REVISITING HULL'S HULLABALOO ON THE QUESTION OF HUMAN NATURE

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CONTENTS

ABSTRACT

This paper makes use of an essay by David Hull, entitled 'On Human Nature,' to explore the issue of whether it is reasonable to posit the existence of a human nature and whether such a notion is conducive to ethical practice. Part of a satisfactory answer to these questions involves coming to terms with what can be deduced from the science of biology. Hull's essay is particularly appropriate in this regard, as his primary focus is to present what professional biologists would say on these matters. On the first issue mentioned, Hull's stance is that biology *does not* lend any scientific support to the notion. As for the second issue, Hull claims that even if human nature did exist it is, ultimately, not of any ethical significance. The thesis of this paper is that Hull is wrong on both counts.

CHAPTER 1

INTRODUCTION

> *American biologist Morton Wheeler...postulated that there exist two different kinds of thinkers at any time. Some are affected by the 'succession of phenomena, the ceaseless current of events, the changes that alter the complexion of the world...[Others] are impressed by the 'similarity of the forms and conditions that recur from time to time and place to place.' Stability, not change, they see when they observe nature.*
>
> --Jane Maienschein (1986, 73-74)

In his essay, 'On Human Nature,' David L. Hull (1998) challenges the view that biological species—and Homo Sapiens, in particular—have a 'nature.' Hull's views on this matter are heavily qualified—both with respect to the specific opponent he has in mind, and his own position. However, skirting these nuances for the moment, Hull's basic thesis is that, if human beings do have a nature, from an 'evolutionary perspective,' it is a highly transient and variable one—and, so much so, it will not likely satisfy the desires of the 'typical' essentialist (383, 392,395). To make matters worse (for the essentialist), Hull insists that even if it *were* true that all humans shared the same nature the insight is of little importance (385, 395).

In this paper, I will acknowledge that Hull may be considered nominally correct on the first aspect of his thesis. At best, this is because deciding whether a nature is transient, or not, is an arbitrary decision given the open-ended evolutionary time-scale Hull uses. However, my own perspective, based primarily on the current predictive power of social science, is that humans *do* have a nature. Moreover, not only is this thesis supported by biology, but it is consistent with general scientific practice and goals. As to the second aspect of Hull's thesis, I will argue that Hull is wrong: understanding human nature is of extreme importance to attaining greater human well-being, and to establishing greater moral behavior toward other organisms.

I believe the major flaw of Hull's essay is the conspicuous neglect—or at least under-emphasis—of the fact that evolutionary biology, as a scientific discipline, has a long successful history of accounting for *structure* within the dizzying flux and variability of life (e.g., Rosenberg 1985, 187). To understate this, as Hull does, is ultimately to distort one of the central tasks of both biology and science in favor of 'shoulder shrugging' and its inherent moral risks.

To argue my case, I will divide my paper into seven chapters.

In this chapter, I will establish the intended scope of Hull's argument and what I take to be its starting parameters—or 'table legs.' What is especially of note, here, is that Hull premises his entire essay on the belief that membership in any sexually reproducing species *must* be determined by genealogy. And yet, at the end of his essay, Hull insists that particular species are *not* natural kinds. In other words, according to Hull, it is feasible to establish what *type* of organism you or I might be (via our parentage) but, paradoxically, this does not really count for anything as it has no *precise* ontological reality.[1]

In chapter II, I will summarize the main arguments of Hull's essay. These expediently fall into three types. However, each is the same in principle; that is, they each are meant to refute anything but the reality of organismic diversity. Drawing on a wealth of knowledge as a philosopher of biology, Hull challenges (a) the apparently common view that some traits are exclusively human; (b) the existence of any invariant cultural practices; and (c) the notion that species exhibit any structure, or behavior, that might fairly be classified as distinct, or species-normal. To conclude his essay, Hull also tries to account for *why* human nature is so tenaciously argued for. In this respect—

[1] The paradox is that, in effect, Hull is arguing that we are both human, and not human.

through intermittent examples of how the term normal and abnormal have been historically abused—the impression Hull creates is that such nomenclature inconspicuously upholds conservative social privilege.

In chapter III, I begin my critique by challenging some of the mainly stylistic, or theoretical, weaknesses found in Hull's essay. I believe many of these weaknesses are not immediately evident, and yet, their combined impact renders Hull's general position more coherent than it really is. By promptly attending to these weaknesses, my primary aim is to clear the way to properly debate Hull on more factual matters.

In Chapter IV, I engage Hull on a network of rather dubious interpretations of what biology stands for as a science. This task involves debating Hull on everything from his presentation of biology as a unified discipline, to his dismissal of the human hand as having a normal function. I will also briefly debate another anti-essentialist, Elliot Sober, who has a similar view to Hull (but a more detailed argument) on the issue of reaction norms. While I present a broad range of particular 'polemic species' in this chapter, all of these species radiate from two distinct 'genera.' First, despite acknowledging the truth of constant change over time—and other complicating factors—I argue that we *can* intelligently speak of particular species as natural kinds and of organisms as expressing a 'nature.' Second, for scientists who try to understand the complexity of living things (enmeshed in complex environments), and whose very job is to find *practical* means to understand and organize sometimes quite hidden regularities, reductionism and simplification are usually 'necessarily evils.' However, I maintain this does not warrant saying that current biological descriptions are mostly prejudiced.

In chapter V, I address the inconsistency of Hull's position on biological species. Here, I try to establish the relevant implications of using genealogy to demarcate species

and I argue that sexual species, at least, exhibit some structure that allows members of the opposite sex to be appealing. I also return to a background issue of Hull's that has bearing on his resistance to essentialism: the issue of whether types, or kinds, can change.

In chapter VI, I question Hull's hypothesis as to why human nature is not important. Here, I present evidence that it is unlikely essentialism is advocated as a way to justify human rights. Rather, I argue that the most plausible reason for essentialism's 'staying power' (aside from the evidence for species structure) is a belief that a nuanced understanding of the type of organism we are can then allow us to exert some control over the behaviors we consider undesirable.

Finally, in chapter VII, I consider the possible reasons why Hull's argument has been attractive to many philosophers. As I do not believe Hull represents biology (in this particular essay) in a fair light, I presume Hull's argument has appeal mainly for its alignment with current dogma as to what is required for social and political integrity. I also suggest that Hull's essay reveals how philosophy and science, in important respects, are sometimes different from each other, and thus, difficult to reconcile.

Hull's Starting Parameters

Early in his essay, Hull makes it clear he does not intend to refute all types of argument favoring the notion of a human 'nature'—for example, those who might want to invoke the existence of a 'soul' as a definitive expression of what it is to be human (385). Rather, Hull's very specific opponent is the 'essentialist' who presumes that his or her view on the matter is backed by the "technical pronouncements of professional biologists" (382).

According to Hull, if we take the 'human' in 'human nature' to refer to Homo sapiens as a biological species, and if we take our descriptions of essential human features

to be based on evolutionary homologies, then no matter how we 'slice it' to arrive at a 'nature' (some kind of sameness, or uniqueness, that non-trivially identifies what we are) we will find our conclusions have no foundation in biology (385). As Hull writes, "[i]f evolutionary theory has anything to teach us, it is that *variability* is at the core of our being" (emphasis mine; 388).

By restricting the range of his argument to a debate over what professional biologists would say and, in particular, what they might say on the species-question, Hull's essay hinges, in no small measure, on his ability to fairly represent the character of evolutionary processes and what we can scientifically say about species.

In regard to the former, Hull states that, insofar as "species evolve, and to the extent they evolve through natural selection, both genetic and phenotypic variation are essential" (384).[2] Hull *does* clarify that, "[w]hich particular variations a species exhibits is a function of both the fundamental regularities which characterize the selection process and numerous historical contingencies. However, variation *as such* [he says] is hardly an accidental characteristic. Without it, evolution would soon grind to a halt" (emphasis mine; 384).

As to the question of species, amongst the twenty or more species concepts available to biologists (Griffiths 1999, 210), Hull invokes, for human beings, a combination of the phylogenetic species concept and the biological species concept and

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[2] At the genetic level, Hull posits, "30 per cent of the genes at the loci that code for structural genes in humans are polymorphic, and in any one individual roughly 7 per cent of the loci are heterozygous" (389).

explicitly gives these—that is to say, genealogy—priority over phenetic taxonomy (395).[3] Hull writes,

> [i]f species are taken to be things which evolve, *then they can, and must, be characterized in terms of ancestor-dependent relations,* and in sexual species these relations are dependent on mating. The organisms that comprise sexual species form complex networks of mating and reproduction. *Any organism that is part of such a network belongs to that species, even if the characters it exhibits are atypical or aberrant.* Conversely, an organism that happens to exhibit precisely the same characters as an organism belonging to a particular species might not itself belong to that species. Genealogy and character covariation are not perfectly coincident, and when they differ, genealogy takes precedent...The genealogical boundaries of our species are extremely sharp. The comparable boundaries in character space are a good deal fuzzier (emphasis mine; 384).

Deleted from the passage above is a qualification on speciation events and how they might threaten the priority of genealogy. But, for the purpose of my discussion, this is not especially relevant. What is relevant, is that Hull uses biology only to establish a minimum standard for what it is to be human. As he himself says "retardates" might not, in any "higher and more sophisticated sense", qualify as human beings, however, "from the crude and pedestrian biological perspective they are unproblematically human" (392-393, 389-390,394).

One caveat, worth mentioning, before proceeding with Hull's main arguments, and one which renders his thesis somewhat ambiguous, is that Hull classifies himself as both a believer in 'natural kinds' and as a kind of quasi-essentialist (394-395). In his essay-conclusion, Hull asserts that, contrary to reputation, he is *not* totally opposed to

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[3] As it may not be completely clear from the subsequent passage, I will just mention that the main reason Hull is averse to phenetic taxonomy is because it can be so arbitrary. As he says at the end of his essay, "[i]f the history of phenetic taxonomy has shown anything, it is that organisms can be subdivided into species as Operational Taxonomic units in indefinitely many ways if all one looks at is character covariation" (395). This is what Hull means, at the bottom of the passage I go on to cite, when he says the boundaries of 'character space' tend to be fuzzier than those of genealogy (384).

essentialism (394). In fact, he claims, it is likely that natural kinds exist—as difficult as they may be to discover—and he even says "that it is extremely important for our understanding of the natural world that such kinds do exist" (395, 388). However, he claims that while he does not believe that *particular* species "as evolving lineages belong in this category", he suggests that the species *category*, itself, might be a natural kind—a kind, no less, whose essence will be partly variable (emphasis mine; 395).

I will not attempt to unravel what Hull means here, as he seems to both acknowledge the reality and 'extreme importance' of natural kinds, while saying that species as evolving lineages would not count as such. If this is so, not only does this leave a fairly narrow range of 'reasonable' species-concepts with which to understand the natural world,[4] but Hull's reader is left with some vexing questions: how and why does life (or species-in-general) have an actual reality, but particular species do not; why is it that the *only* reality conferred by the 'general reality,' to particular species, is the reality of variability; and *what* is it, exactly, about variability that gives it such a monopoly on reality?

[4] I am aware that Hull follows Michael Ghiselin (e.g., Ghiselin 1974) in viewing species as big, individual objects, whose members are parts, as opposed to a tradition of viewing species as a class, or type, whose members are instances. However, I am not convinced of the 'reasonableness' of his position (at least relative to the alternatives) and find it highly counter-intuitive. I will briefly elaborate on this view later in my critique of Hull.

CHAPTER II

A SUMMARY OF HULL'S ARGUMENT

Judging from Hull's treatment of the view, 'naturalistic essentialists' come in at least two forms: they tend to fall into either those who insist on exclusive species-typical universals (genetic, phenotypic, cultural, and developmental), or those who hold that if there are *not* characteristics which *all and only* humans exhibit, then there must be some which at least 'normal' humans exhibit, or 'abnormal' humans potentially exhibit. I will proceed through the various clarifications and arguments Hull makes against these views, although I will not do so following the exact form Hull, himself, lays out. Instead, I will mix and match various parts and, with no small irony, I will simply convey what I think are the 'essential bits'. Furthermore, for the sake of accentuating particular lines of argument, I will divide this portion of my essay into parts—three in total.

Exclusive Human Traits

Perhaps the crudest essentialist argument is one that insists that some character (or phenotype) is universal to *all and only* humans, and is especially distinctive. For example, Hull mentions Eisenberg as saying that a trait common to humans everywhere is language and that the capacity to acquire language is unique to humans (386). Hull provides at least three immediate responses to such claims.

Hull states that "in most cases, any character universally distributed among the organisms belonging to a particular species is also possessed by organisms belonging to other species and, conversely, any character that happens to be limited to the organism belonging to a particular species is unlikely to be possessed by all of them" (383). Hull provides ready examples: in regard to the former, Hull notes that one of our most "important" and unique "adaptations" is what he calls "our ability to play the knowledge

game" (392). Yet, he asserts, many non-human animals can play the game better than some humans (392). In regard to the latter, Hull notes that, as a species, we can "successfully mate only with other human beings although a surprisingly high percentage of human beings are sterile" (389).

According to Hull, one "natural move" for essentialists when confronted by such rebuttals is to argue that "the properties which characterize biological species at least 'cluster'" (383); that is to say, certain organisms will be seen as belonging to a biological species if "they possess enough of the relevant properties or enough of the more relevant properties" (383).

Hull has two rejoinders to this. First, he concedes that "such unimodal clusters do exist, and might well count as 'statistical natures'" (383). However, he adds, "in most cases [these] distributions...are multi-modal, depending on the properties studied", and thus, "[no] matter how desperately one wants to construe biological species as natural kinds characterizable by some sort of 'essences'...such multi-modal distributions simply will not do" (383). Second, Hull asserts "these clusters of properties, whether uni- or mutli-modal, will change through time"—and often, if not inevitably, this will eventually amount to something dramatic (383-384, 392).

This final point is applied, in slightly different guises, throughout Hull's essay.

Cultural Universals

> *It follows from the information thus acquired that the same state of mind is expressed throughout the world with remarkable uniformity; and this fact is in itself interesting as the evidence of the close similarity in...mental disposition of all the races of mankind.*
>
> --Charles Darwin (1872/1970, 17)

Hull dedicates a significant portion of his essay to dealing with essentialists—namely anthropologists—who try to use 'cultural universals' as evidence for some

"uniform psychological nature" (386). In order to deal with such claims, Hull makes 'analogical arguments' from evident intra- and inter- species genetic variability toward a likely parallel variability in cultural practices (386). This is not to say he thinks the former is, in any sense, responsible for the latter. Rather, the reasoning employed is that he imagines the initiative taken by geneticists—one of acknowledging variability after "considerable resistance"—provides an instructive example of the direction the 'less developed' social sciences might take (388).

Hull's main arguments on the issue of cultural universals are as follows.

First, in reaction to the typical lists of 'human' or cultural universals, Hull states that when these claims are not false, they are usually vacuous, and are upheld (at least partially) by plasticity in the terms being used (385-387). One example Hull mentions, in support, is the postulate that "all cultures prefer health to illness" (386). Another is found in Hull's discussion of blood type. Hull argues that one reason why blood type is often thought of as universal is because people tend to define their way to such a conclusion. For instance, Hull notes,

> "[A]t the ABO locus, four different types exist: A, B, AB, and O. Hence, all people [are said to] have the same blood-type at this locus just in case they have one of these types. If one of these alleles is to be lost, or another to crop up, the disjunction only need be contracted or expanded accordingly. This strategy is universality made easy" (387).

Hull grants that "blood-type is hardly the sort of character which advocates of human nature are likely to emphasize" (388), but he still believes it serves to illustrate the weakness of more typical essentialist claims. In either case, Hull's overall argument is that the truth of universals depend primarily on biased interpretation.

A second argument, Hull invokes, relates to what he suspects are the *motives* behind searching for human universals. Hull's essay covers at least three, although I will

mention only two for now. One, "is the desire to formulate laws using these cultural universals" (388). Another motive is "the mistaken belief that universally distributed characters are liable to have a more determinate genetic basis than those distributed in more complex patterns" (388, 386). With regard to the former motive, Hull largely dismisses it by saying, "[e]ven if we grant anthropologists their cultural universals, nothing yet has come of them" (388). In regard to the latter motive, Hull resorts again to a discussion of blood type. For instance, he notes the "allelic frequencies at the dozen or so loci known to influence blood-type vary independently of each other" (388). The implication, here, is that many seemingly common 'genetic' human traits will only minimally represent a population—or will at least be unstable (388). Hull summarizes: "blood type in human beings is about as genetic as any trait can be, and yet it is extremely variable" (387).

Third, as much as we would like it to be otherwise (due to the "curse" of racism), Hull says that various "*groups* of people at a variety of different levels of generality exhibit statistical differences" (emphasis mine; 390). For example, in his discussion on blood type, Hull recounts that the allele frequencies at the ABO locus are quite different between the white population of England, the Basques, and the Navahos (387). In short, as a biological species, humans are simply "not homogenous" (390).

Fourth, Hull says we cannot escape the reality of intra-species phenotypic variability by reverting to the genetic level. For instance, "[z]ebras and horses look much alike but genetically they are quite different...[whereas] human beings and chimpanzees look quite different, but genetically...are almost identical" (389).

Finally, Hull argues that even when they are merited, universals are not likely to fulfill the 'traditional function' essentialists want them to (389). For example, the

postulate that, "for millions of years, no one has been able to mate successfully with an organism belonging to another species" is simply not very useful to an essentialist (389).

Potentiality and Normality

A third body of argument in Hull's essay has to do with common recourse to 'potentiality' and 'normality' to support of the possibility of human nature. According to Hull, one way that essentialists try to discount genetic and phenotypic variability is to argue that organisms "lacking a particular trait actually possess it potentially, or else are abnormal for not possessing it" (389). Hull states that the latter tactic is more common, but he does treat the former briefly (390).

One point worth mentioning, prior to considering this particular body of argument, is Hull believes that 'normality' is a very "slippery notion" with a long history of abuse (390). He says that so-called responsible authorities in the past have claimed, in all sincerity, "that other races are degenerate forms of the Caucasian race, that women are just incompletely formed men, and that homosexuals are merely deviant forms of heterosexuals" (390). This is not to say Hull is opposed to the notion of normality merely because it has been abused (390). Rather, he wants to draw attention to how the concept derives far more from "common-sense, society, deeply held intuitions, or systems of morals" as opposed to something strictly biological (393, 385). As he writes, "[k]inds are easy enough to come by. The difficult task is to discover kinds which function within natural regularities" (388).

Hulls arguments are as follows.

First, on the issue of potentiality, Hull concedes that sometimes *it is* reasonable to posit that an organism lacking a trait might nevertheless possess the capacity for it (389). However, there are many examples of humans who simply *do not have* the potential to

exhibit some 'human' traits. Hull gives one example in regard to language acquisition. He writes "[o]n rare occasions babies are born with little in the way of a cerebrum" (389); in such cases, there is no "significant sense" in which these babies "retain the potentiality for language use" (389).

Second, Hull states that the "central notion of normality relative to human nature...seems to be functional" (393). By this he means that when essentialists dismiss variation, they do so by imagining it as something 'dysfunctional' and which may be brought back to 'normal functioning,' on occasion, by exposure to the right environments, alteration in genetic make-up, and so on (387, 393). Hull's cursory response to this is that if we take such reasoning seriously, then consistency requires us to apply it to other animals—that is, for example, dyslexics *and* chimpanzees could be said to have potential 'human' traits (387).

Third, Hull states that it is very difficult to give an adequate analysis of normal function (393). As he writes,

> structures and functions do not map neatly on to each other, nor can they be made to do so. A single structure commonly performs more than one function, and, conversely, a single function can be fulfilled by more than one structure. If one individuates structures in terms of functions and functions in terms of structures, then the complex mapping of structures and functions can be reduced, possibly eliminated, but only at considerable cost. For example, no matter how one subdivides the human urogenital system, there is no way to work it out so that a particular structure is used for excretion and another structure is used for reproduction (393).

Fourth, Hull explains that any "organ evolved to perform one function might be commandeered to perform another" (393). One example he gives is the hand. The hand can do many things yet '[a]ny notion of the hand which is sufficiently general to capture all the things we can do with [it] is likely to be all but vacuous and surely will make no cut between normal and abnormal uses" (393). Hull admits that such thinking might

indicate a "poverty of the biological perspective" but he dismisses this as being relevant to accuracy (393).

Fifth, the conceptual plasticity that often accompanies these types of discussion, and that might illustrate the difference between common-sense ideas and professional biology, can be found on the topic of sex. Often, when the function of sex is considered, "the common-sense answer is reproduction" (394). And yet, for biologists, "first and foremost, the primary function of sex is to increase genetic heterogeneity" (394). The question Hull tries to prompt is, how do we conclusively decide which is the better answer?

Sixth, another way Hull emphasizes that 'normality' is a somewhat arbitrary term is with reference to genetic reaction norms as well as developmental norms (389-391). In regard to the former, Hull admits that biologists do not know much about these and he also accedes that some reaction norms are quite narrow (391). However, overall, Hull concludes "[e]verything that could happen in some organism or other, does happen" (391). One reason he maintains this is because "environments are so variable in the short and the long term, developmental plasticity is absolutely necessary if organisms are to survive and reproduce" (391). He says, "[a]ny organism that can fulfill a need in only one way in only a narrowly circumscribed environment is not likely to survive for long" (391). In regard to the latter, Hull maintains "[t]here *is* a fairly clear sense of 'normal development', but it is not very significant. As far as I can see, all it denotes is the developmental pathway with which the speaker is familiar in recent locally prevalent environments" (emphasis mine; 391).

Seventh, a final reason while Hull is averse to the idea of biological normality (as noted earlier in my essay, and overlapping with the above) is simply because the evolutionary process renders the concept unstable (392, 383). He writes,

> [e]volution is the process by which rare alleles [or character states] become common, possibly universal, and universally distributed alleles become totally eliminated...From the human perspective, evolutionary change might seem quite slow...[it] might well take thousands of generations [for example] for a mutation to replace what was once termed the 'wild type'...[However] human memory is short...From the evolutionary perspective, claims about 'normal'...tend to be sheer prejudice arising from limited experience (392).

One very interesting concession Hull makes, based on the above passage, is the following: Hull says, "[i]f by 'human nature' all one means is a trait which happens to be prevalent and important *for the moment*, then human nature surely exists. Each species exhibits adaptations, and these adaptations are important for continued existence" (emphasis mine; 392). Contrary to the rest of Hull's essay, this statement appears tolerant of a slightly deviant notion of human nature—that is, insofar as we are willing to de-emphasize evolutionary, or geological time, as the proper context for discussion.

Why Having a Nature is Not Important

At many points in his essay, Hull expresses perplexity as to why people are so insistent about the existence of human nature—and especially "in the absence of any explicitly formulated biological foundation for [the] notion" (384, 385,395,396). One likely answer, Hull suspects, is the presumption that human nature may "provide a foundation for ethics and morals" (395). If this is so, then Hull posits, "to be consistent with current biological knowledge...the resulting system will be largely composed of contingent claims" (395).

Hull knows of only two authors, Ruse and Wilson, who acknowledge this and "are still willing to embrace the consequences that flow from it" (395). However, while he

states he is "uneasy about founding something as important as ethics...on evolutionary contingencies," Hull says he has a bigger problem: Hull complains that unlike "everyone else", he simply does not see the "close connection... between character distributions, admission to the human species, and such things as human rights" (396).

In conclusion, Hull proffers that

> [a]ll the ingenuity which has been exercised trying to show that all human beings are essentially the same might be better used trying to explain why we must all be essentially the same in order to have human rights...Until this question is answered, [he says,] I remain suspicious of continued claims about the existence and importance of human nature (396).

CHAPTER III

CRITIQUE ORIENTATION

The thesis of my critique is that, contrary to Hull, there is good reason to believe humans *do* have a nature, and that it can be derived from biology. At the same time, the account of human nature I believe is tenable would not likely resemble the types usually expounded. On this point, I sympathize with Hull: uncontextualized claims that humans are inherently bad or good, men-aggressive, women-coy, and so on, are specious and upsetting and we can only hope that such views soon go extinct. However, it is important to keep in mind that Hull's thesis is not simply that we must be thoughtful about investigating and explaining human nature; Hull is saying—at least most of the time—*it has no biological reality*. While I do not side with most versions of essentialism, I do not accept Hull's polarized view either.

To argue my thesis I will divide the critique-portion of my paper into three further chapters and, within these chapters, I will revisit the arguments I have presented over the preceding pages. Prior to engaging these, I will try to do some 'house-cleaning' as to Hull's polemic style.

Preliminary Philosophical Issues

In general, I believe Hull's position holds together largely as a result of a variety of polemic, or philosophical, 'sleights of hand;' that is to say, Hull creates straw-person positions, uses ambiguous terminology, hedging, and more, to achieve his goals. I will explain these, in four numbered sections, as follows.

(1)

At numerous points, Hull begins a section of argument with a clear-cut, decisive assertion, but then, later, he softens these assertions with what appear to be 'fall-back

positions'—that is, qualifications, or conditional statements, that might prevent him from being *entirely* aligned with a potentially 'weak' assertion. When combined with the sheer number of arguments he makes, this 'fall-back tactic' makes a clear understanding of Hull quite difficult. In short, it almost allows him to say everything-and-nothing at the same time. Perhaps the best example of this can be found within the very crux of Hull's essay. Hull's key question is, do humans have a nature? Allowing, for the moment, his mixing of terms, Hull spends much of his essay arguing what I would call 'a hard position:' he says things like "it is simply not true that all [human beings]...are essentially the same" (382), or "human universals...are either false or vacuous" (385). At other times, he declares a more moderate stance—things like, "it is *extremely unlikely* that all humans are the same" (emphasis mine; 385). Still, at other times, he seems to come full circle. For example, he says,"[i]f by human nature all one means is a trait which happens to be prevalent and important, for the moment, then *human nature surely exists*" (emphasis mine; 392).

I believe one of the primary reasons for this equivocation is that Hull has set up a 'straw-person essentialism.' My view can only remain speculative without a full survey of the actual writing during the time Hull's essay was written. However, I venture to say that any essentialist (in Hull's time) who based her or his view of human nature on the hope of finding an entirely distinct trait, unique to *only and all* humans, could not possibly have been familiar with Darwin's work and how it strikingly revealed a *continuity* between humans and other animals (Degler 1991; Heyer 1982). I suspect a more worthy essentialist for Hull to engage would be one who views distinctive human traits as different from other animals in degree, rather than kind. If this is the case, then what is mainly important to critiquing Hull's essay is the strength of his arguments as to

'statistical natures,' and the intelligibility of using terms such as 'normality' or 'potentiality.'

(2)

A related reason why I believe Hull is wrong—or at least incoherent—is because he vacillates in his use of the term 'nature.' On some occasions he conflates the term 'nature' and 'essential sameness.' For example, in his opening line Hull says, "[g]enerations of philosophers have argued that all human beings are essentially the same—*that is, they share the same nature"* (emphasis mine; 383). At other times, insofar as the term 'essence' can be equated with 'nature,' he appears to *distinguish* between sameness and essence. For example, in speaking about human reliance on the 'knowledge game,' he says, "this adaptation may not have characterized us throughout our existence, and may not continue to characterize us in the future. Biologically, we will remain *the same species,* the same lineage, even though we lose *our 'essence'*" (emphasis mine; 392). I will not try to discern what Hull favors, nor, in this chapter, will I counter him with precise terms and adequate criteria. But it is important to realize, (a) that a sophisticated view of essentialism will distinguish between the two (Curti 1980, xiii)[5] and (b) this ambiguity allows Hull to largely define his way to some of his conclusions.

In fairness, I believe Hull's imprecision is partly a carry-over from the fact that the term human nature, through history, has never been well-defined (Curti xii). Historian Merle Curti says,

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[5] There are undoubtedly intersections between species 'sameness' and 'essence' to establish a nature. But they are not the same thing. A 'maximal' species-essence will be an inter-species *relative* term (a term established through marking *differences* between species), and which will demarcate *merely* species-common, *non-trivial* 'talents.' At the same time, a 'minimal variety' of species-nature can be established by marking *species-representative constraints*, which will often be shared by, or *similar* to, those facing other species, yet made species-unique via 'species-typical contexts.'

> [c]omplex problems face anyone who tries to write [a systematic, full-scale study of human nature]. By and large the meanings of the term *human nature* have been so taken for granted that the historian rarely finds formal definitions...Though one can identify specific ideas about human nature one often has to extract them from contexts...Furthermore, views about human nature did not always appear as conscious, conceptually refined, or coherent ideas (ibid., xii-xiv).

(3)

A third philosophical short-coming of Hull's essay is that it covers too much ground in too short a space. This seems to force Hull into a polemic style where he occasionally acknowledges a highly contestable—or even conciliatory—point, but he does so in a way that makes it easy for the reader to miss. For example, in discussing the prospect of 'uni-modal property clusters,' Hull says *they do exist* "and might well count as 'statistical natures,' but *in most cases* the distributions...are multi-modal, *depending on the properties* studied" (emphasis mine; 383). He then declares, "such multi-modal distributions simply will not do" (383). The problem with passages like this is they are so sweeping and contingent—so question-begging—they should not even pass as an argument. For instance, in the passage just cited, we are simply to accept, *depending* on the properties studied, that *most* property distributions are multi-modal; there is also no discussion of what *types* of properties cluster in what patterns—either uni-or multi-modal—or how arguably significant this might be; Hull has also provided no examples; etcetera, etcetera. Yet, contra Hull, many uni-modal trait distributions *are* likely to be 'interesting'—especially with cross-comparison to other uni-modal trait distributions. Take, for example, the fact that human infants have exceptionally big heads relative to the size of their bodies (Rosenberg & Trevathan 2003, 82). The average size of an infant's head, and its oval shape (viewed from the top), tightly correlate to the average size and shape of the human female pelvic opening (ibid.). The pelvic opening could not be much

enlarged as this would seriously interfere with the ability to walk or run easily (Calne 1999, 251). When combined with the fact that the human brain is the most energy expensive organ of the body (consuming as much as 50% of the basal metabolic rate), there is likely a narrow range as to the size (especially an upper limit) of an infants head at birth—that is, due to the increasing energy demands placed not only on the mother, but due to the energy requirements of other organs (Allman 1999, 175; Byrne 1995, 213). All this, in turn, has direct bearing on gestation length, and the kind of birthing and parenting practices humans exhibit.[6] There *may* be multi-modal distribution on infant head size relative to the size of the human female pelvic opening. However these will cluster in a largely predictable distribution as, if they did not, the consequences would be drastic: too little pre-natal brain development (and head size) would result in greater parenting demands; too much development would result in greater demands on the mother prior to birth, and would also likely make birth impossible.

This very same style reasoning can be applied to Hull's discussions on variation. As noted in my section on Hull's starting parameters, Hull says "the *particular* variations a species exhibits is a function of both the fundamental regularities in the selection process and numerous historical contingencies" (emphasis mine; 384). However, he goes on to say (many times) that the existence of *variation, itself*, is a necessary feature of evolution. This passage suggests there may be variations *particular* to some species although variation of some kind or another will be found in *all* species. It further

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[6] For a variety of reasons, including the ones mentioned above, human birth is prolonged and painful relative to what is witnessed in other primate species. One interesting corollary of this is that humans appear to be the only primate that regularly seeks assistance at birth (Rosenberg & Trevathan 81). For instance, some monkey infants are strong enough at birth to take part in their own deliveries: once their hands are free they can actually grab their mother's bodies and pull themselves out (ibid., 83).

suggests, given 'the fundamental *regularities'* in selection pressures for a particular species, that such regularities will create a fairly regular constellation of uniqueness, despite this also being subject to eventual change, or accident. In other words, it suggests that something about selection pressure should make certain groups of organisms similar to each other and yet slightly distinct from other groups. However, Hull's thesis (at least with respect to humans) is quite incompatible with this. As I have mentioned, he claims that *particular* species as evolving lineages are *not* natural kinds (395). In fact, at best, he says, "[*b*]*ecause* [humans] are a biological species, and variability is essential to [all] biological species, the traits that characterize us are likely to vary" (388). The question, for Hull is, are all the particular (though contingent) variations of a species insignificant? For example, 'common-sense' reveals that *regularly* beavers make damns, bighorn sheep butt heads, cheetahs run fast, minnows swim in 'schools,' and human females do not cannibalize their male partners after having been inseminated by them. Why would these types of observations count for so little in professional biology? And, if they do count for something, why is it never addressed in Hull's essay? Again, I will not resolve this issue, except to say I believe Hull is blinded by the idea that essentialism requires *fully representative* sameness amongst species members, and that there is no biological way to intelligently talk of normality—or mere *common* sameness.

(4)

One elementary difficulty in arguing against human nature is that it runs into the same problem any relativist position does: the relativist cannot counter the idea of a *general* non-relative reality without contradicting him or her self in the process. To spell this out, when the relativist says 'there is *no* objective reality,' they are, in effect, saying '*the objective reality* is, there is no objective reality.' In regard to human nature, many

scientists and philosophers make the same observation. I will list two, one of whom, is a feminist and a biologist (yet not an essentialist), and the other a team of evolutionary psychologists who are essentialists.

> Many evolutionists and feminists explicitly seek to understand human nature. All others harbor beliefs about human nature. I infer this because every political act of those of us in the social-change business (e.g., feminists or conservation biologists, or any other person struggling with another) is guided by some theory of human nature. Guiding theories may be unconscious and tacit, conscious and explicit, but there at any rate. Their force is especially obvious when we decide to act in the interest of achieving some social change objective...(Gowaty 1997, 2).

> [There] is a genuine disagreement between 'imaginations informed by Darwinism' and those social scientists who do not see its relevance to their disciplines. The difference is in conceptions of *human nature*. The very phrase will make some readers recoil, evoking a despised 'nativism' antithetical to prevalent emphasis upon circumstantial influences. Yet those who would assert that man has no nature would greatly be distressed should their theories of...'self actualization' or whatever prove applicable to Americans but not Papuans. All social theorists, including the staunchest antinativists, seek to describe human [beings] at some cross-culturally general level of abstraction (Daly & Wilson 1998, 8).

I believe Hull's position forces him into the absurdity of a relativist position: to say there is no human nature is to effectively say, 'our human nature is not to have a nature.' In response, Hull might state he is not necessarily *denying* 'human nature,' but merely saying our 'nature' is so broad and variable it cannot tell us anything *definite* or *detailed* about what it is to be human. I will not address this argument right now. But I will eventually argue that such a position forces Hull to misrepresent professional biology. Human open-endedness itself—the dubious claim that human beings exhibit *no* stable (and provocative) idiosyncrasies—would warrant as much a biological explanation as would completely uniform robotic behavior (e.g., Pinker 2002, 74-75).

CHAPTER IV

A CRITIQUE OF HULL'S MAIN ARGUMENTS

The most prominent feature of Hull's essay is its pretense of representing professional biology. A statement of Hull's will clarify this.

> [I]n my discussion of human nature...Nothing that I say should be taken to imply anything about ordinary usage, common-sense conceptions, or what 'we' are inclined to say and not say [on this matter]...The context of this essay is biology as a scientific discipline...I am concerned only with those doctrines that claim to be based on the nature of *Homo sapiens* as a biological species...Those authors not interested in what biologists have to say about biological species...will find nothing of interest here (385).

A very pertinent question is, can Hull *really* tell us what most biologists say? Is biology really a discipline of convergent professional opinion?

In the strictest possible sense—that is, from an evolutionary time-frame of billions of years—Hull is correct to emphasize the fact that *Homo sapiens*, as an evolving lineage, is not a *distinct* or *invariant* natural kind. What is more, Hull's view would match the spirit of Darwin's theory as it was first introduced.[7] However, I will argue in this section that, along with popularity, this is all that Hull's view can reasonably claim. I will start by discussing Hull's preference for geological time versus ecological time. I will then attend to his dismissal of human universals, the reality of normality and potentiality, and the reality of species.

Geological Versus Ecological Time:

> *Why does a line of life keep more or less the same shape and more or less the same habits for thousands, sometimes millions, of years...*
>
> --Jonathan Weiner (1995, 128)

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[7] Prior to the *Origin of Species*, the dominant philosophical and religious dogma presumed species were ideal, distinct, and invariant types (Mayr 1982; Bowler 1983/1989). Thus, one of the greatest impacts of Darwin was to seriously challenge this extreme 'essentialism' (Degler 1991; Heyer, 1982).

The greatest weakness of Hull's view is that it suffers from a gross neglect of the evident structure-within-change that biologists attempt to account for every day. As any introductory biology text will explain, one of the major goals of biology is to not only account for life's *variety*, but also for how that variety is *limited* in important respects (Sterelny & Griffiths 1999, 22-29). The main way a philosopher of biology, like Hull, bypasses this fact is by *assuming* geological time as a constant and justified frame of reference while, conversely, never allowing for the opportunity to falsify this assumption. This might be philosophically excusable if Hull resorted to this tactic only once or twice. However, Hull surprisingly uses it as a 'last line of defense' for almost all his arguments. For instance, in his discussion of development, Hull states that [t]here is a fairly *normal* sense of development" (emphasis mine; 391). This initially appears a happy concession. But Hull goes on to say, "this [sense of development] is not very significant...all it denotes is that developmental pathway with which the speaker is familiar in *recent* locally prevalent environments" (emphasis mine; 391).

It is the word 'recent,' here, that is misleading. Along with words or phrases like 'temporary' or, 'for the moment,' Hull uses the term 'recent' to specify a time-period stretching *merely* thousands or millions of years—in contrast to 'evolutionary time,' which is billions, or at least *many* millions, of years (383, 391,392). But this is only an informed guess. The problem is the reader never knows for certain *what* would amount to non-change according to Hull. In regard to humans, Hull is perhaps bracketing a time of 'normal development' anywhere between 7 million and 200,000 years to the present. On the grand scale of things, this is not much time. However, even if we accept only the smaller estimate, I will later argue that it is still scientifically significant if only by the

fact we have current *working* predictions about humans, based on the physical and social sciences (and ordinary experience) that are 'very helpful'—and, of course, which have some biological foundation.

I will now explain some possible ways in which stability of species nature *does* have some purchase in reality—as opposed to being merely a human fabrication "arising from limited experience" (392). This is as follows.

First, it is evident from the fossil record that evolution does not take place at any fixed rate of change (Bowler 1983/1989, 191). Moreover, while we know that not every persistent feature of an organism is an adaptation, those most professional biologists *do* consider to be—e.g., the human eye—will be a testament to not only 'fairly stable' regularities in the human ancestral environment, but also to a relative stability of form in the evolving organism itself (Tooby & Cosmides 1992, 60,69). In other words, with regard to the latter, adaptations are always constructed out of 'structure' that is reliably present—even if only nominally so. This is surely a point that Hull would concede—that is, abundant chaos (or disrupting variability) over punctuated or long-term periods could just as easily prevent evolution as create it.[8]

Second, it is well-known that most mutations are deleterious when situated within connected (versus mosaic) traits. This is primarily because mutations usually introduce more change into the 'organic system' than the system can manage (Sterelny & Griffiths, 181-190). As Sterelny and Griffiths write,

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[8] One good example of this is when mutation rates are too high relative to the strength of selection. When this occurs the mechanisms that generate variation will swamp the effects of selection. But, just as too much variation swamps selection, too much selection can drive out variation. An example of selection being swamped happens often in artificial breeding. When unwanted characters are culled, significant changes happen early, but then eventually run out of steam (Sterelny & Grifiths, 36).

> organisms are integrated wholes. If a minor mutation (a single change at a single locus) chanced to have a major phenotypic effect—say doubling tooth size—the result would probably be catastrophe, for the necessary alterations elsewhere would not be made. So new kinds of animals rarely arise abruptly—on human time scales—from their ancestors (ibid.).

The implication, here, is that organisms will remain virtually the same as they ever are, for 'long periods' of time, as most 'successful' mutations will only ever amount to 'minor tweaks.' If this is true, the real promoter of evolutionary change will tend to be abrupt ecosystem alterations—e.g., climate or co-evolving predator changes—that create pockets of good or bad fortune for either previously unprolific species, or some anomalous strain *within* a species. This view (of punctuated equilibrium as normal) is supported by many types of research. One obvious example would be the research on mass extinctions and, in particular, the proliferation of mammals, themselves, due to the destruction of the dinosaurs (e.g., Ward 1994). Another can be found in the more modern, and localized, massive plant and animal extinctions due to Neolithic human populations migrating into areas where the native plant and animal species had not co-evolved with them (e.g., Milberg & Tyrberg 1993). Finally, within the last six hundred years, there is the mass destruction of indigenous peoples due to diseases spread by first-contact Europeans (Diamond 1997/1999).

Third, we know from studies on animal reproductive behavior that asexual species, though less in number than sexual ones, are not rare. It is also known that those species which can do both *only* engage in sex during times of extreme environmental instability (Daly & Wilson 1983). This suggests that stability in the environment must be a significant reality for some organisms—and significant enough that the most biologically successful (though risky) mode of gene transmission, cloning, is made

possible because of it. This is not to draw any specific conclusions from 'uniform clones' toward similar uniformity or ecosystem stability in humans. It is only to say that blanket presumptions as to ongoing change make sense only in relation to particular organisms, an ecosystem, and a period in time.

A fourth, and related point to the foregoing, is the well known fact that some extant organisms are what might be called living fossils (Bowler, 192). As Sterelny and Griffiths write,

> [m]ollusks, sponges, bivalves...arthropods, and many kinds of worm first appear in the fossil record over five hundred million years ago, but the basic layout (the 'body plan') of these organisms remains unchanged. In the eyes of [many contemporary] biologists, this stability in body organization over hundreds of millions of years requires explanation (Raff 1996). They think that evolutionary processes have been surprisingly conservative. In their view, we would expect to see more change than we do (29).

Hull, himself, asserts that for "millions of years, no [human] has been able to mate successfully with an organism belonging to another species" (389). Whether Hull would admit *this* is important, or not, his theory must at least account for why he can so easily dismiss five hundred million years of 'sameness,' for certain species, as too short of a period to proclaim anything but change.

Fifth, it is true that empirical data shows substantial genetic overlap among many species. This fact is actually consistent with what you would expect of 'evolution and descent' from a single common ancestor (Ridley 2003, 31). But, we cannot assume, from this, that there are *no* limits whatsoever—no, at least, fuzzy gradations between species. For example, chimpanzees and humans are known to have 98% of their genes in common. Yet there are still many ways to show genetic differences between them (and this is, perhaps, *most* evident from the fact they cannot interbreed). For example, humans and chimps *share no genes* at all in the protein-coding sense of counting genes (Sterelny

& Griffiths, 185). Furthermore, humans are remarkably homogenous, at the genetic level, whereas chimpanzees commonly show as much as 10 times the genetic variation as humans (Cann & Wilson 2003, 58).

The point is, comparing similarities of genetic make-up between species—as Hull does—only shows so much as it is quite clear that *how genes work* during development is at least as important as the actual genome complement (Ridley 31). In fact, it is here that we begin to see the most substantial differences between organisms (although there are also some intriguing similarities too).[9] For instance, the house mouse and human beings have roughly the same number of genes, but the end product is quite different (Gerhart & Kirschner 121). In turn, plants often have more genes than humans, as they do not re-use genes via the batteries of 'promoters' human systems have.

I do not want to downplay the continuity between humans and non-humans, especially given all the ills of anthropocentrism. But, while we *may not yet know all the reasons why*, the idea that many or all species are in some sense, unique, is reasonable and *not* at odds with professional biology. In fact, many professional biologists would oppose Hull. Sterelny and Griffiths, for instance, are two.[10] They state, "[i]n our view, evolutionary theory *lends no support* to the idea that our species classifications *do not* reflect objective features of the living world" (emphasis mine; 182).

Hull and Human Universals

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[9] For example, widely divergent species can share the same developmental programs (Tobin, 6). This would seem to support Hull's arguments of inter-species similarity, while going against him on the idea of there being little stability in, or no 'normal sense' of, development.

[10] I am using the term 'professional biologist" in a broad sense. Sterelny and Griffiths are actually philosophers of biology.

Hull's views on human universals can be summed up quickly. Hull believes they tend to be false, vacuous, prejudiced, and, so far, "nothing yet has come of them" (388). While I am partially sympathetic to Hull's comments, I believe he is far too hasty and far too harsh. Why? For one, given his charges, it is difficult to know just what *would* be appropriate; that is to say, without providing any alternative—short of complete abstinence—it almost appears Hull objects to *any* generalization about humans.

In Hull's defense: if, as he mentions, the motive behind looking for cultural universals is to supply evidence of 'a more determinant genetic basis' for some trait, then such notions are misguided and people should be disabused of this. For example, all social scientists should become familiar with concepts such as evolutionary 'time-lag' (allowing for novel phenotypes), genetic 'norms of reaction,' frequency dependent-selection, disjunctive developmental programs, convergent cultural evolution, and so on. As philosopher Daniel Dennett says, "[s]o far as I know, in every culture...the hunters throw their spears pointy-end-first, but this obviously doesn't establish that there is a pointy-end-first gene that approached fixation in our species" (1995, 486).

On the other hand, if, as Hull says, one of the motives for finding universals is "a desire to formulate laws", then Hull is only correct to state that such a task is difficult—not that attempts to date prove the search is futile (388). In fact, many of the generalizations Hull condescendingly lists are *exactly* what you might expect for first order laws—that is, they take the form of an almost self-evident truth (axiom) broad enough to capture a wide range of phenomena, and stated so as to require supplementation.

I will eventually return to the issue of making generalizations in the section on potentiality and normality—where I will make the brunt of my argument against Hull. For

now, I will just make two preliminary points of principle. One will be to argue for the explanatory potential of universals. The other will be to establish that, as a professional philosopher of biology, Hull ironically overlooks some of the most elementary tenets of Darwinism—both in terms of what we should expect in humans via the theory of natural selection, *and* in terms of Darwin's beliefs as to 'good science.' I will isolate these two sets of argument in numbered sections as follows.

(5)

First, whether a generalization is vacuous or not will depend a lot on the referents. The claim "all cultures have devices for maintaining internal order" *is* a noteworthy claim if we are using it to compare humans to other organisms such as geese, cats, or Tasmanian Devils. It is also noteworthy when embedded within a network of other impinging universals. For example, hierarchies appear to occur automatically in groups of children all over the world, usually before the age of three (Connif 2000, 77). If we compare these child-development studies to studies in human nuero-endocrinology which indicate humans are chemically 'rewarded' for certain kinds of social interaction, then suddenly the original 'vacuous' claim becomes much more interesting (Johnson 2003, 71).[11] From the claim 'all cultures have devices to maintain social order' we can go to ever-more appropriate levels of specificity: 'what methods of order-keeping work best, in which 'ecologies,' and why'?

Second, many universals can only be *truly* known through refined catalogues of context that alter their manifestation. For example, I may not have a callus, but this is not necessarily because I am unique. It might just be that I have not used a shovel for very

[11] When the evidence is examined, what is interesting is we seem to be chemically induced and rewarded to varying degrees of dominance, as well as cooperative behavior—and, of course, we should expect to find differences in gender in these areas.

long. In the same way, if I am not a 'typical philandering male,' it may be that I simply do not have the option to be one. For example, perhaps I have not yet reached puberty, or do not look like Brad Pitt; yet, in typical fashion using hindsight bias, I rationalize on the psychology questionnaire that I am picky, or ethical. Simply pointing to an exception to the rule does not automatically prove the rule false; it sometimes only proves the rule holds in a narrower context than originally assumed. In effect, this is exactly what is stipulated by 'norms of reaction'—which Hull mistakenly assumes works against essentialism.[12]

Third, there are many cultural universals—or near universals—Hull sweeps aside (intentionally, or not) that are loaded with significance, and with failed attempts at change. For example, it is known from anthropological surveys that social stratification is very close to universal once a local population exceeds 100 members (e.g., Carneiro 1968; Murdock 1983). Despite the persistence of modern mythologizing, there is no known society, present or past, that has ever been matriarchal—a point upheld even by many staunch feminists (Bamberger 1974; Ortner 1974; Zimbalist Rosaldo 1974, 19; Goldberg 1993). There is no known society that has avoided sexual division of labor (Brown 1970; Weisfeld 1999, 87). The marriage custom of polyandry has been common to less than a dozen societies throughout history (Haviland, 229). There is no known society where the rates of violence, by women, *come even remotely close* to that of men (Daly and Wilson 1988, 146).[13] There is no known society that has ever been found to be without some type of incest taboo (Haviland, 222). Despite a universal preference for peace and a revulsion toward homicide, there is a record of high fatality warfare that dates

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[12] For a more detailed discussion of this point see page 53.

[13] There have been some all female fighting forces. For example, in the West African kingdom of Dahomey (Harris 1989, 285).

back, at the very least, to early Neolithic people (Knauft, 1987; Ferrill 1988; Keeley 1996). Moreover, it is well-documented that, in both ancient and modern worlds, sustained periods of peace between independent societies are, and have been, rare (ibid.). For as long as it has been in existence, there has been an over-whelmingly male consumer-base for prostitution and pornography (Buss 1994, 85; Burley & Symanski 1981; Salmon & Symons 2001; Symons 1979). There is very little evidence for anything that could properly be so called a collective sustainable ecological ethic, across cultures and through history, and a great deal of evidence to support an iterated pattern of human induced ecosystem exploitation and collapse on all continents save the poles (Bird 1995; Brooks 2001; Diamond 1993; Kretch 1999; Ponting 1993; Ridley and Low 1993, 84-86).[14]

These universals are only the tip of the iceberg. However, the overall point to be made is that some universals *should* be taken seriously. Perhaps 'nothing has come of universals,' not because they are vacuous; but because (for a variety of reasons) we do not pay enough attention to them. When investigated thoroughly, ideology often gets 'its legs' from ecology, morphology, brain anatomy, and bio-chemistry. This is not to say we should consider these universals a fate of sorts—far from it. But they can be. A knowledge of biology is essential to both understand and then meet the challenges humans collectively face.

(6)

[14] Unlike the other claims listed, I recognize this claim is not common and that it will be contentious. However, as I only need a few universals to make my point, I will not attempt to justify this particular claim.

Darwin formulated his views on natural selection on what is called a hypothetico-deductive scientific model (Ruse, 1975). Philosopher of biology Michael Ruse describes this as follows:

> Darwin started his arguments with statements which seemed very much like laws...for instance, that given any species of organisms they will be found to have a tendency to increase their numbers at a geometrically high rate. And this, he tried to show, is something that *must* hold for any species you like to name, even the most slow breeding of species. Then, from law-like statements like these, Darwin tried to show that his conclusions, first about struggle and then about selection, *must* follow (ibid., 168-169).

What is important to realize, here, is that Darwin saw organic systems, despite all their complexity and variability, as subject to laws. This means that as humans fall within the umbrella of living systems, the laws of biology should apply to *whatever* manifestation of life we find—even organisms thought to be 'free' in some sense.[15] What is also of merit to Darwin's approach is that it coincides not only with the sometimes tacit beliefs presupposed by the ordinary person going about their daily business; but it also coincides with what *any* branch of science is founded on—other than, perhaps, quantum physics. In regard to the former, people function in the world by assuming causal laws: we do not touch the hot stove because, every time we do, we get burned; if we want to learn Spanish, we take Spanish lessons and not Bulgarian class; if we want to live a long life, we try to eat healthy food; and so on. Accepting this way of thinking goes 'without a hitch' most of the time. However, when it comes to formal science, and especially when it comes to biology, many people become skittish:

> Several critics...have complained that the application of [evolutionary] thinking to the explanation of behavior is inappropriately 'deterministic.' This accusation is philosophically naive. If it is indeed meaningful to complain about determinism,' then the charge must be leveled against all

[15] One way to corroborate the correctness of this interpretation is that Darwin himself was a determinist (e.g., Robert Wright 1994, 345-363).

> scientific approaches to the study of behavior. Biologists and sociologists alike are committed to the belief that the phenomena under study have knowable causes. We chip away at 'unexplained variance' within our paradigms, trying to better understand what makes the creatures we study do what they do. The entire [scientific] enterprise is predicated on determinism...Those who accuse evolutionists of determinism commonly go on to attribute behavior to social and economic factors; ironically, these are the most popular proximal causes in evolutionary theory too. Unfortunately, these critics do not explain how their preferred theories are able to impute causality and yet avoid determinism...'determinism' is a 'phony issue (Daly & Wilson 1988, 8).

If we accept what Darwin's theory implies—noting its virtually unparalleled explanatory success as a scientific paradigm—then we should expect that human beings exist in perhaps complex, though *still* law-like, fashion. In other words, no matter how unique or refined the behavior, biologists, psychologists, and what not, should be looking for ever more refined universals that reveal and match to ever more refined catalogues of extenuating, though potentially tractable, circumstances. Moreover, we would expect that the laws that best explain the most eccentric instantiations of life will still consistently fit within the dictates of those laws that apply to *all* life. Darwin's theory of natural selection is, in effect, the law of living systems at the most abstract level.

To relate this back to Hull, if we want to understand an organism then we need to understand how this *universal predicament*, shared by every organism—survival and reproduction—is mediated through a more *local predicament,* producing a set of reliable, but now localized problem-solving features in the organism. Certainly, in concurrence with Hull, there is variation and, undoubtedly, no two creatures are perfectly alike—or two different groups of creatures ever perfectly alike. However, when broader universals appear confounded, this does not mean that *all* we are then seeing is variability. If anything, we may only be witnessing scientific or epistemic limits. Human beings are complex, not chaotic, systems—and this is especially revealed by the literature coming

out of the cognitive sciences (and, in particular the work on heuristics and biases). For example, two neuroscientists explain the foregoing conclusion from slightly different angles as follows.

> in some systems more than others, synaptic strengths can change throughout the lifespan to reflect different organism experiences...other circuits remain mostly stable and form the back bone of the notions we have constructed about the world within, and...the world without. The idea that all circuits are evanescent makes little sense. *Wholesale modifiability...would not be adaptive, and clearly does not happen* (emphasis mine; Damasio 1994, 112).

> [n]o inference system follows explicit rules all the way down. At some point the system must, as...the Nike Corporation...said, just do it. That is, the rule must be executed by the reflexive, brute-force operation of the system, no more questions asked. At that point the system...would not be following rules but obeying the laws of physics (Pinker 1997, 99).[16]

If given the above, what are the most general laws claimed by Darwin, in regard to humans, but ignored by Hull?[17] I will not go into any great detail on this, rather I will just make note of two (of many) that I think are obvious.

First, if Hull is properly representing biology and Darwin, then we might expect sexual selection to manifest itself in human nature. In short, human males and females must adapt to each other as enduring features of the 'niche' and they will each face slightly different challenges, with slightly different resources, over their evolutionary

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[16] By saying there are boundaries and rules to a system does not mean that they operate, in a complex organism, in a completely advantageous or clear-cut manner. In fact, often 'biological imperatives,' in certain environments, can contradict each other, with the end result of damaging the system, or at least confounding the 'normal' routes to decision-making. Cases of somatoform disorder might be evidence of this. For instance, a woman may want to leave her severely abusive husband (an imperative to avoid physical harm), yet she may also be terrified of being alone or unloved (e.g., a social imperative). The desire to stab her husband, to be with him, to leave him, and to avoid harm to herself may foster a somatoform condition where her 'body' makes a timely decision for her; overriding the stressful decision-deadlock, her 'body' paralyzes her stabbing arm. (e.g., Nesse and Lloyd 1992, 604).

[17] For a brief discussion of Hull on laws of nature see Griffiths (1999, 211-212). Hull does not seem to, outright, deny laws of nature relative to species, but he does have a fairly qualified view on the matter.

history. Thus, the 'nature' of each should be slightly different. Through extensive comparisons of anatomy, physiology, and neuro-endocrinology, it is plain there are, in fact, *many* 'structural' differences between the sexes (e.g., Baron-Cohen 2003; Blum 1997; Campbell 2002; Kimura 1999; Taylor 2002). However, given that we do not yet understand all the nuances of how various environments can alter the expression of this structure, for now, we can only view behavioral sex differences as gross generalizations. (It may be the case that Hull views the human mind as somehow emergent from biology, but, if so, he has not provided an argument as to how or why).

Second, life itself does, indeed, come with some guaranteed challenges. For example, all organisms (some less than others) are immediately posed with the problem of uncertain orientation, finite ecological resources, uncertain and finite organismic resources, certain vulnerability, uncertain reproductive opportunity, uncertain social status or favor, and so on. As a consequence, we might expect that all organisms operate according to a variety of *absolute* as well as disjunctive laws; rules along the lines of 'do not move, or freeze, if suddenly surprised,' 'avoid painful stimuli, if possible;' 'do what makes sense, if possible;' 'get a return on energy expenditure, if possible;' and so on. In any case, an underlying pre-occupation with finite and uncertain resources is exactly what professional evolutionary biology would expect, although it is often vehemently attacked for holding to this premise. In other words, the starting point of biology is not that selfish behavior must be explained, rather, it is that unselfish behavior must be (e.g., Dawkins). I will not try to defend this view here, but I will extrapolate from this rule. If Darwin is right, and life is a struggle for survival, then what we would expect of human nature is

mainly cooperation to compete.[18] We would also expect altruism to be more pronounced with kin, or in circumstances where there is the possibility of reciprocation (i.e., iterated contact). Hull does not discuss any of this in his paper.

Critique Parameters for Hull's Arguments on Potentiality and Normality

> *Ought science to be seen as truth-telling, or as politics by other means, or can it be both things at the same time*?
>
> --Fausto-Sterling (1997b, 58)

It is difficult to critique Hull on the question of 'normality' without also bringing to bear some discussion of science and politics. Hull is correct to argue that normality is a slippery notion, often informed by cultural prejudice, but this does not then warrant discounting the notion entirely. I will explain my position by dividing this section into three numbered arguments which will form the context for a more detailed discussion of Hull's specific arguments against 'normality.' This is as follows.

(7)

Simplification of 'reality' is utterly vital to an organism's survival. This is so much so that it is built right into the organism's basic constitution and, ultimately, starts right at the organism's point of contact to the world: its sensory modalities. For example, if humans could, all at once, see ultra-violet like a parrot, smell like a blood-hound, and hear like a bat, the sensory overload experienced would completely interfere in our ability to orient ourselves, and survive. As E.O. Wilson writes, "our brains and sensory system evolved as a biological apparatus to preserve and multiply human genes. But they enable

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[18] I am not ruling out, here, the possibility of some forms of cooperation as the manifestation of 'run-away' cognitive complexity; that is, a power of imagination as to others suffering, an 'afterlife,' and so on, that causes humans to act in a way seemingly contradictory to what biologists might expect.

us to navigate only through a tiny segment of the physical world whose mastery serves that need (1999, 56).

To tie this back to Hull, while there may be slight variation amongst a species as to sensory experience, the species itself could not interface with the outside niche (or with con-specifics) unless there was some bracketing of that experience and some commonality as to how a group of organisms experience the world.[19] Discerning a 'nature,' then, starts right at intra-species comparative anatomy and this, in turn, is accentuated via an understanding of the 'normal' anatomy of other organisms. For instance, every minor characteristic of the 'typical human being,' who tends to be terrestrial, bipedal, 'x' number of kilos, diurnal, warm-blooded, viviparous, placental, thermoregulating, large-brained, trichromatic in vision, small-stomached, and on and on, will nudge decision-making, and thus behavior, in a particular direction. In fact, at some level, a rough description of human essence will ultimately be traceable to a rough list of structural criteria which are known to reliably prompt certain behavior. Against Hull, then, natures *will* have something to do with 'having enough of the relevant, or normal species-properties' and *will* be statistical. And thus, in some cases, distinguishing between species is easy. For example, humans will never attempt to eat most of their own brain, unlike the mobile larval form of the sea squirt whose version of a brain is exterior to itself. There is simply too vast a difference in *structure*, or necessary evolved problem-solving, and thus behavior between humans and sea squirts, for this to occur. On the other hand, in organisms that belong to the same taxonomic family—say, chimpanzees and humans—the organisms and their behavior may render the task of distinguishing

[19] Even those humans with synesthesia still experience roughly the same range of sensation as any other member of the species; it is merely 'cross-wired.'

'natures' very difficult. But again, 'natures' do not need to be entirely exclusive to a particular species; nor must they be resistant to change over time. They are, in a sense, partially pragmatic criteria, although this very amenability to classification will tend to reflect something more than mere whim.

(8)

It will be very rare that any science, let alone biology, will need exact and perfect descriptions of phenomena in order to 'work.' All that is really necessary is that a description, or hypothesis, be 'good enough' relative to the alternatives and to what the scientist hopes to accomplish. This is a sometimes-resorted-to practice in medicine where doctors and scientists do not fully understand how or why a certain medication works (e.g., prednizone), but it will be prescribed anyway given an evident positive effect and a relative absence of 'negative' effect.[20] Doctors may eventually come to a 'better' understanding of the phenomena in question, but their initial naiveté is sometimes overlooked in favor of 'utility at low risk.' In biology, in particular (due to the sheer complexity of living phenomena), we may start off with a quite *subjective* understanding of the world around us, but one key constraint is that certain descriptions of the world simply 'work better' than others. For example, certain hypotheses allow for greater predictability and control of phenomena, they require fewer supporting auxiliary hypotheses, they create spin-offs of fruitful research in related topics or disciplines, and so on. Many philosophers of biology, make a similar point. I will mention just two.

> Any biological system to be studied must be simplified in various ways to make it tractable for agents like us. We build simplified models because we are limited beings, and most of the systems we want to understand are too complex in their natural state. So we abstract from them what seem to be the

[20] Personal communication by Dr. Carol Holmen.

> most important or the most easily manipulated variables in order to generate a manageable representation of their workings (Robert 2003, 977).
>
> Every successful scientific typology is a miracle of question begging and the result of pulling oneself up by one's own bootstraps. One starts somewhere, anywhere, with a special theory, or with presumptions embedded in ordinary descriptions of phenomena, and attempts to construct a taxonomy. This is roughly how Mendeleev did it for the periodic table, arranging elements according to similarities and differences between well-known properties of chemicals, and without any knowledge of the underlying structure. It was only in the next generation that such knowledge vindicated his typology as *the* correct one. Doubtless, a philosopher could have hamstrung Mendeleev's 'operationalism,' and it was probably fortunate that he did not offer any philosophical justification for his procedure (Rosenberg 1985, 186).

Given this basic line of reasoning, the implication is that scientists and philosophers must conscientiously juggle between theoretical perfection, and the merits of more crude practicality. As has been undoubtedly gleaned, I view Hull as guilty of philosophical obscuritanism. For example, if the standard of proper philosophical inquiry is something close to attaining perfect certainty, it is easy to be a skeptic and to produce arguments that science does not really get anything right.

(9)

Scientists attempt to understand how and why phenomena act or, so to speak, behave, as they do. However, this cannot take place without delineating the features of one type of 'thing' as distinct from another—for example, what it may be that makes a dog different from a cat, and different from a mouse. This process of delineation has, historically, been plagued by all sorts of difficulties, but it is *essential* to the practice of science as once these categories are created, scientists can then turn to discovering the laws, or, in the case of very complex phenomena, the probabilities, of how particular events take place. In turn, scientists can then predict and manipulate phenomena—in

ways that can sometimes make, at least, human lives better. Griffiths makes a similar point.

> Even if different [theoretical] categories are valuable for different purposes, it is still true that some are better for a particular purpose than others and that some have no foreseeable use at all. Embodying these ideas in the language of natural kinds links it to a broadly realist perspective in which the predictive and explanatory value of the categories is taken to be prima facie evidence they capture a part of the structure of the world (1999, 217).

One of the problems with Hull's paper is that it simply defies the basic goals of science. How can description occur if there is nothing really to describe but variation? I am certain Hull takes this stance, to some degree, because biological phenomena *are* difficult to explain. But I also suspect Hull's paper is part of a long and continuing tradition of sensitivity to 'hard and fast' descriptions of human beings, or to almost any kind of social label.[21] Three passages might clarify this observation.

> As early twentieth-century social scientists rightly pointed out, for a dominant group to classify or identify a subordinate group, whether a sex or a race, was ipso facto, to exert some control over it. The very idea of definition or classification set limits to acceptable behavior, or more generally, the nature or character of the group. Certainly, that was the idea of race imposed on blacks; the same was accomplished for women by sex (Degler 105-106).

> Oppressed and excluded groups are almost always characterized as different *in kind* from the dominant culture. In the last two or three centuries in the West, these groups' stigmatized differences have often been turned into biological essences from which there is no escape. The oppressed, then, must either accept such assignments, while reinterpreting them as positive, or show that the naturalization is wrong and that the identity has been socially constructed or is simply false (Hubbard 2001, 467).

> [A]ny suggestion that socially consequential behaviors such as aggression, personality, and intelligence are innate implies the existence of biologically defined categories of people. Smart people and aggressive people are that way by 'nature,' raising the possibility of a genetically based caste system, the

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[21] The 'traditional political left' rarely makes use of evolutionary biology as a way to help solve social problems (e.g., Ellis 1996). Moreover, what is interesting is that when biology *is* factored in, it is almost always to emphasize variability and diversity—not constrained similarity (e.g., Gowaty 1991; Fausto-Sterling 1997b; Roughgarden 2004).

> antithesis of modern liberal democracy...Such a view understandably makes the acceptance of evolutionary interpretations for certain aspects of human behavior...undesirable (Bjorklund and Pellegrini 2002, 66).

For ethical integrity, it is important to develop an awareness as to how the description 'typical' or 'normal,' or any such generalization, can be used as a source of empowerment or disempowerment for various groups of people. However, at the same time, there is no avoiding the fact that generalizations can also be accurate and beneficial. For example, discerning whether someone is seriously depressed will depend on delineating some contrasting measure of health. Once this takes place, and depending on how 'true' it is, the label can allow for amelioration of the true condition, yet may also create social stigma in the process. Because of the real possibility of treatment, the answer to stigmatization does not (necessarily) rest in *avoiding* making the distinction; it rests in changing our attitudes toward those who might fall within the denigrated category. Moreover, sometimes, the more detailed the category, the better.[22] For example, dysthymia, bi-polar depression, seasonal affective disorder, iron deficiency, and hypothyroidism, are all characterized by lethargy and apathy. However, they all are treated in completely different fashion: one is responsive to cognitive therapy, another to medication, another is treated by increasing exposure to light, another by increasing iron-intake, and the last by hormone treatment. To take the position that none of these conditions really exists, that there are varying degrees of each condition, or that the condition between health and depression is sometimes difficult to judge, might be appropriate on occasion—for example, perhaps in the case of dysthymia—but taking this

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[22] Of course, this is sometimes not the case either, as with the seemingly increasing tendency to 'medicalize' quite mundane and situational behavior (Parens 24, 2004).

general stance can also be a big gamble leading to very harmful consequences through inaction.

Hull's style of criticism can be captured in a statement by feminist Allison Jagger. In a paper on emotions, Jagger says, "[it] is an axiom of feminist theory...that all generalizations about people are suspect. The divisions in our society are so deep...that talk about people in general is ideologically dangerous" (Jagger 1997, 394). Jagger may be correct, but then how do we proceed saying anything that might instigate social change? For example, I think Jagger would agree with the generalization that women have been oppressed by men through history and into the present. However, is stating this ideologically dangerous? Given her emphasis on caution, are we to avoid saying something that may, in fact, be true as well as very important? Surely, what Jagger really means is that we must avoid making wrong or inaccurate generalizations. But then the question is, how do we tell which is which?

Critique of Hull's Specific Arguments on Potentiality and Normality

> *One doesn't have to look far to find minds that are profoundly different from our own:...the human mind [differs] in many ways from...the mind of an alligator or a bee or a sparrow or a wolf. The minds of different species have different design features: different perceptual processes, different ways of categorizing the world, different preferences, different rules of inference, different memory systems, different learning mechanisms and so on. These differences in psychological design cause differences in behavior.*
>
> --Tooby and Cosmides (1992, 8).

Once there is the possibility of using ecological time as an appropriate frame of reference, Hull's arguments against potentiality and normality can be seen as quite specious. I will start my critique by considering his arguments as to potentiality and then I will move to those of normality. I will isolate these arguments in four numbered sections as follows.

(10)

No moderately sophisticated essentialist is going to ignore the fact that human capacities may be different between the sexes, and will change over the individual's lifetime. Thus, if we are trying to find a 'human essence' through comparison between species, then our point of comparison will most likely be a 'generic, fully mature, human adult.' This is not to say that 'natures' might not be determined by comparing aspects of human development, such as juvenility, or senescence, to aspects of similar development in other species. However, if we desire to determine what makes a species phenotypically distinct, an accurate picture will likely coincide with a *typical* (or extreme) expression of some *mature* human ability. The key word, again, is typical; the naturalistic essentialist wants an *approximate* measure of the full human essence, trait, power, weakness, skill, behavior, and so on, relative to the same in other organisms.

Hull seems to accept something like what I have said above as he *does* admit that an organism may lack a trait which it, nevertheless, may eventually possess (389). However, his two objections are, (a), that some humans, as defined by lineage, may completely lack the potential for some so-called 'essential human trait'—for example, language (which suggests there is no foundation for 'a human nature' in biology), and (b), asserting that a human has potential to be 'x' is too open- ended to be meaningful; that is, any excuses invoked to include, say, a feral child, as essentially human, could also be invoked for a chimpanzees, or other organisms ad infinitum.

In response to Hull, both these arguments can be countered simply through the fact that we do not need to insist on a single criterion for establishing 'a nature' (let alone for a species). At least at this stage of science, it is more likely that we will use a constellation of methods that begins by establishing some nominal identification as

human—via lineage, genetics, interbreeding, and so on—and then proceeds through other types of checklists: concealed ovulation, omnivorous diet, a large neo-cortex, and so on. There is no automatic elitism, here, as capturing what it is to be 'a fully mature adult human' has application only in distinguishing 'natures' *between* species. It might be argued that once gradations are established as to what best represents humanness, there is a danger of declaring that anything less warrants some different treatment, or is inferior. But again, I find this argument untenable. Establishing sameness and difference, and categorizing various aspects of the world, is inevitable. As alluded to already, this process is built right into the most basic acts of perception. Without a doubt, the very act of confirming differences will almost always be accompanied by worrisome moral implications, but the tactic of avoiding these threats by insisting the differences do not really exist often cracks under the strain of not matching up to evident realities. In the case of human beings, at this stage of moral knowledge, moral protection is made official (through law) and is assumed (although not guaranteed) simply by virtue of being born to (or conceived by) human parents. While we all recognize differences amongst humans, most of the time these are of little significant moral consequence except where special features justify special considerations—for example, laws allowing for maternity leave as protective of women and not men.

Given the above, it is true that some humans may *never* have the potential for something like meta-cognition, but this will not—or at least should not—translate into anything morally worrisome until humans are forced to make hard choices of the unusual type found in philosophy thought-experiments. (For example, if you could save only one person, choosing between either a person older than sixty or an infant, who would it be and why?). In which case, as Hull admits, such people are securely human, but might not

be in any sophisticated sense—or, in a sense, that could be hidden from any junior high school student (393). In which case, contra Hull, chimpanzees can be said not to have the potential for human 'x,' that is a feature of 'human essence,' precisely because they do not share recent human lineage. What a chimpanzee might exhibit is a skill *shared* with, or similar to, humans; but even if it is a skill exactly matched, it will still be uniquely expressed precisely because a chimpanzee is *different* from a human in *other* fundamental ways.

(11)

Hull's arguments on normality lose some of their force if we base 'normal' on what we currently find in science—that is, base it on the fossil record, anthropology, history, comparative anatomy, genetics, neuro-science, bio-chemistry, medicine, and the predictability of behavior confirmed by all branches of social science. This is not to say there is a united front as to how to accurately and fairly describe human beings. It is only to say that certain questions and investigations have largely been left behind, new ones are being resolved and, in turn, these too will lose their urgency and give way to more pressing mysteries. However, the fact there is relative predictability, and working technology in the world is evidence that scientists are finding something out that is of substance.[23] For example, taking an aspirin to relieve a head ache, using a movie star to

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[23] I make this claim with philosophers such as Elizabeth Lloyd or Lisa Gannett in mind. These philosophers, in my opinion, overemphasize the notion that our descriptions of the world—and especially our descriptions of normality and abnormality, health and illness, or the appellation 'genetic'—are largely socially negotiated (Lloyd 1998, 552-556; Gannett 1999). For example, Gannett says that "reference classes do not thrust themselves on passive observers" (365). I agree with Gannett that humans are not passive observers. However, some aspects of experience impose themselves so forcefully on humans that deviance or variety of interpretation is very rare. For instance, provided a person has the usual functioning sensory modalities (e.g., eyesight) some conclusions are unavoidable: a whale can easily and correctly be described as physically bigger than a

sell a car, thinking positive thoughts when you are upset, or successfully coaching your daughter on how to hit a baseball, all work precisely because they are based on stable, global findings about human physiology and psychology. Hull seems to agree with this when he says that human nature does exist if all we mean by it is "a trait which happens to be prevalent and important for the moment" (392). However, Hull does put forth a number of technical arguments as to why normality is not supported by biology. I will take these up as follows.

(12)

Hull declares that functionality is central to the notion of normality. This claim is highly debatable, if not disingenuous. In fact, I would counter that most essentialists are focused almost entirely on mere cataloguing, comparison, and description of what is seemingly usual, or unusual, in a population. If function is the focus for essentialists, then it must be at least a very refined notion of it. For example, humans are hardly different from any other animal if we are comparing, in general, what a brain does, a tongue, a hand, skin, and so on. This is because the function of those features, while quite specialized per species, are basically the same for all of them. If a 'functional trait' amounts to very specific phenomena such as being able to speak a language, exhibit 'a theory of mind,' do math, or art, or what have you, then I suppose most of these types of things might fit Hull's thesis. But, even so, there is an increasing trend to establish

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mouse. The same can be said about many so-called scientific descriptions. For example, the reason it sometimes 'fits' to say there is a gene for 'x' (that is, the reason the description is so expedient) is because the description actually matches an existing reality—or, at the very least, the description cannot be immediately surpassed in explanatory power by other descriptions (or is as easily translated into working technology). More important, this is not a position that necessarily legitimizes the status quo any more than, say, describing the physics of how airplanes fly might legitimate the status quo.

human nature via a detailed understanding of genes, anatomy, and physiology as primary, with its eventual relationship to overt functional behavior as only secondary.[24] For example, primate brains are unique among animals as they tend to be over two times larger than the brains of non-primates of the same body weight (Allman 1999, 161). The relative weight of the human brain is even further distinguished by the fact that it is large even amongst primates, and is matched in proportionate size only by toothed whales such as porpoises and dolphins (Byrne 1995, 226; Allman 161).[25] However, this is still not what is most notable: what makes the human brain especially distinct is the development and size of the neo-cortex (Byrne 217-221; Carter 1998, 182). In particular, the human frontal cortex takes up about 28 percent of the cortical area—far more than any other animal (Carter 182; Calne 1999, 78). If we know these facts, and if we know what the functions of both the frontal cortex and other parts of the brain are, then it is likely we can predict substantial differences in overt behavior between animals that do not have a frontal cortex, and those who do. Moreover, among those who do, we are likely to find some discrepancies in behavior given the relative size differences of the frontal-cortex. Given all this, when we come across a human being with a damaged frontal cortex, it is not unreasonable to consider them atypically human. Moreover, we do not need to focus on actual overt behavior to draw this conclusion. We might find that if damage occurred early enough in development, other parts of the brain may have compensated so that a difference in behavior is hardly noticeable. Yet, all the same, what we consider 'natural'

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[24] This style of thinking might stem back to Darwin himself: "[i]t is generally acknowledged that all organic beings have been formed on two great laws—Unity of Type and the Conditions of Existence. By unity of type is meant that fundamental agreement in structure, which we see in organic beings of the same class, and which is quite independent of their habits of life" (Darwin 1859, 206).

[25] Relative to a chimpanzee, and taking into account body-size, the human brain is three times larger (Byrne 214; Allman 163).

will mainly be captured through evolved anatomy that would anticipate typical behavior.[26]

(13)

Hull argues that "structures and functions do not map neatly on to each other" and, from this, claims that we cannot then single out some function as normal (393). This claim has some merit, but only as a partial truth. I will explain myself as follows.

First, some structures clearly *do* have an evident function—or at least primary function: eyes seem useful for seeing, ears for hearing, teeth for biting and chewing, the heart for circulating blood, and so on. There is nothing particularly ambiguous about this. In fact, it is difficult to understand Hull's commotion, for example, about the function of the hand. Hands seem good at manipulating things; elbows are not good at manipulating things. Manipulation seems to be a good guess as to the normal function of the hand even if it is true that a hand can sometimes be used for sign language. What is vacuous about this answer?

Second, it may be the case that a single structure performs more than one function, or one function is performed by more than one structure. Also, sometimes, these multiple functions cannot be parsed out separately. However, it is difficult to understand why we cannot simply consider some parts of human anatomy and physiology as normally and

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[26] This style of argument is especially note-worthy when illustrating sex differences. For example, we know that the effect of the hormone oxytocin is enhanced by estrogen and undermined by testosterone (Taylor 2002 28; Allman 97,183). Given what is known about oxytocin, there seems to be a good evolutionary reason for this phenomenon, and thus, some of the predictable differences in male and female behavior appear 'natural.' However, if we observe that many males exhibit strong pair-bonding behavior with infants, this does not discount the 'natural' differences in anatomy between males and females. Rather, it says that the sources of behavior are multifarious and that it is often modifiable.

functionally multi-modal. With Hull's own example of the urogenital system, we can say that it is *normally* used for both excretion *and* reproduction.

Third, Hull notes that quite often an organ evolved to perform one function can be co-opted to perform another. Once again, if this is occurring uniformly across a particular species, then we will call the new function normal for the species. If it is still a mixed phenomenon across the species, we simply withhold judgment. (For example, feathers appear to have initially evolved for insulation [not flight] which means at one time they might have performed both functions—or still do [Bakker 1975]). If a 'commandeering of function' is happening in an individual organism (and in our life-time), we may withhold judgment until it seems as though one function, or the other, stabilizes. However, all in all, there is no reason why we should assume that natures, along with functions, are forever fixed (e.g., Bjorklund and Pellegrini 71). .

Fourth, Hull argues that problems often accompany discussions of function because of conceptual plasticity. However, plasticity can often be resolved simply by deferring to the so-called experts. For example, Hull uses the function of sex to illustrate his case (394). Here, we can simply say the common-sense answer of reproduction is not as good—that is, if we are forced to make a choice. However, most of the time we can allow that many answers might be right, or that we do not yet know the answer.

Fifth, Hull gives a discussion of genetic reaction norms and through these eventually concludes, (a) there is no clear sense of normal development that is significant and, (b) developmental plasticity is absolutely necessary if an organism is to survive (391). When understood even within a geological time-frame, these are still puzzling statements. In regard to the former, life (especially in complex organisms) would not be possible if natural selection, first and foremost, could not reliably guarantee the integrity

of the developmental process. Thus, *there is* a very clear sense of normal development precisely because any significant deviation from certain courses of development will cause the organism to be significantly malformed and functionally impaired—or will even retard growth in such a way as to be fatal. For instance, in regard to humans, menopause, mylenation of the frontal cortex, and puberty come after infant neural pruning, baby teeth, and an understanding of 'object permanence.' Reversing this order of development would be physically impossible—in our universe.[27] In regard to developmental plasticity, similar comments can be made. For example, certain species of coral reef fish are capable of changing sex when there are changes in the sex-ratio composition of the larger group. This serves to show that some species appear to exhibit radical developmental plasticity. And yet, the reef fish only change into something quite reef-fish-like; they do not change into, for example, albatrosses or something albatross-like. The same can be said of humans. As Ingold writes, "[w]hatever the environmental conditions, there are certain things humans potentially can do and others they definitely cannot. Doubtless, a great deal of genetic change would be needed to turn a human into something like a bat" (2000, 283). The point is, development, as well as reaction norms, *has limits*, and that is one of the main reasons why species go extinct daily.[28] It is these limits that form the starting point for discussing normality and the differences between species.

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[27] This reasoning is based on phenomena such as phylogenetic inertia (e.g., Griffiths 1999, 220), canalization (Waddington 1966), generative entrenchment (Wimsatt 1985), and so on.

[28] One example of such limits can be witnessed in what is known as critical developmental windows: early in development, the cells of an amphibian embryo can be removed and transplanted into another cellular environment and they will develop in accordance with their new, rather than old, surroundings (Tobin 1999, 7). However, later (after gastrulation) this ability is lost and the transplanted cells develop according to a seemingly already determined program (ibid.).

Critique of Elliot Sober on Reaction Norms and Constraints:

Because it is so common to invoke reaction norms to discredit essentialism I will take a moment to elaborate on the foregoing argument. To do so I will briefly veer from Hull's essay to consider a more detailed argument which supports Hull's view—those of philosopher, Elliot Sober in his essay *Evolution, Population Thinking, and Essentialism.*

Just as anti-essentialists are not committed to a denial of regularities in nature, or predictability, essentialists are not committed to a denial of variability. In comparing population thinking (in biology) to essentialism, Sober acknowledges this.

> The *average* fecundity within a population is no more a property which we invent...than is the fecundity of individual organisms. Individuals and groups are equally 'out there' to be discovered. And similarly, it is unclear how one could suggest that [essentialists] held that variability is unreal; surely the historical record shows that [essentialists] realized that differences between individuals *exist* (1980, 352).

Sober goes on to describe how he imagines essentialists tolerate variety, but he eventually argues that 'population thinking' on the issue is scientifically superior (e.g., 372). His conclusion rests, in part, on the idea that essentialists view variation as a "deviation from type" (e.g., 377), or as the result of a 'perturbation' or 'interfering force' in a natural or normal state (e.g., 380). Part of Sober's argument is that when we look at reaction norms, the essentialist cannot satisfactorily point to any normal state: no "one path of foetal development" (374); no single genotype or phenotype—or "restricted range" of these—that translates into something 'natural' to the organism (ibid.). He says, "all environments are on par and all phenotypes are on par" (ibid.); "it is arbitrary to single out as privileged one phenotype as opposed to any other" (379); "[w]hat happens in nature [what is natural] is simply everything that happens" (379).

Building on what I have argued in previous sections, I will make the following seven points.

First, while Sober may be correct that it is arbitrary to single out *one* privileged phenotype, it is not incorrect to single out ranges or clusters of natural phenotypes—at least on a more parochial time scale. To disallow this would be to rule out any discussions of species-typical adaptations. Adaptations are extant records of the regular, unique challenges of a niche at some earlier time. They represent an amicable match, or fit, between 'normal past, graduated form' and 'normal, past context' (whatever way we choose to draw the line between where one ends and the other begins). Such niches exist outside and inside an organism and are revealed in much of the organism's macro- and micro- structure. From the perspective of the organism, adaptations denote that suffering and non-existence are, in a sense, *unnatural.*[29] They also denote that, as far as survival is a context for science, it is not unreasonable to connect some modicum of functionality (and health) to normality, and to connect some extreme deviation from this to abnormality. Thus, Sober and Hull are overstating their point on reaction norms: it cannot possibly be the case *all* phenotypes are on par or that there is no *quasi* restricted range of species-normal genotype or phenotype—at least up to the present moment. This argument allows us to make sense of the fact, for example, that humans do not normally live, unaided, underwater for very long; that we cannot plant human DNA in top-soil and

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[29] Death is perfectly natural (in terms of it being an inevitable occurrence)—and perhaps Sober is saying as much, i.e., it is just another 'phenotype' (1980, 375). However, a context this broad makes it impossible to say anything about organisms that is non-trivial. There may be *a vast number* of phenotypes within, and across, the history of life. But, while initiated by random forces, these phenotypes fall into, and represent, a type of order. Moreover, it is plain that some of this order (e.g., anatomy and behavior) is more represented, and resorted to, in certain groups of 'similar organisms' than others. It is this nuanced order that biology looks to account for.

expect it to sprout a fetus; that we cannot survive by drinking only gasoline; and that being an extreme daredevil might be less 'natural' (for humans) than mild book-wormishness. Certainly, such constraints may be too broad and vacuous to be of scientific interest. But, the point is, this is not always the case—and especially when such generalizations are considered within a *known* constellation of other constraints: those which are globally-typical, species-typical, gender-typical, ecology-typical, developmentally-typical, or idiosyncratically-typical.[30]

Second, reaction norm arguments seem to depict essentialists as committed to some crude nature/nurture dichotomy, or as fixated with teasing apart and highlighting some genetic essence (e.g., Lewontin 1976).[31] Again, this is not a fair depiction.[32] In principle, all that is required to begin talking of a 'nature' is the identification of stable differences, and/or stable constraints, which are made non-trivial by their capacity to confer relative uniqueness, or at least human interest. This means we do not always need

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[30] Wachbroit says something very similar: "talk of normality in biology makes sense at every level of complexity: We can talk about the normal heart, the normal cell, the normal chromosome, the normal gene, and so on. When 'normal' ceases to be applicable in this progression, we have left the realm of biology" (Wachbroit 1994, 587).

[31] Lewontin claims that "no single phenotype corresponds to a unique genotype or visa versa" (ibid., 184). Yet, he later goes on to admit, "there are a few genotypes that are of uniformly poor viability... probably corresponding to homozygosity for a single deleterious gene of strong effect (191). Lewontin is generally right, but a few qualifications should be made. First, while we still know very little about reaction norms, the 'black boxing of developmental processes' through the mid twentieth century, and into the present, is not likely to have occurred if certain genes, in certain environments, were not fairly consistent in effect. Second, there are over 1200 monogenic conditions documented at present and, moreover, they are not always deleterious (Wilson 1998, 158). For example, the SRY gene (only 612 letters long) masculinizes a body simply by switching on another gene SOX9 (Ridley 2003, 160). Third, research on 'junk DNA' is shedding more light on so-called (narrow) genetic programs (Mattick 2004).

[32] I suspect many biologists focus on genes mostly because they assume genes to be the unit of selection. Being a gene-selectionist does not, however, make one a genetic determinist, or a genetic essentialist. (See Segerstråle 2000, 190-191, for a brief discussion).

to understand the ultimate origin or function of a trait to understand how it might factor into, or amount to, a 'nature.' Rather, we need simply notice how a phenomenon is reliably present and how it impacts, or brackets, decision-making and eventual behavior.[33] With some irony, I follow Sober on this (as paraphrased by Wachbroit): "[w]ith variation the rule, the aim of evolutionary explanations is to explain the *constraints on* variation rather than the presence of variation" (Wachbroit, 590).

Third, the essentialist is not committed to holding variation as simply a deviation from a norm that should be "explained away" (Sober 370). For certain, in one small sense Sober is right, but it is not in a sense any anti-essentialist, herself, would likely disavow. Organisms are homeostatic systems sensitive to, and regulating, a certain type and range of experience. This 'balancing act' could not occur if there was not some 'normal' internal, or external, condition which the system corrects toward. For example, when humans are too hot, they sweat or take their down-jackets off; and when too cold, they shiver or fly to the tropics. When light is too bright a pupil constricts, or the blinds come down; and when it is too dark, a pupil dilates, or the sunglasses come off. While the onset of each condition—correcting for an inadequate body temperature, or light input—might be somewhat different from person to person, the need for fluctuation (variation), itself, is normal and can be reasonably accounted for and predicted. Given this, the essentialist is not always looking to *explain away* deviation from a 'norm' because deviation is expected and embedded within the system. This same reasoning can

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[33] One of the ways Sober tries to dismiss this is to state that some natural (i.e., highly fit) traits *may not yet have occurred.* He says, "[p]erhaps every environment that a species has historically experienced is such that a given genotype in that environment is a *diseased* phenotype, or one that is developmentally impaired in some way" (376). But this is not of great concern to an essentialist as s/he need only focus on the bottom-line (at least to get started); that is, the only 'nature' an essentialist may need to understand is the one that is stably in front of her.

also be applied to a population. In other words, there appears to be a normal homeostatic *correction* occurring when a population size goes outside a certain range. When too small, a population will struggle to sustain its numbers, possibly going extinct. When too large, it can crash by exceeding the niche's carrying capacity. These types of phenomena indicate there are certain contexts in which a 'Natural State Model,' as applied to organic systems, actually has an appropriate application.[34] Furthermore, when the word 'normal' is so expedient to describing these fluctuations, *it is not a big step to draw a contrast* to those fluctuations which fall outside the norm—for instance, to notice those people who wear down-jackets during hot days at the beach.

Fourth, it may be the case that those who adhere to what Sober calls the 'Natural State Model' view death and disease as somehow unnatural, and *flourishing* as natural (Sober 375-378). But this model is not something an essentialist must pledge her allegiance to in order to posit a nature. What may be natural for a human being is menopause, senescence, death, some amount of ill health, moments of sadness, deteriorating eyesight, Viagra, or what have you. Yet, as with homeostasis, changes over the course of an organism's life-span are to be expected, and there is nothing to presume that anything more than minimal 'fitness' is all that natural selection 'desires.' In fact, there is much to say that, for many organisms, quite sub-optimal conditions are a far better characterization of the 'natural state.'[35]

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[34] Sober agrees to the 'Natural State Model' as having relevance at the 'population level.' For instance, he specifies the Hardy-Weinberg law as an example (361, 381). However, he seems to discount (at least implicitly) anything of interest at the level of the individual.

[35] This point does not contradict the first point made in this section. Depending on the context, death can be seen as both natural and unnatural. The main point of disagreement, then, will be the supposition that essentialists 'hang their hat' on the idea that organisms must flourish.

Fifth, there is no strong reason why positing a nature requires essentialists to choose one absolute, exclusive state over another, or for essentialists to be disqualified from making conditional statements about a 'nature.' There may, as stressed earlier, be a few aspects of structure that are non-negotiable (highly resistant, or insensitive, to a vast range of environments) which essentialists might espouse. But these are likely to be uncommon. As Sober clarifies (and any Darwinian would agree), intra-species variety is fairly constant: "[b]ell curves are normal; they are found everywhere" (ibid.). Thus, most of the time, an essentialist can say: it is human nature for humans of 'x' developmental resources to usually be angry in these conditions, but not in these ones; to laugh in these scenarios, but not these ones; to have a life-expectancy of 'x' years in these conditions, but not if these conditions change. Sober himself says, in the passage cited earlier, that *population averages are as real as individual properties.*[36] Griffiths rounds this out.

> Generalizations about taxa are exception-ridden. This does not, however, prevent them from being lawlike...The fact that...predictions and extrapolations are not absolutely reliable is simply beside the point. They are more reliable than chance, so unless there is some way to capture the same regularities, eschewing the use of these categories would mean discarding some of our understanding of the structure of nature (1999, 222).

Sixth, establishing the 'nature' of an organism is not the same as, or is not completely dependent on, gaining philosophical closure on what species an organism is. In fact, it is not problematic to use whatever species-criteria are currently most reasonable to biologists as an essentialist can then preoccupy him/her self with the implications of whatever organismic properties (functional or non-functional) are immediately and stably present. For example, perhaps the 'biological species concept' is provisionally the best

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[36] Even Ghiselin, with a bit of stretch, might be amenable to this way of thinking. He says, "[o]f course, erecting classes on the basis of shared traits has its place..." (1974, 539)

way to understand humans as a species—that is, perhaps human parentage, interbreeding potential, or DNA, establishes some minimal guarantee of humanness. If so, from this it is possible to just work with, and extrapolate from, the moderately stable clusters of properties investigated.[37] Moreover, on this conception, it would even be feasible to speak of phenomena such as a 'human/ dolphin essence'—perhaps almost exactly the same—and yet still view humans and dolphins as separate species. It might even be appropriate to talk of phenomena such as 'mammal' or 'neocortex' nature, and so on. Bare minimum, all the essentialist requires is a generalization about a group of organisms which, taken alone, or in combination, indicates something definite (on an ecological time-scale, or between fuzzy speciation events) and is non-trivial—that is, is something that allows humans to reliably 'make sense' of ourselves in certain surroundings, relative to past or present 'other' organisms. The species question, and species categories, will strongly inform this understanding, but it will not override it.

Seventh, Sober makes it evident that population thinkers also attempt to explain invariance. The main difference, however, is that the "populationist...tries to identify invariances by ascending to a different level of organization" (352, 370,381). For Sober, "[a] population is an entity, subject to its own forces, and obeying its own laws" (370). As an example of this, Sober mentions the Lotke-Volterra equations which describe the interactions between predator and prey populations (352). I would agree with Sober "there is something real over and above individual organisms" (352). However, despite likely charges of reductionism, I would argue that explaining these so-called emergent laws themselves—in any detailed fashion—will always involve gaining *some*

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[37] With the focus on geological time de-emphasized, the implication is that evolutionary biology is not the only discipline that may have something interesting to contribute as to understanding 'natures.' Sober hints at this possibility at the top pf page 178 (1980).

understanding of the characteristics of the groups, or classes, they are meant to apply to. For example, in the case of the Lotke-Volterra equations, the laws of predator and prey relations would be unfathomable without being able to, ultimately, reference a number of particular instantiations of predators and prey. Given this, the idea that population thinking avoids the problems of constituent definitions (that are thought to be typical of essentialist species concepts) is, at best, only superficially true.[38] In turn, this implies that population thinking and essentialism are not necessarily as different as they appear—and this is especially the case if essentialists are not held to the straw-person position that identity-relevant organisimic structure should be present *regardless* of context (e.g., Sober 377).[39]

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[38] This point undermines the idea that population thinking is more scientifically parsimonious than essentialism.

[39] A great example of the tight-interrelationship between population generalizations, ecology, and species-typical properties can be found in a comparison of the sexual practices of different primate groups such as humans, gorillas, chimpanzees, and orangutans (Diamond 1993, 59-84). For example, polygamy, monogamy, promiscuity, sexual dimorphism, and genital anatomy (e.g., relative penis and testicle size, ejaculate volume, sperm specialization, etc.), can be predicted, in part, on the basis of ecological constraints on how each of these primates feed themselves. (See also Baker 1996).

CHAPTER V

A CRITIQUE OF HULL ON BIOLOGICAL SPECIES

I have no objection to Hull's insistence that "[i]f species are taken to be things which evolve, then they can, and must, be characterized in terms of ancestor dependent-relations" (384). Moreover, I concur that in sexual species these relationships can be "characterized...[by] complex networks of mating and reproduction...[and that any] organism that is part of such a network belongs to that species" (384). However, I cannot imagine this minimal description is *all* we that can be reasonably said about our lineage when using *all* the scientific power we can muster. I also do not fathom how Hull himself can truly escape this conclusion. I will explain this briefly as follows.

In the foregoing quotations, Hull has effectively says that the human lineage, at least 'lately,' must rely on 'networks of mating' which implies that, somehow, sex is very important to the human species. Moreover, he goes on to impute that exclusive, or nearly exclusive, homosexual behavior is not as common as primarily exclusive heterosexual behavior and that, although "these percentages may vary from society to society and from time to time", at any one time the estimates as to the former are roughly about 5-10% of the total population (390).[40] He further admits that "[s]ome combination or combinations of traits" must be responsible for the fact that humans have not been able to mate with an organism from another species for "several million years" (389). Yet, Hull's terse conclusion to all of this is that such traits "are not likely to fulfill the traditional function of human nature" (389)—end of story.

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[40] Hull even goes so far as to say the following: "[h]eterosexuality is the normal state programmed into our genes. It needs no special explanation. Normal genes in a wide variety of normal environments lead most children to prefer members of the opposite sex for sexual and emotional partners" (390). I have not included this in my text as Hull appears to be speaking facetiously.

I would agree with Hull that if we are looking for a *single* trait to define humans as a species, sex will not be it—and this is partly because many other species also are sexual. However, a moderately sophisticated essentialist could say, in regard to humans, that sexual urges are *a small piece* of a greater constellation of other puzzle-pieces that, when all taken together (as difficult to discover as they may all be), create a certain 'human gestalt.'

My critique of Hull does not stand or fall on this point, but it is clear to any 'professional biologist' that if something as important as sex is to occur at all—as with eating high energy food, as opposed to cardboard, or preferring to sit on a warm beach versus hot coals—it cannot be left entirely to whimsical, open-ended, choice in the face of equally potent choice options. In other words, interbreeding is not simply a consequence of possessing 'interbreeding equipment.' For certain, humans can discover anomalous and eccentric pleasures, we can delay our immediate desire for certain pleasures, we can be overwhelmed sometimes as to choosing amongst pleasures, but we cannot completely control the underlying impetus itself, or the fact that certain conditions will *always* be more 'appealing' to us, cross-culturally, than others.[41] In turn, if it is possible to see 'sexual arousal' as an anchor point in the potential chaos of choosing—as something holding us on a loose leash and in ways we might not always be aware of—it is likely there are other realms of choice that require some 'guidance or prompting' from natural selection also—and that will epitomize what is natural to us.

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[41] This argument could be supported by many different empirical examples. One of these would be the premature deaths of paraplegics (due to being constantly sedentary) and those who suffer from syryngomyelia. People in each of these conditions cannot, in important respects, feel pleasure or pain (e.g., Nesse, 1991).

Dove-tailing with the above, Hull seems to focus on heterosexuality as if humans were 'fitness maximizers' and not 'adaptation executors' (Buss 1995, 9-10). Reproduction occurs *mainly* as a byproduct of more immediate adaptive impulses. Thus, if we are to truly understand the importance of sex to human beings we cannot simply count heterosexual encounters and the incidence of procreation versus anomalies to that—for example, people who are sterile, religious persons who are sworn to celibacy, homosexuals, "old maids", and so on (Hull 394). Instead, we must focus on the prevalence and potency of *the urge* for sexual pleasure, or 'sexual-ish' pleasure.

Like humans who are celibate, parthenogenic species do not engage in sex. However, a key difference between the two is that humans, who are somehow 'abnormal' in regard to sex, often retain the urge toward sex (or something resembling it); while the 'nature' of parthenogenic species, on the other hand, is that they *never* have such urges. Given all the above, homosexuality might easily be understood as different only in degree from heterosexuality. In other words, it is not at all biologically abnormal insofar as we focus on the proximate mechanisms of sexual arousal (or of social attachment) relative to the options that contingently meet this impetus. What *is* cross-culturally universal among hetero- or homosexual humans is the relationship between some kind of sexual urge, or urges for intimate social attachment, and the desire to look nice, have 'high status,' be 'witty and engaging,' and on and on. Contra Hull, none of this is an *insignificant* aspect of being human—especially given the fact many asexual organisms do not have the same rippling web of 'anchored' compulsions.

Do 'Types' Evolve?

Behind much of Hull's impatience with essentialism is a long history of philosophical frustration with the goal of discerning just how, exactly, to understand what

species are. Darwin, himself, was uncertain about how to answer the question. Yet, the context of the discussion traces back at least to Plato. Plato believed that kinds are immutable and that it is only instances of kinds that change (e.g., Rosenberg 206). Whether this is true, or not, philosophers have attempted to apply it to defining species. In turn, this practice seems to have created dogmatic philosophical barriers around certain aspects of the species discussion.

At the time he wrote the essay in question, Hull was a proponent of a radically new way of imagining species; he viewed them as individuals and not as classes, or types. This reconceptualization of species allowed philosophers like Hull to say that species changed and evolved—as particular individuals do—which then seemed to reconcile the species concept to the tenets of Darwin's theory. However, as the founder of this view—Michael Ghiselin—admits, "[t]here are both advantages and disadvantages to treating species as individuals" (536).

I will not take up the merits, or demerits, of Ghiselin and Hull's view. Nor will I try to resolve the species question. However, perhaps the whole issue has been framed improperly. I will build a very brief argument as follows:

While there may be support for a certain limited scope of 'kinds' as immutable, there are grounds to suggest the opposite as well. I will not take up the former as it is not crucial to my case. Rather, I will just clarify some candidates for the latter. One common example of an accepted form of essentialism, by anti-essentialists, is the chemical periodic table. Sober, for instance, establishes that "it is necessarily the case that a thing is made of nitrogen, if and only if it is made of stuff having the atomic number 14. Moreover [he says], this characteristic atomic number plays a central role in explaining [the] other chemical properties of nitrogen" (1980, 355). At the same time, Sober

clarifies, "[the] fact that nitrogen can be changed into oxygen does not in any way show that nitrogen and oxygen lack essences. To be nitrogen is to have one atomic number and to be oxygen is to have another" (356). Sober eventually concludes that "[e]ssentialism [as to chemical kinds] is in principle consistent with *vague essences* "—that is, "as long as the vagueness of 'nitrogen' and that of the atomic number 14' coincide" (358).

Are there some other examples that might be like this? I would argue there are types (even artificial or theoretical ones) that *do* seem distinct from and yet continuous with change—similar to the way a chemical kind is.[42] We can even accept the idea these distinct kinds exist 'if and only if' they have 'x' properties. However, we will not always need to know the exact catalogue of why something is what it is to posit an essence; we need only know that our method of identification is good enough—or insist on something like a 'vague essence.' For example, eyeglasses are a distinct class of which there are many instances or styles. We might also say eye-glasses are slightly different from a monocle, or pince-nez; are substantially different from a magnifying glass, telescope, or binoculars; are very different from a microscope or astronomical observatory; and are related in some way to contact lenses, eating many carrots, laser eye surgery, and vision-enhancing gene therapy. The descriptive features of all these class's of items make them all quite distinct classes. Yet they might also be said to share a fairly narrow functional essence, sometimes seemingly quite at odds with each classes descriptive features (and perhaps traceable through some kind of historical genealogy). Moreover, given the first proto-eyeglasses were probably crude, we might find the original so different from contact lenses we would not even recognize it as a forerunner (or ancestor) to them. Even

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[42] Sober agrees, but he does not think this argument is decisively helpful to essentialism (355-359).

further, while pragmatic criteria relative to a present context may reveal the functional essence of eye-glasses to be a paper weight, a refractor of sunshine for starting fires, a technology to make one's eyes look bulbous, or all of them, this may change. Given certain pragmatic criteria—which will undoubtedly (or eventually) reflect a measure of reality—we will know that relative to soccer balls, it is unlikely that the essence of eye-glasses has something to do with kickablity. We may also find that relative to matches, an actual paperweight, or sudden surprises, eyeglasses are perhaps best considered a technology to improve vision. Moreover, eyeglasses could, in effect, become extinct, due to some newly emerging, vision-enhancing, gene-therapy procedure. At this point, the essence of eyeglasses may appear to be that of a historical artifact, and it may be hard to discern some essence beyond this. However, this will be an epistemic limit—that is, if we expect accurate descriptions to be constrained in the 'right directions' by 'reality.'

Could we say the same about automobiles as a class, or entity? For example, does this class evolve? Are there confusing cases of where the class 'automobile' ends and, say, 'boat' begins? For example, could an original model T Ford, a solar-powered vehicle, a go-cart, an amphibious vehicle, and a 'car' used to set a land speed record, all be considered instances of an automobile, or instances of a shifting class?

The point is, the desire to treat species as individuals seems to rest on the idea that proper 'types' do not change. And yet, I suspect that on closer consideration the insistence that individuals evolve, while 'types' do not, is not true.[43]

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[43] One response to this may be that species as individuals is at least more scientifically parsimonious. However, I would debate this: species depicted as individuals is as philosophically unwieldy as kinds depicted through identifying clusters of properties (provided lineage can be resorted to, in the case of the latter, as a minimal standard for establishing human kinds).

CHAPTER VI

AN ANSWER TO HULL ON WHY A NATURE IS IMPORTANT

In considering the motives as to why people are so insistent on the existence of human nature, one of the conclusions Hull comes to is that it is meant to provide a foundation for ethics and to justify human rights (385, 395,396). I believe that each of the issues is quite separate, and that Hull's views on the matter are slightly off the mark in each case. I will try to highlight this, starting with the former, and then I will eventually show how an understanding of human nature is extremely important. I will make three more numbered arguments.

(14)

In regard to a foundation for ethics, I cannot hope to summarize the diverse intents of most of the academics interested in this area. However, I would argue that what is going on, currently, given its strong empirical dimension, is far superior to the arm-chair theorizing of past (and present) philosophical practice. Hull is correct to surmise that moral systems are contingent—that is to say, as Wilson and Ruse do, that "[n]o abstract moral principles exist outside the particular nature of individual species" (1986, 186). However, *there is* an element of quasi-objectivity to moral systems given that all humans face the similar niche of living in a group. This means that because all humans (to varying degrees) face similar social problems, with similar resources, and similar needs and desires, the answers they come up with, cross-culturally, will tend to be similar. As Wilson and Ruse assert, "[human cultures] tend to converge in their morality...when a largely similar array of epigenetic rules meet a largely similar array of behavioral choices" (ibid.).

Hull suggests this type of thinking is dubious as he suspects the genetic variability characterizing mental development will be at least as large as that which characterizes phenomena such as human blood-type (396). But Hull is wrong here—or even if we grant that he is correct, this variability is mainly superficial. Many experiments, in disciplines ranging from economics to art history, are showing that human thought process are constrained not only by brain anatomy and neuro-chemistry, but also by the fact that embedded within such processes are fairly stable preferences, operating heuristics, and self-serving biases (e.g., Nisbett and Ross 1980; Kahneman et al. 1982; Kuhn 1991/1994; Taylor 1989; Sutherland 1994; Gigerenzer 1999; Connolly et al. 2000). For example, we know the neo-cortex was the last portion of the brain to evolve and that our brain is wired to favor—at the very least—oblique dominance by the older layers of the brain responsible for base regulative functions and the expression and experience of emotions (Carter 80-105; Calne). This is documented in a vast range of disparate literature starting with the evident protection of voluntary interference to base regulative functions, and moving to research on brain-damaged patients, phobias, post-traumatic stress disorder, and so on (e.g., Frank 1988; Damasio 1994; Goleman 1995; Griffiths 1997; LeDoux 1996). As the scientific evidence piles up, various countries are implementing these findings into law. For example, not only are there now various mitigating conditions for the assessment of adult criminality based on brain research (e.g., Hare 1993; Raine 1993), but there is presently a push in the United States to ensure that people under the age of 18 should not be subject to the death penalty as brain wiring favors more impulsive decision-making prior to early adulthood (Wallis 2004).

In any case, insofar as biology is intended as some absolute foundation for ethics, Hull is correct: biology can never justify values. However, biology can certainly provide

a foundation by using empirical data to help explain *why* we value what we do, or why morality tends to have the shape it does. For example, evolutionists might try to explain why fairness is important to humans, why certain kinds of moral thinking are largely absent in young children, why altruism might be prevalent in some scenarios and not others, or why we tend to view murder as worse than telling a lie. Moreover, once a culture or sub-culture does establish certain moral principles, biology and psychology can provide facts that can alter the scope of application, or can tell us whether we are being consistent to our initial principles. For example, we may believe that moral consideration should apply only to those phenomena that exhibit interests. In such a scenario, biology can show us how a rock stands outside the boundary of phenomena that necessitate moral consideration, and a mosquito does not.

(15)

I am not sure why Hull is so pre-occupied with the notion that essentialists are looking to human nature as a way to justify human rights. At the time Hull was writing, there was already a wealth of literature indicating that many people did not consider it necessary for all humans to be the same in order to have rights. In fact, there was already a substantial movement underway to protect more than human beings. For example, in 1975, eleven years prior to Hull's essay, philosopher Peter Singer's book *Animal Liberation* was published. Singer argued that non-human animals—to put it modestly—should be considered as equally worthy of moral consideration as human animals.[44] Furthermore, three years prior to Hull's essay, another book by philosopher Tom Regan (which also became very popular) argued much the same premise as Singer except from a

[44] This book is still in print after 30 years.

deontological, rather than utilitarian, ethical stance.[45] Hull must have known of these ideas as their origin dates back to at least 1789 with the popular writings of Jeremy Bentham.

Because Hull cites only one essentialist, Eisenberg, it is difficult to tell who exactly his polemic is directed against. Hull claims to represent biologists, but then a reasonable assumption as to who would use biology to arrive at human nature would be biologists themselves. In which case, perhaps, Hull intended to target the sociobiologists of the time. But again, well-known biology writers such as David Barash, Jerome Barkow, Richard Dawkins, Robin Fox, William D. Hamilton, J.B.S. Haldane, John Maynard Smith, Lionel Tiger, Robert Trivers, George Williams, and E.O. Wilson, were not making any statements demanding sameness to justify rights—or, if they were, it was only a minimal sameness that humans shared with other animals; that is, a sameness only in the sense that moral consideration requires having an interest, the possibility of suffering, and so on. One example of the perceived irrelevance of human sameness to morality (amongst essentialists), can be found in Dawkins' book, *The Selfish Gene*, which appeared 10 years prior to Hull, and is perhaps as important and popular a book as Wilson's tome *Sociobiology*. Dawkins writes the following:

> The politically liberal, who are normally the most convinced spokesmen of the species ethic, now have the greatest scorn for those who have gone a little further in widening their altruism, so that it includes other species. If I say that I am more interested in preventing the slaughter of large whales than I am in improving housing conditions for people, I am likely to shock some of my friends
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> The feeling that members of one's own species deserve special moral consideration as compared with members of other species is old and deep. Killing people outside war is the most serious crime ordinarily committed. The only thing more strongly forbidden by our culture is eating other people (even if they are already dead). We enjoy eating members of other species,

[45] This book is 'The case for Animal Rights.'

> however. Many of us shrink from judicial execution of even the most horrible human criminals, while we cheerfully countenance the shooting without trial of fairly mild animal pests. Indeed we kill members of other harmless species as a means of recreation and amusement. A human foetus, with no more human feeling than an amoeba, enjoys a reverence and legal protection far in excess of those granted to an adult chimpanzee. Yet the chimp feels and thinks and—according to recent experimental evidence—may be capable of learning a form of language...Whether the ethic of 'speciesism...can be put on a logical footing any more sound than that of 'racism', I do not know. What I do know is that it has no proper basis in evolutionary biology (1976, 9-10).

It is tempting to go on with similar quotes by other authors, but for the purpose of this essay I will simply posit that Hull's argument on this issue is arguably a straw-person.[46]

(16)

As Hull seems uncertain as to what the exact reason is for why people are hunting to discover human nature, I will provide an answer for him based on writing that indicates what I believe it is. The main reason why essentialists are trying to understand why humans are the way they are, what is important to humans, and how humans think and feel, is because armed with this knowledge we can then try to make the world a better place by *undoing* some of the ways our thinking and habits are naturally prejudiced, destructive, and maladaptive.

> The important point is not simply that biology *definitionally* encompasses all the life sciences, but that it provides an encompassing *conceptual* framework, which the social sciences ignore to their disadvantage. Progress in every subfield of what is usually called biology is predicated on evolutionary insights, and most of it upon understanding [natural] selection (Wilson & Daly 1988, 154-55)

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[46] Another possibility as to why Hull may have assumed some philosophers were arguing that human rights are based on sameness might have to do with a concern that sociobiology is a legitimation of the status quo via argumentation that what was morally right, is what is natural. However, again, quote after quote shows that all of the well-known sociobiologists of the day were denying this (e.g., Barkow 1989, 373; Dawkins 3; Wilson 1975).

> A Darwinian [political] left would...[a]ccept such a thing as human nature, and seek to find out more about it, so that policies can be grounded on the best available evidence of what human beings are like (Singer 1999, 61).

> [T]o say that something is 'natural' is not to say that it is good. There is no reason to adopt natural selections values as our own. But presumably, if we want to pursue values that are at odds with natural selections we need to know what we are up against (Wright, 31).

> Be warned that if you wish, as I do, to build a society in which individuals cooperate generously and unselfishly toward the common good, you can expect little help from biological nature. Let us try to teach generosity and altruism, because we are born selfish. Let us understand what our selfish genes are up to, because we may then at least have a chance to upset their designs, something that no other species has ever aspired to (Dawkins, 3).

> The existence of human nature is not necessarily a reactionary doctrine that dooms us to eternal oppression, violence, and greed. *Of course* we should try to reduce harmful behavior, just as we try to reduce afflictions like hunger, disease, and the elements. But we fight those afflictions not by denying the pesky facts of nature but by turning some of them against others. For efforts at social change to be effective, they must identify the cognitive and moral resources that make some kinds of change possible (Pinker 2002, 172-173).

> In accepting the idea that womanhood is socially constructed and is without any psychological basis, we are already in danger of developing policies that are not in women's best interest...If on the other hand we accept that women and men are different, we can think about a society that breaks down [entrenched] barriers...If evolutionary theory is correct then we cannot design twenty-first century woman as if from scratch. Ideology, social policies, law, and the media cannot in and of themselves make women into something they are not. What we can and should do is give people choices that allow them the maximum freedom to be whatever they want. With that freedom, women's nature can take its own course (Campbell, 32-33).

> Biology is not destiny, unless one ignores it (Barkow 1989, 379).

In citing these quotes, I will not attempt to argue their veracity. However, despite the ongoing depiction of essentialists as somehow conservative, or non-progressive, I would argue that substantial evidence shows that they are one of the few groups of people that search far and wide for *all* the pieces of the puzzle: from biology, to psychology, to

economics, to neuro-science, and so forth. Furthermore, they seem to be one of the only 'politically left' groups to admit there are constraints on thinking, of any kind.

Judging from past history, the great barrier to a truly moral society—or at least a significantly improved one—is, as it has always been, human arrogance. Copernicus dethroned the comfortable notion that our earth was the center of the universe; Darwin dethroned the idea that humans were special of all the animals; recently the idea that our own race, or gender, is special is being chipped away at; and now, one of the last barriers will be the idea that culture escapes biology and that humans simply create themselves equally and in any way they please.

For people like Hull, it appears 'the emperor is finely clothed' and that sheer elbow grease and moral didacticism can solve anything. As philosopher Peter Singer writes, and paraphrasing somewhat, "[to the non-essentialist] education in the broadest possible sense is the great panacea, with the potential to mold human beings into the perfect citizens" (32-33). I would not go so far as to deny that education is the answer to our problems, but this answer needs refinement: we cannot hope to achieve lasting, progressive change *merely* through generic attempts to inspire or shame people into moral action.[47] A 'proper education' and perfect citizenry will require far more humility.

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[47] I am not saying exactly the same thing, but Erik Parens of the Hastings Center makes an interesting comment along these lines—one that many academics from the 'traditional left' might balk at. Parens says: "[if]...it were feasible to genetically 'enhance' human traits and capacities, would there be an obligation to use that power to equalize the opportunities of those whose opportunities are limited by a bad draw in the genetic lottery? Even more bluntly: if is sometimes appropriate to respond to social inequalities with social forms of affirmative action, then would it be appropriate to respond to those same inequalities with genetic, natural, or medical means?...Indeed, one might conclude that it is senseless to treat social disadvantages without treating natural ones, if both are unchosen and both have the same undesirable effects" (28).

Because humans have a nature, some thoughts, feelings, and actions, are easier for us than others—that is to say, contrary to Hull, humans do not exhibit nearly infinite variability.

If education *is* the great panacea, then the 'right education' must begin by finally paying attention to biology, to human universals, and to constraints on good decision-making.

CHAPTER VII

CONCLUSION

> *Perhaps it is no wonder that many scientists...regard philosophy of science as at best irrelevant—'about as useful to scientists as ornithology is to birds.'*
> --Susan Haack (2003, 21)

Since its publication, Hull's paper has been an influential one for academics within philosophy of biology. However, because I find so many claims within it either contentious, or at least conspicuously skewed to favor his thesis, I must confess I cannot appreciate its full significance. In fact, my immediate suspicion is that many of Hull's arguments are partly convincing because of their emotional appeal. Hull's essay, in a 'nut-shell,' is *a vindication of diversity*, and, interspersed within the longer technical arguments about biology as a science, there are many statements to suggest Hull is aligned on the side of various minority groups—something I presume, most academic readers are sympathetic to. I also suspect there is hardly a reader who, at one time or another, has not felt ostracized because s/he did not fit the 'norm.' If so, perhaps Hull's technical arguments make more sense than they really should because, to oppose them, the reader seemingly implicates him or her self as homophobic, androcentric, and so on.

I grant this reasoning is speculative and (Hull might be pleased) philosophically atypical, but I do not think it is entirely misplaced. Hull 'book-ends' his essay with very strong statements defending the idea we do not all need to be the same to have rights. Maybe this agenda gets the better of Hull and prevents him from creating a fair account.

On a less speculative note, it is important to realize that much of the tension generated in Hull's essay (at least for a biology-informed reader) has less to do with the fact that Hull is wrong, and rather more to do with the fact that he has *over-stated* the truth. In other words, technically speaking, Hull is correct to emphasize change and

diversity as a starting point for understanding living things, but his account gives the impression that this is *all* there is. Because this conclusion is so at odds with what we witness in everyday life, I am certain that Hull's hullabaloo on human nature (in this instance) was largely an attempt to balance a perhaps undue zeal for essentialism during the era he wrote in.[48] The implication here, then, is that Hull's view is—if this makes any sense—more 'scientific' within the original context it was presented in.

This brings me to my final point.

After carefully considering Hull's paper, the take-home point I vouch for is that even though scientific practice is *necessarily* informed by philosophical theory,[49] in the end, the two endeavors are often worlds apart—perhaps I might even say they are completely different species. Science successfully proceeds at a level that modestly aims at replicable results, practical application, and further predictability and application. Philosophical practice, on the other hand, is often relentless in its pursuit of perfect certainty and theoretical consistency.[50] This pragmatism and idealism each have their place. However, in this instance, and, at least in the present-day context, philosophical perfectionism might need to be temporarily relaxed. This may be difficult to do when applying science to understanding human beings; that is, at first glance, there appears to be a great deal at stake—and especially considering how often what is 'natural' has been

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[48] One possible reply to this, on behalf of Hull, would be that my own position represents the commonsense view that Hull takes pains to exclude from the scope of his essay. I would counter that I have supplied enough 'science' in my paper to make this dismissal not an easy one to resort to.

[49] Ultimately, the reverse of this should also hold true, although it still does not occur often enough.

[50] Rosenberg makes a similar point about phenetic taxonomy (even though he later goes on to discredit it): "[l]ike all scientific research programs, numerical taxonomy will not allow itself to be detained by philosophy, and it ultimately finds its best argument in the scientific success it can produce" (185).

used to justify what is normal or 'right.' But I would argue that accepting that there are relatively stable facts about human beings—even about groups of human beings—and allowing these facts to speak for themselves, is ultimately a far better method of appreciating diversity. In accurately discerning what we know to be the same, or similar about humans, we then have a foil to properly identify and revel in 'genuine' uniqueness.

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