the capacity for it varies greatly among people and inevitably there are people who don't have it well enough developed and those who have it too well developed: purely selfish behaviour carried to an extreme so that there's serious neglect of responsibilities to other people, and on the other hand people who are so nagged by guilt that it interferes with any constructive behaviour that they otherwise might be engaged in. In fiction, for example, anyone depicted as a villain would be someone who was defective in social responsibility. At the opposite extreme - Oedipus gouged his eyes out through guilt. He had committed incest and parricide. Now these are serious crimes but since he didn't really know what he was doing when he committed them it seems to me that his feelings of guilt were a bit excessive. He should have tried to make amends not merely inflict punishment upon himself. There would be these opposites, and the same can be said of almost any capability for some emotional response to a situation, anxiety etc.

***the evolutionist:*** So, in a nutshell, guilt is the emotional regulator of reciprocal altruism - and kin altruism to a lesser extent?

**Williams:** Certainly the reciprocity factor would be important: somebody has done things for you repeatedly and then you have an opportunity to do something for them, and you fail to do so. This gives rise to the emotion of guilt. This, I presume, would make you more likely in the future to behave with greater benevolence to that individual. And to react more morally acceptably in similar situations that arise in the future. In their extreme manifestations these are medical problems, but we're just talking about the day-to-day role of the emotions in human life.



***the evolutionist:*** You've said that many of the problems we experience today are due to the differences between our modern and ancestral lifestyles. What role did laziness play then and now?

**Williams:** To get an adequate diet in ancestral situations took a hell of a lot of hard work, so any unnecessary activity was maladaptive - you got plenty of exercise just doing what it took to keep you alive. So today we still have the motivation to avoid wasting energy - this leads us to be much too sedentary.

***the evolutionist:*** So did Stone-Age Man have 'an afternoon off'?

**Williams:** Almost anywhere in pre-agricultural societies there would be seasons of abundance and seasons of scarcity, and in the seasons of abundance maybe you did what you could to store some of the abundance - an extremely difficult thing, lacking modern technologies of food storage. Yeah, there was leisure available, frequently.

## "any unnecessary activity was maladaptive"

But on average it took a lot more energy expenditure to find enough food and avoid hazards, and so on, than would be necessary today. So in general, making use of your leisure time to relax and maybe put on a pound or two in preparation for the shortages that are likely to hit next month, would have been desirable. Nowadays we're not rescued by shortages next month, we keep on putting on another pound or two until we're seriously over-weight. Or the food excesses may be producing damage in other ways in the form of cholesterol deposits in our arteries or impairment of the immune function that may control incipient cancer growths. Over-eating and under-exercising today are serious sources of illness.

**the evolutionist:** You also see mass communication as a source of ill health, albeit psychological.

**Williams:** If you have a personality that demands that you be on top of things - well then, it's hard to be on top of the world. If you're a chess player and the fact that you're not as good as [Kaspararov](#) is a source of unhappiness for you, then you're vulnerable to a source of unhappiness that would not have happened in ancestral environments. You may well have been the best player of some prodigious game in your little tribal unit but you didn't have to be the best in the world to feel good about it.

**the evolutionist:** Ok, you can eat a proper diet and exercise, but what do you do about things like that? Not watch telly?

**Williams:** You cope with that kind of problem by realising that following your natural inclinations may cause difficulties, cause health problems and that you should make an attempt to bias both your eating behaviour and your activities towards what would be closer to the Stone Age, normal situation. Spend less time sitting in front of the television tube and more time gardening, walking.

**the evolutionist:** You cite the dilution of family support structures as another source of unhappiness. What has caused this in the transition from ancestral to modern conditions?

**Williams:** Ancestral social structures is were tremendously variable. In some modern tribal societies male-female relationships are such that the children that are associated with particular men are probably not the children of those men. There's an interesting calculation; in any situation in which more than a third of the children are not the offspring of the men associated with particular women then it becomes more genetically profitable for those men to contribute to their sister's children rather than to their wives' children. So you get these avuncular social systems in which family lines become much more explicitly maternal and the men make economic contributions to the children in the maternal line of descent. Certainly the economic situations are tremendously variable.

I'm not sure that the modern Western nuclear family concept is a particularly natural or common one, but of course, whether it is or not, it is both certainly socially desirable and biologically normal for human beings to grow up in a network of relatives that they know to be relatives and feel a special responsibility towards and are the recipient of special benefits from those relatives - this does

contribute to one's emotional security. When I imply that this is the normal situation in ancestral societies I think that we should also recognise that this was frequently disrupted. One common situation is that women were kidnapped from one society and forced to be concubines in another. Certainly strife between groups was a tremendously destructive social force throughout human history - and strife within groups. Animosities build up and can lead to violence or deprivation and so on. There were plenty of these negative influences in ancestral societies. These were tragedies that people some how had to cope with and had adaptations for dealing with.

**the evolutionist:** So we can cope with some of the problems of the modern nuclear family as well?

**Williams:** Yeah. Most modern social problems, in fact all social pathologies, affect a small proportion of people. People in general do cope, do rise above their difficulties, but not everyone is capable of so doing. I'm sure there's an awful lot of pure chance, but it's obviously much more difficult to cope with social problems when you're not in a stable social group. I think the idea that our ancestors always lived in stable social groups is an unrealistic view of what sorts of things people faced in ancestral environments. There were plenty of sources of social strife and unrest and insecurity that might destroy what might be very benign social situations. There were constant threats to these situations - if there hadn't been then the population would have exploded, and it didn't. The situations were sufficiently stressful that death rates balanced birth rates for the entire Stone Age.

**the evolutionist:** OK. So if we accept that the nuclear family is not *necessarily* any better or worse than other or older social systems, the question of what caused the transition from 'traditional' to nuclear families remains.

**Williams:** I think that the traditional monogamous system we have in Western societies is the result of coalition between secular and ecclesiastical authorities to impose a system on the population that results in a minimum level of strife in the population. This is the suppression of one of the main sources of contention in a population: the competition between men for women.

**"men who seem to be monogamous, well behaved and faithful, stay married for a long time and take care of their kids, have not *lost* their desire to appropriate other women"**

If you impose monogamy, a pair of individuals stays together till one of them dies and that pair is responsible for their children, and any sexual transgressions - adultery or anything suggestive of it - is frowned upon, then people are not necessarily extremely happy, but it enables the authorities to accomplish more. Collecting taxes: if people are not wasting resources in conflict with each other there'll be a source of more abundant revenues.

**the evolutionist:** And why wasn't this the case in hunter-gatherer societies?

**Williams:** Hunter-gatherer social systems were highly variable. I think the great majority of them

were at least partly polygynous. Men might have two or three wives - not the big harems you get in later agricultural situations - other men had no wives at all. There were deprived and privileged individuals which reflected these individuals' socio-economic power - either because of their own strength and skills or family connections.

**the evolutionist:** Well, what's happened nowadays to that imposition?

**Williams:** I think the basic problem is that even men who seem to be monogamous, well behaved and faithful, stay married for a long time and take care of their kids, have not *lost* their desire to appropriate other women. The desire or capability to expand their sexual horizons varies among men but a large proportion of them do have the opportunity and make use of it. My guess is that a hundred years ago there was an awful lot of hidden unhappiness in families. There were men who really hated their wives and vice versa but they somehow stayed together because it was expected of them or they had no opportunity to do otherwise - now they have the opportunity. If they don't like each other they separate.

**the evolutionist:** You changed "Everything in biology is only understandable in the light of evolution" to "Everything in medicine is only understandable in the light of evolution". Do you think you could also say "Everything humans are and do is only understandable in the light of evolution"?

**Williams:** Yes, I think evolutionary ideas have a contribution to make about any aspect of human behaviour, but other things need to be considered also. Human cultural evolution is something quite unique - nothing like it has ever happened in any other species to anything approaching the same extent. But I can't imagine there's any human problem or human activity in which there is not a biological component.

**the evolutionist**



(The interview was conducted in London, November 9, 1995.)