REFERENCES

Griffiths, Paul E. (1997), *What Emotions Really Are: The Problem of Psychological Categories.* Chicago: University of Chicago Press.

Parkinson, Brian (1995), *Ideas and Realities of Emotion.* London: Routledge.

Nick Bostrom, ***Anthropic Bias: Observation Selection Effects in Science and Philosophy.*** New York: Routledge (2002), xiii + 224 pp., $70.00 (cloth).

When somebody, human or not, performs an observation, this action itself implies that there be an actor: the observer. Moreover, such observation is carried out from the particular vantage point of the observer, i.e. the observer's unique spacetime location. The standpoint of the viewer and indeed her mere existence result in observational biases which may be relevant in the appraisal of the gained data. These effects are called *observation selection effects (OSE).* In his *Anthropic Bias: Observation Selection Effects in Science and Philosophy,* Nick Bostrom attempts to analyze these effects both in scientific contexts as well as in philosophical debates and to construct a theory of these selection effects. His aim is to first develop a methodology of how to deal with OSE and second, to apply the theory to scientific and philosophical problems where such effects are pertinent. Among others, observation selection biases have applications to the fine-tuning problem in modern cosmology, the issue of time's arrow in thermodynamics, the debate on the likelihood of the evolution of intelligent life on Earth in evolutionary biology, and why you tend to end up in the slowest lane when driving home. Bostrom illustrates beautifully why, how, and to what extent OSE have implications for all these and many more problems. In his ingenious analysis of extant arguments pertaining to these issues or to the infamous Doomsday argument, he operates within a strictly Bayesian framework of belief revision.

In chapter 2, Bostrom sets out to motivate the enterprise by showing how these effects must be taken into account in assessing the significance of cosmic 'fine-tuning.' Cosmologists talk about the fine-tuning of various physical constants, implying that if the values of these constants had been slightly different then no intelligent life could have evolved. Several explanations of such alleged coincidences have been brought forth. Most prominently, it has been argued that fine-tuning points to the existence of a cosmic designer or of an ensemble of actual universes with varying constants, a so-called 'multiverse.' Arguing that unless we find an elegant theory depending on only a very small number of parameters (to none of which life is overly sensitive), Bostrom insists that fine-tuning requires explanation. In fact, he continues, if OSE are adequately taken into

account, fine-tuning provides support to the multiverse hypothesis. The assumption that life, and therefore observers, can only be sustained in a universe with sufficiently similar parameter values represents a crucial premise. In a sufficiently large ensemble of universes with statistically distributed physical parameters—although the probability of a fine-tuned universe may still be astronomically low—one then expects to find a few of them. Thus, observers just live in the exceptionally few fine-tuned universes and our observation that our universe is fine-tuned can no longer be regarded as surprising. Bostrom concludes that "[i]f there were no observation selection effect restricting our observation to an atypical proper part of the cosmos, then postulating a bigger cosmos [i.e. a multiverse] would not in general give a higher conditional probability to us observing some particular feature" (41). Thus, the consideration of these effects is of paramount importance in scientific inferences.

Given their established relevance for the fine-tuning controversy, Bostrom moves on to discuss extant anthropic principles, i.e. attempts to capture the essence of OSE, typically in cosmology. Rejecting all of them, he proposes a preliminary formulation of what he dubs the 'self-sampling assumption': one should reason as if one were a random sample of all observers from a suitable reference class. Armed with such a principle, he then applies it to a series of philosophical thought experiments as well as to the previously mentioned scientific examples in chapters 4 and 5. His ambition is to establish the principle's intuitive plausibility and its congruence with scientific practice. Chapters 6 and 7 harbor a subtle and convincing discussion of the notorious Doomsday argument, which allegedly shows that the extinction of the human race is imminent, and some purported escapes from its gloomy conclusion. Bostrom claims that the argument is inconclusive and that the suggested resolutions fail. Before turning to the final theory of OSE, Bostrom devotes chapters 8 and 9 to the discussion of purported paradoxical conclusions to which the advocate of the self-sampling assumption is allegedly forced. One of these paradoxes is *Adam and Eve,* which describes a scenario in which Eve and Adam know that if they gratified their flesh, one of two possibilities actualizes: either Eve gets pregnant or not. In the former case, they will be among the first two out of billions of humans; otherwise they will remain alone. If they produce offspring, the serpent tempts them, their conditional probability of having the first two birth positions given the existence of billions is vanishingly small. If they don't, the serpent continues, this probability is equal to one. By Bayes's theorem, the risk of having a child is less than one in a billion. Given this improbability, the serpent suggests that they indulge and worry not the consequences. Bostrom claims that the serpent's conclusion follows from the self-sampling assumption, according to which Adam and Eve must consider themselves a random sample from

billions of humans in case she gets pregnant. But while the Bayesian calculus is sound, this line of reasoning is not. Since Eve and Adam *know* that they are the first two humans, learning whether or not there are billions of others does not change their belief that they are the first humans. This background knowledge spoils the applicability of the self-sampling assumption, and they cannot be considered a random sample. When Bostrom later discusses the reference class problem, i.e. the difficulty of choosing an adequate reference class, he admits that the background knowledge of the observer is intimately linked with the choice of reference class. Thus, the problem that Bostrom solves, or attempts to solve, almost inverts: rather than calculating probabilities of hypotheses in the light of some biased observational evidence from some mechanically established reference class, one starts out from intuitively given probabilities and infers back the corresponding reference class and its stability under varying probability distributions.

Chapters 10 and 11 present a general theory of OSE, including a reformulation of the self-sampling assumption. The author discusses, but does not solve, the reference class problem and its relation to indexical information. Unfortunately, he only offers a rather sketchy account of these issues, which are of high interest to the reader with a systematic inclination. Apart from the insufficiently explicated and thus somewhat obfuscated mathematical reasoning in these two chapters, Bostrom presents a highly readable and widely relevant work which can be warmly recommended to everyone in philosophy of science. The book has an associated website (www.anthropic-principle.com) where one can find an abundance of scholarly resources regarding anthropic reasoning, the Doomsday argument, and some other philosophical conundrums. Bostrom's book has appeared in the Studies in Philosophy: Outstanding Dissertations series edited by the late Robert Nozick. Just a few pages into the volume, and the reader learns why.

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Bryan G. Norton, ***Searching for Sustainability: Interdisciplinary Essays in the Philosophy of Conservation Biology.*** New York: Cambridge University Press (2003), viii + 554 pp., $30.00 (paper).

This anthology collects 27 essays published since 1988 by Bryan Norton, whose early books set much of the agenda and a higher standard of argumentation for environmental ethics (Norton 1987, 1991). Reflecting his longstanding participation in environmental policy formation with the Environmental Protection Agency and his position in a public policy