



Essay Review

Evolutionary psychology: "fashionable ideology" or "new foundation"?

By

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Review of *Alas, Poor Darwin: Arguments against evolutionary psychology* edited by Hilary Rose and Steven Rose. London, Jonathan Cape, 2000.

At the end of *The Origin of Species*, Charles Darwin wrote: "In the distant future I see open fields for far more important researches. Psychology will be based on a new foundation. . . Light will be thrown on the origin of man and his history."¹ It took more than 100 years but, in the closing decades of the 20th century, Darwin's theory of evolution by natural selection began to be applied to minds, brains and behaviour. "Evolutionary psychology" argues that the mind is a collection of special-purpose software designed by natural selection to solve the problems of survival and reproduction that faced our ancestors -- problems such as finding food, picking suitable habitats, attracting mates, learning a language and navigating the social world.²

However, this new development is not without its critics. *Alas, Poor Darwin* -- a collection of essays edited by Hilary and Steven Rose -- bring these critics together to argue that evolutionary psychology is a "fashionable ideology" whose adherents are "fundamentalists" who promote "simple-minded", "socially irresponsible", "culturally pernicious" explanations

of human behaviour that rest on "shaky empirical evidence, flawed premises and unexamined political presuppositions".

Many chapters in *Alas, Poor Darwin* repeat the accusations that evolutionary psychology is reductionist, determinist and adaptationist -- "accusations" that have been made and dealt with many times before.³ Other chapters misidentify evolutionary psychology with the theory of memes,⁴ or criticise versions of evolutionary psychology that no one in the field would recognise or defend.⁵ For these reasons, this review will not look at each chapter in detail.⁶ Instead, after briefly introducing evolutionary psychology, the review will look at the Roses' five main "arguments against" it, and will then consider the Roses' account of the politics of the discipline.

A very short introduction to evolutionary psychology

According to modern evolutionary biology, genes build organisms in order to make more copies of themselves.⁷ The design of organisms reflects the problems, obstacles and opportunities that genes face on the long road to

replication. Biologists use these problems to make predictions about the kinds of 'design solutions' or 'adaptations' of which organisms will be composed. They can then conduct experiments to test for the presence of these adaptations.⁸ Conversely, biologists can ask whether a particular trait is an adaptation by asking whether it solves (better than chance) a problem that the organism typically faces. These two processes are sometimes referred to as engineering and reverse-engineering respectively. Engineers start with a problem and try to design a widget that will solve the problem. 'Reverse engineers' start with a widget and try to work out what problem it solves.⁹

Evolutionary psychology adopts this "adaptationist" approach when investigating the design of the human mind. Evolutionary psychologists can start with a problem that would have been recurrent in the lives of our ancestors -- such as how to choose fertile mates, or how to maintain cooperative alliances. They then suggest alternative solutions, and design experiments to test for them.¹⁰ For example, using evolutionary theory, comparative data and the ethnographic record, Donald Symons was able to make a number of predictions about the evolved design of human sexual psychology; these predictions were subsequently put to the test and largely confirmed by a survey of 10,000 individuals from 37 different cultures conducted by David Buss.¹¹ And the process can run in reverse: previously mysterious psychological devices can be illuminated by revealing the function that they are designed to perform. For example, through a series of experiments, a quirk of human psychology -- discovered years earlier on the Wason Selection Task -- was explained by Leda Cosmides and John Tooby as a "cheater-detection mechanism", a device that game theory predicts is necessary for certain forms of cooperation.¹²

Steven Rose seems to accept the basic premise of evolutionary psychology. He writes: "The declared aim of evolutionary psychology is to provide explanations for the patterns of

human activity and the forms of organisation of human society which take into account the fact that humans are animals and, like all other currently living organisms, are the present-day products of some four billion years of evolution. So far so good."¹³ Rose continues: "Because humans are as subject as any other organism to evolutionary processes, we should therefore expect to find such adaptations among our own kind just as much as amongst the others that we study. Individual aspects of being human -- from our body shape to our eyes and capacity for binocular vision -- are clearly evolved features and fit us to the environment in which we live."¹⁴

However, the Roses object to using this adaptationist approach to illuminate the psychological mechanisms that underpin human *social* behaviour. This is because, the Roses claim, not enough is known about the conditions under which our ancestors evolved to make claims about the problems that they faced, or to test whether or not particular features of human psychology are adaptations. The Roses also claim that the period of pre-history that evolutionary psychologists focus upon -- the Pleistocene or 'Stone Age' -- is the wrong one because there has been sufficient time since the end of the Pleistocene for significant evolutionary change in the design of the human mind. In addition, the Roses argue that evolutionary psychology's claims about universal features of human social psychology are contradicted by cultural and historical variability, and neglect the role of emotion in human mental life. Finally, the Roses use Daly and Wilson's research on step-parents to exemplify what they see as the empirical short-comings of evolutionary psychology. This review will look at each of these 'arguments against evolutionary psychology' in turn.

Meet the ancestors

As we have seen, evolutionary psychologists use information about human evolutionary history to make and test predictions about psychological adaptations. But the Roses

claim that not enough is known about the Pleistocene to make this approach viable. In raising this objection, the Roses would seem to accept that investigating the Pleistocene is, in principle, the right way to go about establishing an adaptationist account of human psychology and behaviour; it's just that, in practice, not enough is actually known.

What do evolutionary psychologists know about the Pleistocene, and how do they know it? Information about ancestral adaptive problems comes from a diverse range of disciplines, including physical and paleo-anthropology, primatology and other cross-species comparisons, studies of modern-day hunter-gatherer societies, and game-theory models of social interaction.¹⁵ As a result, we know, for example, that our ancestors "nursed, had two sexes, hunted, gathered, chose mates, used tools, had color vision, bled when wounded, were predated upon, were subject to viral infections, were incapacitated from injuries, had deleterious recessives and so were subject to inbreeding depression if they mated with siblings, fought with each other, cooperated with each other, lived in a biotic environment with predatory cats, venomous snakes, and plant toxins. They were omnivorous, ground-living primates, and mammals with helpless infants, long periods of biparental investment in offspring, and an extended period of physiologically obligatory female investment in pregnancy and lactation" and so on.¹⁶

In order to argue that this body of knowledge was inadequate as a starting point for evolutionary psychology, the Roses would need to show that current research on the Pleistocene is insufficient or unreliable (in which case they would presumably recommend more or better research); or the Roses would need to argue that the conditions of the Pleistocene are in principle 'unknowable', and hence an evolutionary psychology will never be possible. However, no such arguments are forthcoming. The Roses do not provide any criticism of any of the actual methods used to investigate the

past. Nor do they demonstrate that any of the actual assumptions about ancestral conditions employed by evolutionary psychologists are false or unreasonable. Nor, with the notable exception of step-relations (see below), do the Roses take issue with any of the predictions or discoveries about adaptations for social life -- such as infanticide, polygamy, concealed ovulation, uncertainty of paternity, sperm competition, maternal-foetal conflict, mate-guarding, 'theory of mind' -- that evolutionary psychologists have made. Steven Rose merely follows Stephen Jay Gould in suggesting that accounts of ancestral conditions are little more than Just-So stories.¹⁷ And Hilary Rose quips that evolutionary psychologists offer up a vision of the Stone Age that owes more to *The Flintstones* than to serious scholarship.¹⁸ And that's it. The Roses' contention seems to be merely that finding out what the Pleistocene was like is difficult, and that nothing is certain. But then what branch of science is any different?

Hence the Roses do not so much argue the point as assert it. And, in the absence of anything that would substantiate their assertion, we may turn to the Roses' next 'argument'.

Out of Africa?

Evolution is a very slow process, and so evolutionary psychologists expect human psychology to be designed to cope with the conditions experienced during the million or so years that we spent as hunter-gatherers on the African savannah, but not with the novel problems encountered during the relatively brief period -- about 10,000 years -- that we have spent as pastoralists and farmers, or the even briefer period spent in modern industrial societies.¹⁹

The Roses' second argument takes issue with this assumption, and claims that there *has* been enough time since the Stone Age for substantial evolutionary change in the design of the human mind. Steven Rose writes that: "Evolutionarily modern humans appeared some 100,000 years ago. Allowing 15-20 years as a generation time, there have been some 5,000-6,600 generations between human origins and

modern times". Noting that rapid evolutionary change is commonly observed in other species, he concludes that the assumption that humans have not changed significantly in the last 10,000 years "does not bear serious inspection".²⁰

First, given that the issue at hand is the possibility of evolutionary change during the 10,000 years since the end of the Stone Age, it is not altogether clear why Steven Rose makes an argument about the possibility of change in the last *100,000 years*.²¹ So, the real question is whether 500-660 generations -- and *not* 5,000-6,600 generations -- is enough time for significant evolutionary change.

Second, Steven Rose's argument for the speed of evolutionary change rests on "[l]aboratory and field experiments in species varying from fruit flies to guppies [which] give rates of change of up to 50,000 darwins. . . . English sparrows transported to the south of the USA have lengthened their legs at a rate of around 100,000 darwins, or 5 per cent a century".²² Rose's contention is presumably that if a sparrow's leg can become 5% longer over 100 years (approximately 100 generations), then it is reasonable to suppose that humans may have changed (in some unspecified way) by 25% over 500 generations. For this to be a possibility, the period since the Stone Age would have had to have been characterised by the kind of consistent, uniform, directional selection pressures that led to the changes in the sparrow's legs. But Rose does not point to any such selection pressures. On the contrary, he later argues that the period since the Stone Age has been characterised by "very rapid changes in human environment, social organisation, technology and mode of production".²³

Third, quite apart from the question of how fast evolution could *conceivably* occur, there is the question of whether any such change has *actually* occurred in the human line in the last 10,000 years. Steven Rose presents no evidence to show that it has. He concludes, rather bafflingly, that "we really have no idea

whether the 6,000 or so generations between early and modern humans is 'time enough' for substantial evolutionary change. We don't even know what 'substantial' might mean in this context".²⁴

One obvious test of the Roses' theory would be to look for genetic differences in populations that have lived under different conditions since the beginning of the agricultural revolution. If the Roses were correct, and there had been time for "significant" evolutionary change in the design of human psychology since the Pleistocene, then, to the extent that different groups occupied different environments, one would expect them to have evolved in different ways. Groups of humans that remained in Africa might be expected to differ from those that migrated to the Russian steppes, the Asian archipelagos, or the Australian outback. Hunter-gatherers should have a different set of mental tools from agriculturalists and industrialists. But the Roses do not discuss this question, or present any evidence that bears on its answer.

Universal variability

One implication of the evolutionary psychologists' view that the human mind took its current form in the Pleistocene is that all modern humans share a universal human nature. But how do evolutionary psychologists reconcile this claim with the manifest diversity of behaviour and culture found around the world? The answer is that psychological mechanisms are 'condition dependent' -- that is, the behaviour they produce will be different under different conditions. Suppose, for example, that human psychology operates in part according to the rule "*If resources are scarce, then adopt a more aggressive approach to acquiring them*". On this basis one might expect overt levels of aggression to vary according to the current economic or ecological circumstances of the people under consideration. Evolutionary psychologists look at, amongst other things, permutations in behaviour in order to work out what the underlying rules are and how they op-

erate. This research, which necessarily involves cross-cultural studies, commits evolutionary psychologists to a strongly "environmentalist" position: the idea that differences in behaviour are largely the product of differences in environmental -- physical, social or cultural -- factors.²⁵

The Roses' third argument against evolutionary psychology is that cultural and historical variability in cultural forms *refutes* the claim that humans share a universal, species-typical psychology. Referring to historically-recent changes in female mate-preferences, levels of violence, and fecundity in various hunter-gatherer populations, Steven Rose remarks "Each of these societies has undergone rapid economic, technological and social change in the last decade. What has happened to the evolutionary psychology predictions? Why have these assumed human universals suddenly failed to operate?"²⁶

But, as the evolutionary psychologists John Tooby and Leda Cosmides have put it: "The recognition that a universal evolved psychology will produce variable manifest behaviour given different environmental conditions exposes [this argument] as a complete non-sequitur."²⁷ In order to make their point, the Roses would need to show not only that behaviour changes, but that behaviour changes in ways that are *not* predicted by the evolutionary psychologist's account of the mechanisms responsible.²⁸ But no such demonstrations are forthcoming. Indeed, by presenting social and cultural explanations as *alternatives to* -- rather than *continuous with* -- biological explanations, the Roses perpetuate the myth that genes can operate only in a rigidly 'deterministic' fashion.

Emotional neglect

Steven Rose's fourth argument against evolutionary psychology is that it neglects the role that emotion plays in human mental life. He writes: "Emotional mechanisms and indeed their expression are evolved properties, and several neuroscientists have devoted considerable attention to the mechanisms and survival

advantages of emotion. So it is therefore all the more surprising to find this conspicuous gap in the concerns of evolutionary psychologists . . ."²⁹

Surprising indeed. The entry for 'Emotion' in the index of the evolutionary psychologist Steven Pinker's book *How the Mind Works* -- to which both the Roses refer -- reads as follows:

Emotion, 65, 143, 315, **363-424**; adaptive function, 143, 370-374; facial expressions, 273, 365-366, 374, 379, 414-416, 546; hydraulic model, 57, 65, 551; and imagery, 285; in music, 529, 531-532, 533-534; neuroanatomy, 371-372; phylogeny, 370-371; universality, 364-369. *See also* Anger, Beauty; Disgust; Exhilaration; Fear; Gratitude; Grief; Guilt; Happiness; Honor; Jealousy; Liking; Love; Passion; Self-control; Sexual desire; Shame; Sympathy; Trust; Vengeance³⁰

The Roses also neglect to mention: Tooby and Cosmides' discussion of emotion in *The Adapted Mind*, and their article entitled "*Evolutionary psychology and the emotions*" in an edited collection called *Handbook of Emotions*;³¹ David Buss's *Evolution of Desire*, or his more recent book *The Dangerous Passion*;³² Robert Frank's *Passions Within Reason: The strategic role of the emotions*;³³ Randolph Nesse's paper "*Evolutionary explanations of emotions*";³⁴ Paul Ekman's work on the facial expression of emotion, including his recent edited version of Darwin's *The Expression of the Emotions in Man and Animals*;³⁵ and many more.

Most surprising of all, Steven Rose appears to have forgotten that he has debated the evolution of the emotions with Steven Pinker.³⁶ (Oddly, this amnesia is only temporary. In a recent article the Roses can be found criticising the evolutionary claim that human emotions are universal.)³⁷

More fundamentally, Steven Rose's

claim that evolutionary psychology neglects the emotions rests on an elementary misunderstanding of what it means to be an "information processor". Rose writes: "it is not adequate to reduce the mind/brain to nothing more than a cognitive 'architectural' information-processing machine. Brains/minds do not just deal with information. They deal with living meaning. . . . The key here is emotion, for the key feature which distinguishes brains/minds from computers is their/our capacity to experience emotion."³⁸

But adopting an 'information processing' or 'computational' approach to the mind does not commit you to a desktop-computer view of psychology, any more than charting the parabolic of a falling apple commits you to inferring that the apple is performing calculus. 'Information theory' is merely a branch of mathematics used to capture how a system's inputs map onto its outputs. It "does not ... imply that the best explanation of brain function will actually be in computational/representational terms. For in this abstract sense, livers, stomachs and brains - not to mention sieves and the solar system -- *all* compute".³⁹ Consequently, "information" does not exclude "emotion".

Tooby and Cosmides are perfectly clear on this point. They write:

[I]t is important to keep in mind exactly what we mean by the cognitive or information-processing level. . . . [S]ome researchers use it in a narrow sense, to refer to so-called 'higher mental' processes, such as reasoning, as distinct from other psychological processes, such as 'emotion' or 'motivation' . . . In contrast, . . . we use terms such as cognitive and information-processing to refer to a language or level of analysis that can be used to precisely describe any psychological process: Reasoning, emotion, motivation, and motor control can all be described in cognitive terms.⁴⁰

Cinderella denied

Alas, Poor Darwin does not present research to refute any of the empirical claims of evolutionary psychology; indeed it carries little sustained discussion of any empirical work. The exception -- Hilary Rose's arguments against Martin Daly and Margo Wilson's work on step-relationships -- is revealing.

In a recent popular book -- *The Truth about Cinderella: A Darwinian view of parental love*⁴¹ -- Daly and Wilson summarise their findings that children are at much higher risk of abuse and murder from step-parents than from genetic parents. Their explanation is that parental investment is a costly resource, and that the psychology of parents has been designed by natural selection to preferentially invest in one's own genetic children, and to be reluctant to invest in children that are not one's own. Within step-relationships, this reluctance can manifest itself in less harmonious relationships, or unwillingness to pay for such things as college education. But at the extremes this neglect can result in severe abuse and even murder.

Hilary Rose does not dispute the higher incidence of abuse by step-parents. Instead, her contention is that "[r]ather obvious matters of context" to do with the "psychological strain" and "financial pressures" of starting second families, "explain better why some men ill-treat their partner's children".⁴² Steven Rose chides Daly and Wilson for "ignoring [these] much more obvious proximal causal processes".⁴³ And, writing in *New Scientist*, the Roses remark that their "obvious" alternative causes "are better grounded than untestable evolutionary speculations".⁴⁴

Hilary Rose does not elaborate on these "obvious" alternatives, nor point to research that has "grounded" them. In fact, she does not make any references to any other studies of child abuse whatsoever. She seems entirely unaware that these "obvious" explanations have been put to the test, and that they failed. Presenting their research on the confounding ef-

fects of poverty in *The Truth about Cinderella*, Daly and Wilson write: "this initially plausible hypothesis was rejected, for it turned out that the distribution of family incomes in stepparent homes in the United States was virtually identical to that in two-genetic-parent homes".⁴⁵ Having discussed other possible confounding effects,⁴⁶ they conclude: "All in all, although several additional risk factors were identified, stepparenthood held its place as the most important predictor [of serious child abuse], and its influence was scarcely diminished when the statistical impacts of all the other risk factors were controlled."⁴⁷ In their major work, *Homicide*⁴⁸ they also discuss how blanket 'explanations' such as "strain" do not explain such nuances as the fact that in families where there are step- and genetic children present, the stepchildren are singled out for abuse.

Hilary Rose goes on to complain that Daly and Wilson's "superficially impressive" data do not distinguish between a step-child whose parent has died and a step-child whose parent is absent through divorce, or between married step-parents and casual lovers. But she does not suggest *any* reason why, or any evidence *that*, the distinctions she suggests -- or indeed, any of the infinite number of distinctions that one could make -- might matter. Nevertheless, various other studies have attempted to articulate several of these claims and test them empirically, and as yet none has been supported by the evidence.⁴⁹

Finally, Hilary Rose writes that Daly and Wilson "get no support from the primatologist Sarah Hrdy, whose work on langur monkey infanticide is key to their thesis. In the *New Scientist* [Hrdy] is recently quoted as saying, 'Human violence towards babies and infants may be tragic but it's nothing like what a langur male is doing.'⁵⁰ Readers of *Cinderella* might be surprised, therefore, to discover that Daly and Wilson take the same view of how Hrdy's thesis relates to their own. They write: "Human beings are not like langurs or lions. We know that 'sexually selected infanticide' is not a hu-

man adaptation because men, unlike male langurs and lions, do not routinely, efficiently dispose of their predecessors' young. ... Quite unlike the situation in langurs or lions, human stepfamilies exist in all societies, and most stepchildren survive them."⁵¹

To conclude this section of the review, it would appear that none of the Roses' "arguments against evolutionary psychology" succeed in establishing that the discipline relies on "shaky empirical evidence" or "flawed premises". The next section of the review considers the Roses' additional accusation: that evolutionary psychology relies on "unexamined political presuppositions".

Political animals

In the past, Steven Rose has promoted the view that there is more to evolutionary explanations of human behaviour than mere science. His co-authored book, *Not in Our Genes*,⁵² presented an explicitly Marxist critique of evolutionary biology; and his 1997 book, *Lifelines*, begins with the warning that "[t]he rise of the present enthusiasms for biologically determinist accounts of the human condition date back to the 1960s. They were not initiated by any specific advance in biological science, or powerful new theory, but harked back instead to an earlier tradition of eugenic thinking which . . . had been eclipsed and driven into intellectual and political disrepute in the aftermath of the war against Nazi Germany and its racially inspired Holocaust."⁵³

Alas, Poor Darwin marks a complete reversal from this earlier position. Hilary Rose now concedes that evolutionary psychology eschews any notion of race, and that it is compatible with a wide variety of political viewpoints, such as Peter Singer's Darwinian Left, Matt Ridley's free marketeering, Helena Cronin's feminism, Francis Fukuyama's call for state intervention to tackle unemployment, and Darwin@LSE's collaborations with the left-leaning think-tank Demos.⁵⁴ (She could have added also that John Maynard Smith FRS was a communist, and Robert Trivers was a member

of the Black Panther Party.) Each of these researchers illustrate the point that facts and values can be kept separate; that one's political goals do not dictate one's science (or vice versa), but that once you've settled on your political or social objectives, science can help you achieve them.⁵⁵

Of course, in accommodating researchers with diverse political views, evolutionary psychology is no different from any other academic discipline. In order to make the point that evolutionary psychology (or any other discipline) is politically-motivated the Roses must demonstrate that the political views of a researcher have led to scientific error. But no such demonstrations are forthcoming.

A new foundation

In conclusion, the Roses do not show that evolutionary psychology rests on any "shaky empirical evidence" or "flawed premises". Evolutionary psychologists use accounts of pre-history corroborated by numerous diverse disciplines; their assumptions about the rate of evolutionary change are in keeping with standard assumptions in evolutionary biology; their claims about human universals are consistent with, and go some way towards explaining, cultural and historical variability; emotions have been the subject of a great deal of evolutionary research; and Martin Daly and Margo Wilson's findings have withstood over two decades of testing and scrutiny. Nor do the Roses provide any reason for thinking that evolutionary psychology is a "fashionable ideology" motivated by "unexamined political presuppositions".

Nevertheless, mud sticks, and so in the short term the Roses will no doubt succeed in misleading the public and the media about evolutionary psychology. But, fortunately, the Roses have had little effect on the current research programme of evolutionary psychology, and in the long term seem destined to have no effect whatsoever.⁵⁶ Darwin's theory of evolution has revolutionised our understanding of the natural world. And by placing psychology on "a

new foundation", Darwin's theory is set to revolutionise our understanding of ourselves, and of our place in that world. Despite their best efforts, the Roses will not be able to delay this revolution.

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Notes

1. Darwin 1859, p458).
2. For overviews of evolutionary psychology, see: (Barkow, Cosmides et al. 1992; Pinker 1997; Buss 1999). See also: (Betzig 1997; Cartwright 2000).
3. For discussion of the various "isms", see any of the books in Footnote 2, (Dawkins 24/01/1985; Dawkins 1982; Dennett 1995; Radcliffe Richards 2001), or (Kurzban 2002).
4. For an evolutionary psychological argument against memes, see: (Pinker 1997 pp208-210).
5. For examples of misquotes, misrepresentations and misunderstandings, see the messages located at: <http://groups.yahoo.com/group/evolutionary-psychology/message/6061>, and <http://groups.yahoo.com/group/evolutionary-psychology/message/13601>
6. For a critical summary of each chapter, see (Pitchford 2001).
7. (Dawkins 1976).
8. In one celebrated case, biologists knew that bats hunted moths in the dark, but it was not known how they managed it. One conjectured solution was that bats used a kind of radar. Experiments were designed to test for such a radar, and it turned out that bats did indeed have such an adaptation (Dawkins 1986, Chapter 2).
9. (Dennett 1995). For further discussion of adaptation and adaptationism, see: (Williams 1966; Buss, Haselton et al. 1988; Tooby 1999; Alcock 2000).
10. "If one knows what adaptive functions the

human mind was designed to accomplish, one can make many educated guesses about what design features it should have, and can then design experiments to test for them." (Cosmides, Tooby et al. 1992, p10).

11. (Symons 1979; Buss 1994; Symons 1995; Salmon and Symons 2001).

12. (Cosmides and Tooby 1992)

13. (Rose 2000, p247)

14. (Rose 2000, p250)

15. (Tooby and DeVore 1987)

16. (Cosmides and Tooby 1997).

17. (Rose 2000, p253).

18. (Rose 2000, p118).

19. It is argued that the mismatch between "stone-age minds" and "space-age world" is part of the reason why, under modern conditions, human behaviour does not reliably result in increased reproductive success. For example, our preference for sugars, salts and fats evolved at a time when these valuable nutrients were scarce, and we could not get too much of them. In the modern world, where these things are abundant, these same propensities lead us to suffer from tooth decay, high blood pressure and obesity. (Nesse and Williams 1994).

20. (Rose 2000, pp253-4). Steven Rose also invokes Gould and Eldredge's theory of "punctuated equilibrium" to explain how evolutionary change might have occurred faster than the evolutionary psychologists assume. However, this does not help his argument, because even the "revolutionary" phases of evolutionary change proposed by the theory take tens of thousand of years in creatures with much faster generation times than humans.

21. This reflects the Roses' wider confusion about the dates of the Pleistocene. In *Alas, Poor Darwin* they suggest that the Pleistocene was the period between "100-600,000 years ago" (Rose and Rose 2000, p1). In their *New Scientist* article, the Pleistocene is "between 10,000 and 1.6 million years ago" (Rose and Rose 22/6/2000). And in their *Guardian* article, they suggest that there has been "100-600,000 years since the Pleistocene" (my italics) (Rose and

Rose 13/7/2000).

22. (Rose 2000, p253). A 'darwin' is: "the change in the mean of the natural log of a morphological character divided by the elapsed time in millions of years over which the change has occurred" (Thain and Hickman 1995). At no point does Rose explain how a measure of morphological change can be applied to the kinds of information-processing mechanisms that evolutionary psychologists study. He is perhaps thinking of changes in brain size -- but what would it mean for a software package to become 5% longer? And even if such change had occurred, Rose does not explain how or why this would undermine the claim that the mind is adapted to ancestral conditions. A 5% "longer" cheater-detection mechanism is still a cheater-detection mechanism.

23. (Rose 2000, pp253-4).

24. (Rose 2000, pp253).

25. (Crawford and Anderson 1989).

26. (Rose 2000, pp262-3).

27. (Tooby and Cosmides 1992, p46).

28. And even if the Roses did present such evidence, they would be refuting a particular hypothesis about a particular mechanism, not the entire evolutionary approach to psychology

29. (Rose 2000, p262).

30. (Pinker 1997, p637).

31. (Cosmides and Tooby 2000). See also: (Tooby and Cosmides 1990).

32. (Buss 1994; Buss 2000).

33. (Frank 1988).

34. (Nesse 1990).

35. (Darwin 1872/1998)

36. (Pinker and Rose 21/01/1998).

37. (Rose and Rose 13/7/2000).

38. (Rose 2000, p261).

39. (Churchland and Grush 1999).

40. (Tooby and Cosmides 1992, p65).

41. (Daly and Wilson 1998).

42. (Rose 2000, p122).

43. (Rose 2000, p260).

44. (Rose and Rose 22/6/2000).

45. (Daly and Wilson 1998, p29).

46. Daly and Wilson have also looked into the

effects of numerous other confounding variables -- such as the age of the child, age of the mother, whether the step-father was present at the birth, and the personalities of people who remarry. And, despite Hilary Rose's comments to the contrary (Rose 2000, p122), Daly and Wilson also discuss the apparent anomaly of adoption (Daly and Wilson 1998, pp45-6).

47. (Daly and Wilson 1998, p31).

48. (Daly and Wilson 1988).

49. (Daly and Wilson 2001).

50. (Rose 2000, p121).

51. (Daly and Wilson 1998, pp37-8).

52. (Rose, Lewontin et al. 1984).

53. (Rose 1997, pix).

54. (Rose 2000, p125).

55. For a different take on the politics of socio-biology, see: (Trivers 1981).

56. Throughout *Alas, Poor Darwin*, the Roses makes great promises for their 'alternative' to current evolutionary biology : 'liberatory biology'. First touted twenty years ago (Rose 1982), this new approach to biology has yet to generate any new hypotheses or research, and shows no sign of doing so. As Martin Daly notes, "[The] call for an alternative paradigm has failed to impress practicing biologists both because adaptationism is successful and well-founded, and because its critics have no alternative research program to offer. Each year sees the establishment of such new journals as *Functional Biology* and *Behavioral Ecology*. Sufficient research to fill a first issue of *Dialectical Biology* has yet to materialize." (Daly 1991). Part of the reason for the lack of 'alternative' research is perhaps that contributors to *Alas, Poor Darwin* "do not speak with a single voice", (Rose and Rose 2000, p9). Steven Rose recognises the problem, but decides that "it is not necessary to adjudicate between these positions" in order to "escape" evolutionary psychology, (Rose 2000, p260). The situation is reminiscent of an earlier round of anti-Darwinism, of which John Maynard Smith FRS said: "I have little sympathy . . . for schools of thought that have been constructed by bringing

together everyone who has something anti-Darwinian to say, however mutually contradictory their own views may be." (Maynard Smith 1988, p123).

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