

LIKING WHAT'S GOOD FOR YOU: EVOLUTION, SUBJECTIVITY AND PURPOSE

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ABSTRACT: The evolutionary argument for the causal efficacy of consciousness of William James contends that an implication of the theory of evolution by natural selection is that subjective states have physical effects. This paper explores the contemporary relevance of James' argument. The argument will be examined and some objections to it briefly discussed. Following this, the implications of the argument for the foundations of science and for evolutionary theory will be addressed. Consideration will then be given to how extensively subjective purpose may occur in living nature in view of James' argument. It is argued that the evolutionary argument lends support to Whiteheadian metaphysics and has significant implications for the world-view of scientific materialism.

KEYWORDS: Whitehead; Evolution; William James; Purpose; Subjectivity

I INTRODUCTION

I think there is a bomb lodged in the foundations of science that may be about to go off. It is a bomb that Charles Darwin inadvertently set ticking, William James exposed for all to see - and which 20th century thought has done its best to try and bury.¹

The bomb which organic chemist and author Graham Cairns-Smith refers to is the evolutionary argument for the causal efficacy of consciousness (hereafter, 'the evolutionary argument'). Although it has been nearly twenty years since these words were published and no bomb has since gone off, the issues the evolutionary argument present for scientific materialism remain.

¹ A.G. Cairns-Smith, *Secrets of the Mind A Tale of Discovery and Mistaken Identity*, New York, Springer Verlag, 1999, p.54.

This paper aims to review the evolutionary argument in the light of recent trends in biology, behavioural sciences and the philosophy of mind and to discuss the relevance of the argument to a Whiteheadian metaphysics.

II THE ARGUMENT

The crux of the evolutionary argument is that our subjective feelings are generally appropriate to helping us survive, which means that these feelings must have evolved and therefore must have physical effects.

In the words of James himself:

There is yet another set of facts which seem explicable on the supposition that consciousness has causal efficacy. *It is a well-known fact that pleasures are generally associated with beneficial, pains with detrimental, experiences.* All the fundamental vital processes illustrate this law. Starvation, suffocation, privation of food, drink and sleep, work when exhausted, burns, wounds, inflammation, the effects of poison, are as disagreeable as filling the hungry stomach, enjoying rest and sleep after fatigue, exercise after rest, and a sound skin and unbroken bones at all times, are pleasant. Mr. Spencer and others have suggested that these coincidences are due, not to any pre-established harmony, but to the mere action of natural selection which would certainly kill off in the long-run any breed of creatures to whom the fundamentally noxious experience seemed enjoyable. An animal that should take pleasure in a feeling of suffocation would, if that pleasure were efficacious enough to make him immerse his head in water, enjoy a longevity of four or five minutes. But if pleasures and pains have no efficacy, one does not see (without some such a priori rational harmony as would be scouted by the 'scientific' champions of the automaton-theory) why the most noxious acts, such as burning, might not give thrills of delight, and the most necessary ones, such as breathing, cause agony.² (italics in original)

Implicit in the evolutionary argument is the Darwinian assumption that organisms have evolved through natural selection of traits which increase reproductive fitness. The steps in the argument can be spelled out as follows:

1. Evolution occurs through natural selection of favorable traits.
2. Pleasure is generally associated with events which enhance survival prospects and pain with the opposite.
3. Given (1), the correlation in (2) must have evolved through the processes of natural selection.
4. If subjective pleasure and pain had no physical effects then natural selection

² William James, *The Principles of Psychology*, Vol.1, New York, Harry Holt and Company, 1908, pp. 143-144.

would have no effect on them.

5. Therefore, subjective experiences such as pleasure and pain have physical effects.

An important thing to note about the evolutionary argument is that it is not just implying that feelings evolved. Traits can evolve as a side effect of other evolutionary pressures with no selective advantage in themselves. Thus, it could be argued that feelings have evolved but are still entirely epiphenomenal, like the proverbial steam coming out of a train whistle which plays no part in the locomotion of the train. On this account, subjective feelings could be seen as evolutionarily akin to male nipples, no doubt having evolved but having no effect on fitness.

However, the appropriateness of feelings to their adaptive context undercuts the epiphenomenal argument and implies that they do have physical effects. The gnawing hunger relieved by the pleasure of eating, feelings of sexual desire associated with reproductive activity, the pain of injury associated with noxious stimuli, and the feelings of fatigue preliminary to rest could not be explained in an evolutionary context if such feelings were not meaningfully associated with physical effects. The correlation between the feeling and the adaptive response indicates that the feeling has been selected for by natural selection. And such selection could only have occurred if subjective feelings have physical effects.

Although at first glance the argument may seem trivial or banal, the salience of it is made clearer by looking at exceptions to it.

There are of course many instances where pleasant or attractive feelings are not associated with survival enhancing events. However, these instances can be reasonably explained by the fact that the conditions under which the human body evolved are very much different from those of contemporary society.

For example, in traditional hunter gatherer societies where sugar was rare and being able to convert excess sugar into fat in times of food scarcity was advantageous, sweet things having a pleasant taste was adaptive. Now it is a factor in the obesity epidemic. Similarly, a liking for salt is adaptive for hunter-gatherer omnivores who lose salt through sweating and could otherwise become sodium-depleted. However, in current conditions, where salt is readily available, a high salt diet is associated with high blood pressure and heart disease.³ Such cases demonstrate the strengths of the evolutionary argument rather than any weaknesses.

At this point, it is appropriate to consider how it is that subjective feelings could

³ Paul A.S. Breslin, 'An evolutionary perspective on food and human taste' *Current Biology*, vol. 23, no. 9, 2013, pp. R409-R418.

have physical effects. Of course, the common sense explanation for this is that feelings have physical effects by motivating changes in behaviour. Feeling thirsty motivates me to get up and get a drink. The numbness in my leg motivates me to give it a stretch. The pursuit of pleasure and the avoidance of pain lead me to act with purpose, to act towards achieving goals.⁴

The common sense explanation is obviously not popular from the perspective of the physical sciences, the reason being that it requires subjective mental states to affect physical processes. However, as a result of the evolutionary argument, the Rubicon of the subjective affecting the objective has already been crossed. Hence, if feelings do affect behaviour there is no apparent reason to adopt any other explanation for why this occurs than the one which accords with parsimony, intuition and common sense.

Thus, if the evolutionary argument holds it can reasonably be concluded that subjective feelings have physical effects through motivating purposeful, goal-directed behaviour.

III OBJECTIONS

Physiologist Ian Glynn wrote in 1993 that the evolutionary argument presents a problem which ‘is important, which is still not solved, and yet which is very largely neglected’.⁵ These words are still relevant today.

Two recent critiques of the evolutionary argument have been made by philosophers Joseph Corabi⁶ and William Robinson⁷. Whilst both these authors contend that the evolutionary argument is ultimately not successful in refuting epiphenomenalism, Robinson concedes that it is a ‘formidable argument’⁸ and Corabi says that previous arguments against it have been diverse but ‘far from decisive’⁹. Both of these authors also don’t believe that the other has successfully refuted the evolutionary argument.

⁴ Subjective states might also directly influence physiological changes which enhance survival value without affecting behaviour. For example, the beneficial effects of meditation and the detrimental effects of stress may be related to concomitant subjective states. Non-behavioral effects of subjective states will not be considered here.

⁵ Ian M. Glynn, ‘The evolution of Consciousness: William James’s unresolved problem’, *Biological Review of the Cambridge Philosophical Society*, Vol.68, no.4, 1993, p.599.

⁶ Joseph Corabi, ‘The misuse and failure of the evolutionary argument’, *Disputatio*, vol. 6, 2014, pp. 199-227.

⁷ William S. Robinson, ‘Evolution and epiphenomenalism’, *Journal of Consciousness Studies*, Vol. 14, 2007, pp. 27-42.

⁸ William S. Robinson, ‘James’s evolutionary argument’, *Disputatio*, Vol. 39, 2014: 229.

⁹ Corabi, ‘The misuse and failure of the evolutionary argument’, p.201.

Robinson's paper focuses on the argument that epiphenomenalism not being able to explain the link between pleasure and efficaciousness as being no worse than interactionism not being able to explain the causation of physical behaviour by non-physical sensations, or the inability of physicalism to account for the identity of neural states and sensations. Therefore, it is contended, the evolutionary argument offers no grounds for rejecting epiphenomenalism¹⁰. Corabi criticises Robinson's view on the basis that the method of inference to the best explanation used by Robinson in comparing what competing theories do and do not explain is unlikely to be a promising method in assessing them, unless there are no decent alternatives¹¹.

On his part, Corabi believes that the evolutionary argument is best examined by reframing it using determinate evidence statements and using a Bayesian confirmation theory framework. On this basis, Corabi argues that the evidence adduced from the evolutionary argument is no more likely given physicalism than it is given dualism¹². Robinson is unconvinced by Corabi's thesis and argues that reframing the evolutionary argument in terms of determinate statements introduces irrelevancies and obscures the argument's strengths¹³. Neither Robinson nor Corabi apply a panpsychist construal of consciousness to their arguments.¹⁴

Whilst detailed examination of the arguments and counterarguments of Corabi and Robinson is beyond the scope of this paper, the ongoing debate amongst contemporary philosophers about the evolutionary argument illustrates that it still merits serious attention by scientists and philosophers. This is particularly the case when the implications of the argument are considered.

IV IMPLICATIONS FOR THE FOUNDATIONS OF SCIENCE

Clearly, the conclusion that subjective feelings have physical effects has huge implications for the explanatory models of the physical sciences.

A hallmark of physical science has been the explanation of higher-level processes in terms of lower level processes. As David Chalmers puts it, in reductive explanation

¹⁰ Robinson, 'Evolution and epiphenomenalism', p.36.

¹¹ Joseph Corabi, 'Pleasure's role in evolution', *Journal of Consciousness Studies*, Vol. 15, 2008, pp. 83-84.

¹² Corabi, 'The misuse and failure of the evolutionary argument', 225.

¹³ Robinson, 'James's evolutionary argument', p. 237.

¹⁴ Corabi notes that it could be argued that setting aside panpsychist hypotheses in his paper could be an inappropriate assumption as James himself was a panpsychist, However, Corabi contends that this is addressed by the fact that James's reasons for endorsing panpsychism have no connection with the evolutionary argument and the two can be treated independently; Corabi, 'The misuse and failure of the evolutionary argument', footnote 18, pp. 209-210.

an appropriate account of lower-level processes results in the explanation of the higher-level phenomenon falling out.¹⁵ Or, in more technical terms, a natural phenomenon is reductively explainable in terms of some low-level properties when it is logically supervenient on those properties.¹⁶ In terms of the physiology of the human body, this means that, in principle, an explanation at the level of physical and chemical processes in the body as determined by the laws of physics and chemistry would explain all movements of the body. There is no need to infer any contribution from higher-level subjective mental states.

However, what the evolutionary argument is saying is that the higher level subjective states do in fact influence behaviour. Even if such states are initially determined at the microphysical level there must also be some 'top down causation' from the subjective mental states to subsequent behavior. Otherwise, there is no way that natural selection could have made the subjective feelings appropriately aligned with their behavioural effects. So subjective states must influence subsequent events at the microphysical level. Whilst Chalmers argued that consciousness cannot be reductively explained, the evolutionary argument implies that human behaviour also cannot be reductively explained.

This seems like such a radical proposition that perhaps any refutation of the evolutionary argument, no matter how weak or feeble, should be embraced for the sake of maintaining the integrity of the foundations of physics and science generally. Perhaps this would be the appropriate position to adopt if there were no defensible interpretations of physics available which are consistent both with observed empirical facts and with the proposition that subjective states influence physical behaviour. Fortunately, such interpretations are available.

For example, Whiteheadian metaphysics accounts for human behavior and the behaviour of all material objects in terms of the mutual interaction of experiential events which are influenced by past events from the surrounding environment. In complex organisms such as human bodies there exist presiding or dominant series of events - which constitute the experience of one's 'self'- which can influence the character of subsequent events in the rest of the body.¹⁷ As Whitehead puts it; 'Owing to the delicate organisation of the body, there is a returned influence, an inheritance of character derived from the presiding occasion and modifying the subsequent occasions

¹⁵ David J. Chalmers, *The Conscious Mind: In Search of a Fundamental Theory*, Oxford, Oxford University Press, 1996, p.42.

¹⁶ *Ibid*, p. 47.

¹⁷ David Ray Griffin, *Unsnarling the World-Knot: Consciousness, Freedom and the Mind-Body Problem*, Los Angeles, University of California Press, 1998' pp. 187-188.

through the rest of the body'.¹⁸

Under a Whiteheadian model, the causal efficacy of consciousness can be explained by the feelings of the dominant occasions influencing subsequent occasions in the body, resulting in changes in movement and behaviour of the organism. On the other hand, bodies which are aggregations of events with no presiding or dominant occasions exerting 'downward' influence can adequately be explained by reductive explanation. In these cases, mutual influence is 'predominantly of a formal character expressible in formal sciences, such as mathematics. The inorganic is dominated by the average. It lacks individual expression in its parts. Their flashes of selection (if any) are sporadic and ineffective. Its parts merely transmit average expressions'.¹⁹

Whilst this is not the place for a detailed exposition of Whitehead, suffice it to say, a Whiteheadian based metaphysics can readily account for the implications of the evolutionary argument whilst also subsuming reductive explanation where this is appropriate. Thus, to the extent that reductive explanatory models are unable to account for the implications of the evolutionary argument, Whiteheadian explanation is to be preferred to reductive models.

How such Whiteheadian explanation could be integrated with conventional scientific explanation based on objective empirical observations of course poses an enormous challenge. Nevertheless, if there are grounds for concluding that subjective elements have objective effects, the difficulty of incorporating this with scientific explanation is no reason to deny such a conclusion.

V IMPLICATIONS FOR EVOLUTIONARY THEORY

In *The Selfish Gene*, Richard Dawkins notes that 'One of the most striking properties of survival-machine behaviour is its apparent purposiveness'. He then describes examples of the mechanisms of the Watt steam governor and guided missiles which rely on principles such as negative feedback to give the appearance of acting purposively.²⁰ This apparent purposiveness purportedly conceals the fact that humans and other organisms are in fact 'lumbering robots' acting deterministically in accord with the pushes and pulls of genes and the environment.

However, this picture is now turned on its head. The implication of the evolutionary argument is that at least in some cases, organisms are not acting with apparent purpose but with actual purpose, responding to how they feel. If they did not

¹⁸ Alfred North Whitehead, *Process and Reality: An Essay in Cosmology*, [1929] Corr. ed. Ed. Griffin, D.R, and Sherburne, D. W, New York, Free Press, 1978, p. 109.

¹⁹ Alfred North Whitehead, *Modes of Thought*, New York, Free Press, [1938] 1968, p. 27.

²⁰ Richard Dawkins, *The Selfish Gene*, New Edition, Oxford, Oxford University Press, 1989, pp. 50-51.

have such feelings they would have acted differently, because the fact that such feelings are non-randomly correlated with relevant behaviours indicates that the feelings must have been selected for. They could only have been selected for if they had physical effects, so in their absence these physical effects would have been absent and the behaviour would have been different.

Therefore, if the evolutionary argument is sound then subjective feelings and purposes must be taken into account in evolutionary explanations of behaviour.

To give another example, the following is from an interview with evolutionary psychologist Steven Pinker:

Pinker: Since we can imagine a robot that, behaviour-for-behaviour and state-for-state, is identical to a human, but in which there's "no one home" - no one actually feeling the pain or seeing the red - there can't be an adaptive explanation of sentience, because we've defined it as something that can have no external consequences.

the evolutionist: So it's not just a case of the adaptive explanation of sentience forever eluding us, but rather that there cannot be one?

Pinker: That's right. Something that has no consequences can have no adaptive consequences. We can imagine a robot or a zombie or an android that has no consciousness, but otherwise interacts with the environment in the same way a sentient human does.²¹

The problem with this line of reasoning is that the evolutionary argument tells us that consciousness (or 'sentience') does have external consequences. If there were no external consequences to one's feelings then there is no reason why a consequence of evolution is that things which feel good are generally good for us and things which feel bad aren't. Further, it also follows from the evolutionary argument that if feelings affect behaviour, a robot or zombie without consciousness could not be functionally equivalent to a human being, as human functions are partially caused by consciousness.

Thus, another implication of the evolutionary argument is that if sentience has been defined as something which has no external consequences, then a redefinition is in order.

Whilst clearly the evolutionary argument has major consequences for evolutionary theory, how this actually pans out for evolutionary explanations at the physiological

²¹ The Evolutionist, 'In conversation with Steven Pinker', June 1998 interview. Retrieved from <http://www.lse.ac.uk/CPNSS/research/projectsCurrentlyOnHold/darwin/publications/evolutionist/pinker.aspx>. Accessed 2 January 2018.

level is not so clear. Like the situation with physics, it remains to be seen how an account of subjective purposes could be integrated into evolutionary explanations based on objectively observable biological phenomena.

At the level of behavioural explanation, the situation is more sanguine. For instance, cognitive ethology is a branch of ethology which studies cognitive processes in animals and which includes subjective consciousness within its ambit. This discipline recognises that whilst there will always be a lack of objective evidence involved in inferring the existence of consciousness in other organisms (just as there is in inferring it in other humans), the fact that no objectively verifiable data about non-human consciousness can ever be obtained does not mean that this subject should not be studied. Just as the study of consciousness in humans has become more respectable and sophisticated over the years, so too has the study of animal consciousness²².

In any case, regardless of how difficult it may be for evolutionary science to adapt itself to account for subjective purposes, if the evolutionary argument is sound and the effects of such purposes on behaviour are not taken into account then this science is incomplete. The implication of the evolutionary argument is that at least in some cases evolution does not act on unconscious automata but on purposive beings whose behaviour is caused by their aversion to some feelings and attraction to others. Thus, Darwinism itself suggests that alongside natural selection there exists another motor of evolution - the pleasure principle.

VI HOW FAR DOWN?

An obvious question which arises when considering the evolutionary argument and behaviour influenced by subjective purposes is how far down the evolutionary scale this type of behaviour extends. Some speculation on this issue will be made below. Although, as previously discussed, the evolutionary argument lends support to Whiteheadian metaphysics or something similar, this speculation will be made independently of any assumptions grounded in Whiteheadian metaphysics.

The first thing to note here is that an organism which has feelings capable of affecting behaviour would have strong selective advantages over organisms which did not have feelings or whose feelings had no impact on their behaviour. An organism which can subjectively experience their environment in a way which motivates them to act in ways which are beneficial for their survival is likely to reproduce at a higher

²² Donald R. Griffin, *Animal Minds: Beyond Cognition to Consciousness*, Chicago, University of Chicago Press, 2001, pp 1-20

rate than an organism where there is 'nobody home'. Of course, realising that such a trait would be strongly selected for does nothing to say about when it emerged, only that once it did appear it would be likely to proliferate quickly.

A second important consideration which the evolutionary argument brings to prominence is that explanations of behaviour in terms of the most simple processes may not always be superior to those made in terms of more complex processes. A fundamental principle of comparative psychology has been 'Morgan's Canon', which states that higher cognitive capacities to explain an observed behaviour should not be assumed if capacities lower in the scale of psychological evolution and development are able to do so. This is an application of the principle of parsimony and arose as a reaction against overly anthropomorphic explanations of animal behaviour in the 19th century.

As Primatologist and ethologist Frans De Waal has observed, overly strict adherence to Morgan's Canon has been taken to imply that animals are merely unfeeling automata or stimulus-response machines. However, given our own advanced cognitive abilities, the 'blind automata' assumption goes against evolutionary principles of gradual modification from more primitive forms. A minimalist cognitive explanation for species other than humans may imply evolutionary miracles to account for the evolution of our own capacities. As De Waals puts it, 'the pursuit of cognitive parsimony often conflicts with evolutionary parsimony'.²³

The need to balance cognitive parsimony and evolutionary parsimony is further heightened by the implications of James' evolutionary argument. The evolutionary argument implies that our own feelings affect our behaviour, even though sequences of automatic processes involving no subjectivity could be postulated. This reasoning can be analogously applied to the behaviour of other organisms - just because behaviour can potentially be explained by negating the influence of subjective consciousness does not mean that such explanations are always the most reasonable. Explanations which impute a gradual evolution of subjective feelings affecting behaviour are to be preferred to explanations requiring miraculous leaps.

A third and related consideration here is the relevance of inferences from our own subjective purposes. As the evolutionary argument implies that feelings affect behaviour where the latter is motivated by subjective purposes, purposive behaviours in humans give reasonable grounds for inferring subjective purpose for similar behaviours in other species. Whilst there are no subjective purposes implicated in some

²³ Frans De Waal, *Are We Smart Enough to Know How Smart Animals Are*, London, Granta Books, 2016, pp.42-43.

human movements such as the knee-jerk reflex or the beating of the heart, other movements such as the unscrewing of a lid of a jar clearly do involve intention and subjective purpose in our own case. Similar behaviours in other organisms may give reasonable grounds for inferring subjective purpose in them.

On the other hand, in this regard it is also necessary to bear in mind experiments such as Benjamin Libet's which suggest that for some behaviours, initiation of muscular action begins before conscious awareness of the wish to move.²⁴ This means that inference of subjective purpose in other species by analogy is not without risk of error. In some cases it is arguable that our behaviour may not have been purposeful even though it feels like it was, so circumspection is warranted in extrapolating purpose to other species.

Similarly, the fact that purposeful behaviour exists in humans does not mean that it can be attributed wherever it seems to appear. Some behaviours which may look purposeful are not. For example, the tropisms of plants such as growing towards the light may look like purposeful groping when viewed with time lapse photography, but this is caused by differential rates of growth shoots depending on light exposure. No attribution of purpose is required. Thus, in potential attribution of purposive behaviour to other species, each case must be looked at on its own merits based on the known biology and the rationality of inferences from our own subjective states.

The above considerations will be kept in mind in the discussion of subjective purpose in other organisms below.

In undertaking this discussion it is apposite to note that science has not shown that there is any exclusive property of cells in the brain or the brain's structure that are associated with subjective purposes. Thus, rather than looking for biological or neurological correlates of subjective purpose, this discussion can most profitably be undertaken by focusing on the observable behaviour of organisms. Hence, it is economical to start at the very bottom of the evolutionary scale, with unicellular organisms.

Bacteria have been shown to display an array of complex behaviour in terms of how they sense changes in their environment, analyze sensory information and respond adaptively. In a review of studies on the behaviour of bacteria, Pamela Lyon notes that:

Extensive experimental evidence shows that microbial behavior is guided by processes that, in other contexts, are readily regarded as part of biological cognition, capacities which together encompass an organism's ability to navigate,

²⁴ Cairns-Smith, *Secrets of the Mind*, pp. 17-18.

become familiar with, value, learn from and solve critical existential problems within its world of experience, including coordinating action with conspecifics. ... I believe there is something going on at the microscopic level that doesn't just 'look' cognitive, it *is* cognitive, or, more accurately, it is typically considered cognitive when studied in animals more like us.²⁵

This description of bacteria as having cognitive capacities should not be taken to mean that the author is implying that any subjective consciousness is involved. Rather, like the methodology of cognitive science generally, cognitive processes in bacteria would be characterised by most microbiologists as the result of information processing for which no subjective consciousness need be attributed.

However, Lyon also notes:

So how does an individual bacterium integrate the information from a dizzying array of signalling pathways—sensorimotor, physiological, chemosensory, and communicative—into a coherent adaptive response? The short answer is we don't know. This is perhaps the greatest challenge facing work in this field.²⁶

Given what was said above about the inference from cognition to subjective purpose, the integration of information into adaptive response could potentially be explicable by the behaviour of bacteria being motivated by subjective purpose.

The cognitive capacities of simple organisms have also been demonstrated through recent work on slime molds. *Physarum polycephalum* is a giant single celled organism lacking neurons or a central nervous system that can grow to several meters in size. This organism has amazing decision making abilities. It has demonstrated an ability to solve complicated mazes, make trade off decisions, anticipate periodic events and use its slime trail as a form of memory to avoid revisiting areas it has already been. For example, in navigating a maze with nutrients at both ends, the mold will send out branches some of which are subsequently retracted so that the mold will grow exclusively along the shortest path between the two pieces of food.²⁷ Again, researchers on slime mold behaviour are not implying any subjective consciousness or purpose is involved. But as with humans, apparent purposive behaviour may be an indication of

²⁵ Pamela Lyon, 'The cognitive cell: bacterial behaviour reconsidered', *Frontiers in Microbiology*, Vol. 6, 2015, Art:264, p.3.

²⁶ *Ibid.*, p. 13.

²⁷ Ferris Jabr, 'How brainless slime molds redefine intelligence', *Scientific American*, Retrieved from <https://www.scientificamerican.com/article/brainless-slime-molds>. Accessed 13 January 2018; Chris R. Reid, Hannelore MacDonald, Richard P. Mann, James A. R. Marshall, Tanya Latty & Simon Garnier, 'Decision-making without a brain: how an amoeboid organism solves the two-armed bandit', *Journal of the Royal Society Interface*, Vol. 39, No.119, DOI: 10.1098/rsif.2016.0030.

actual purposiveness.

Indeed there are some contemporary scientists who are taking the next step of imputing consciousness in single celled organisms. Psychologist Arthur Reber proposes that subjective consciousness is a property of single celled organisms with flexible cell walls. He posits that some of the advantages of this model are that it reformulates research on human consciousness away from the search for ‘miracle moments’ where aspects of mind suddenly emerge from the brain to the search for how complex aspects of consciousness, cognition and behaviour have evolved from more simpler functions.²⁸

Reber notes that all models which suggest that consciousness somehow emerges from the brain suffer a fatal flaw whereby complex but nonconscious neural functions reach a threshold from which conscious states miraculously emerge. He notes that his model, whereby human consciousness evolves from consciousness of simpler organisms, also requires a miracle in the emergence of consciousness in unicellular microbes, but that this it is ‘a very small one and far more tractable’.²⁹

Of course, in reality one miracle is as fatal as any other and it would be far preferable to have a model that does not need to posit miraculous leaps. Here again we are led back to the appeal of a Whiteheadian based metaphysics, in which experiential events in some form or another are a fundamental part of nature and the need for miracles is negated.

Of relevance here as well is the resurgence in interest in recent years in academic philosophy in panpsychism. This is the view that experientiality or subjectivity is a fundamental and ubiquitous feature of matter (of which Whiteheadian metaphysics is one possible version). Panpsychism has a long history in philosophy, though in the last century it was largely derided as not worthy of serious consideration. However, panpsychism is now back in vogue somewhat and a number of analytic philosophers are exploring it as a viable option both for the explanation of human consciousness and of the intrinsic nature of matter.³⁰ The evolutionary argument lends support to panpsychic models which postulate an active role for subjectivity in nature, such as Whitehead’s.

It is also noteworthy that although the notion of subjective purpose and consciousness going ‘all the way down’ to microbes may seem rather absurd and fantastical in this day and age, this notion was not always regarded as such by biologists. For instance, zoologist and geneticist Herbert Jennings, whilst observing that

²⁸ Arthur S. Reber, ‘Caterpillars, consciousness and the origins of mind’, *Animal Sentience*, No.11 (1), 2016.

²⁹ *Ibid.* p. 8

³⁰ See, for example; Godehard Brüntrup & Ludwig Jaskolla (eds), *Panpsychism: Contemporary Perspectives*, Oxford, Oxford University Press, 2016.

proving the existence or nonexistence of conscious states is beyond the scope of science, wrote in 1906 that:

‘.. if Amoeba were a large animal, so as to come within the everyday experience of human beings, its behaviour would at once call forth the attribution to it of states of pleasure and pain, of hunger, desire, and the like, on precisely the same basis as we attribute these things to the dog.’³¹

Further, the idea that subjective purpose manifests at the cellular level was considered in depth in the past by zoologist Wilfred Agar. His book, *A Contribution to the Theory of the Living Organism* was strongly influenced by Whitehead and develops the premise that embryological development of complex organisms occurs through the interaction of purposively acting agents, beginning at the cellular level. Some of these organisms, such as humans, may also develop a coordinating central agent.³²

Nature’s review of Agar’s book stated that biologists would do well to read the book if they ‘admit that they should give heed to the trend of thought in Whitehead’s philosophy of organism, as sooner or later it seems they must’.³³ More than seventy years henceforth, the evolutionary argument adds weight to the view that such a heeding is overdue.

None of the above is meant to say that the evolutionary argument by itself proves that the behaviours of organisms all the way down to bacteria are influenced by subjective states. However, as it is a reasonable conclusion from the evolutionary argument that humans are motivated by subjective purpose, this adds weight to arguments which infer subjective purpose affecting behaviour in other species. Along with existing biological knowledge and other considerations in theory choice such as simplicity, accuracy, consistency, scope and fruitfulness, the evolutionary argument adds another ingredient into the mix in making inferences about the existence and efficacy of consciousness.

VII CONCLUSION

Arran Gare has described the global ecological crisis as being a manifestation of invalid metaphysical assumptions and a defective way of defining reality that dominates modern institutions and society. At the heart of this defective model of reality is the

³¹ Herbert Spencer Jennings, *Behaviour of the Lower Organisms*, New York, Columbia University Press, 1906, p. 336.

³² Wilfred Eade. Agar, *A Contribution to the Theory of the Living Organism*, 2nd ed., Melbourne, Melbourne University Press 1951, pp. 154-199. (First published 1943).

³³ *Ibid*, Review excerpt in Book Jacket.

world-view of scientific materialism, which has come to define humanity's ultimate goal as the endless expansion of commodity production, in which progress entails the elimination of the less fit.³⁴

The evolutionary argument for the causal efficacy of consciousness raises significant challenges to scientific materialism in terms of its epistemological and metaphysical assumptions, the effects of subjective purpose on behaviour and on evolution, and the distribution of subjective purpose across the realm of living nature.

It is true that the Darwinian theory of evolution is a significant part of the world-view of scientific materialism, and thus can be seen as a contributor to the current metaphysical and ecological malaise. However, the evolutionary argument also shows that, on its own terms, the theory of evolution by natural selection implies that subjective purposes have physical effects. In an environment where consciousness is at last being taken more seriously both within the frameworks of analytic philosophy and the biological sciences, it thus has the potential to help vitalise alternative metaphysical positions and reintroduce purposiveness back into our view of life.

Thus, while it is fundamental to scientific materialism, Darwin's theory may also be integral to its overcoming.

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³⁴ Arran Gare, 'From 'sustainable development' to 'ecological civilization': Winning the war for survival', *Cosmos and History: The Journal of Natural and Social Philosophy*, Vol. 13, No. 3, 2017, p. 142.

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