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POTENTIALISM AND THE VALUE OF AN EMBRYO

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INTRODUCTION

A person arguing for moral status for an embryo based on its potentiality will be referred to here as a "potentialist," and the position argued for as "potentialism." Potentialism has been repeatedly stymied on logical, moral, and scientific grounds. Arguments like Jim Stone's in "Why Potentiality Matters"[1] and "Why Potentiality Still Matters"[2] go some way toward achieving a scientifically defensible potentialism. I will consider whether scientific objections to Stone's potentialism, questioning the postulation of an identifiable individual who continues from the beginning, present necessarily insurmountable problems, and conclude that they do not. Potentiality could be predicated of an instance of human life-form, where that type's (natural kind's) purpose is to instantiate the complex developmental property of capacity to actualize individual consciousness of a certain sort (supporting personhood). Type potentialism need not identify a specific individual who continues from the beginning. Process metaphysics may assist in articulating this view. Substance metaphysics is fundamentally an ontology of discrete *things*, which things possess properties and have continuing identity in virtue of some distinct essence. Process metaphysics instead views dynamical complexes of processes, and not things, as the basic building blocks of reality. In addition, I will depart from Stone by affirming an explicitly teleological approach, drawing upon the notion of "proper function." Finally, I will argue that we require a non-scientistic, though scientifically informed, discourse for the moral evaluation of the embryo. Moral conclusions can be based on what reason tells us about the existential nature of the embryo, along with moral axioms about valuing. In order to imaginatively and emotionally engage with what reason reveals we need a discourse wherein the existential and normative facts encourage actual persons to embrace and connect with human embryos whose nature, like ours, is human. In the latter part of this paper I touch on factors that impede this sort of identification.

The implications for abortion and experimentation will not be worked out thoroughly. It is not my view that the intrinsic moral status of the embryo is the *sole* determinant in moral decisions concerning the life or death of the embryo, though I think it is a primary one. The central purpose of this paper is to explore the basis of moral unresponsiveness to an embryo's potentiality, especially where that is linked to arguments from science.

An almost universally shared moral premise is that human beings qua persons occupy the pinnacle of the value/status hierarchy. Moral agents are capable of moral valuing and decision-making, and have moral status thereby. Moral patients, in virtue of certain characteristics, have a value making them worthy of moral consideration, even if they are not moral agents. Some sort of conscious awareness or sentience is usually considered necessary for both. But capacity for rational reflective self-consciousness is a pre-requisite for moral agency. It is because "persons" are commonly philosophically defined in terms of a cluster of actual psycho-social-behavioral capacities or dispositions including: ability to feel, think, value, communicate, reason, reflect, be self-aware over time, relate, and make principled decisions, etc., that persons qualify as both moral patients and moral agents. And it is in virtue of this dual qualification that they are at the top of the value/status hierarchy. Consequently, the moral domain is mapped in terms of autonomy and the presence or absence of the capacity to consciously suffer or feel.

Infants, mentally impaired adults, and animals do not meet all the requirements of personhood. But they are all consciously aware, and so find their place and consideration for their interests somewhere in the moral domain. Human embryos do not (yet) possess actual characteristics of either personhood or well-developed sentience. Potentialists claim that the fact that human embryos have the *potential* for both moral agency and moral patient-hood is itself morally significant. Potentiality detractors stress *actually* manifested characteristics of entities in placing them on the value/status hierarchy. Potentiality detractors accuse potentialists of incoherently attempting to base status/value on a morally relevant property embryos do not actually possess at the time of evaluation even though they may come to possess it later if they acquire an end state. A common view seems to be that embryos possess minimal, if any, morally relevant properties if they do not have manifested properties indicative of *actual* personhood and/or *actual* conscious awareness, though "gradualists" consider the embryo to increase in intrinsic value as it develops toward sentience and the active expression of personhood characteristics.

1. The Problem with Potentiality Arguments

Potentialists are often charged with either confusing the moral significance of the capacity to acquire a morally significant property with that of having the

morally significant property, or with being unable to say why having the capacity to acquire the morally significant property should itself be morally significant. Potentialist arguments turning directly on the embryo's *future* capacities are particularly susceptible to these criticisms. Jim Stone tries instead to base an argument directly on an embryo's *current* capacities.[3] Letting "P" stand for end state properties/capacities associated with personhood, a *future* capacities argument could be expressed thus:

(P1)
1. The embryo will acquire property P in future;
2. P is morally significant.
3. Therefore, the embryo has the value/status that P confers.

But if morality judges autonomy or sentience to be the basis of P, hence of conferral of moral value or inclusion in the moral domain, and the embryo does not actually possess these, why should the embryo be granted moral equivalence?

Furthermore, a future capacities argument of this type seems an easy target for a certain kind of commonly expressed utilitarian counter-argument. Working backward from the larger moral decision of whether abortion in the circumstances is morally permitted, considering the happiness or interests of all concerned, the utilitarian may conclude that it is. The utilitarian can then argue that, as it is not the destiny of a particular embryo to continue to birth and P, it does not have the value associated with P-potentiality. An embryo's potentiality is thus construed as a contingent matter, dependant on projected outcomes of decisions to be made by other people.[4] To the extent that the outcomes of abortion or destructive research are likely or probable, the probability of the embryo acquiring P is correspondingly lowered or negated, and thus the value conferred on the embryo based on P-potentiality is correlatively lessened or negated. By allowing contingent comprehensive utility judgments to undermine the first premise of (P1), the conclusion of value for the embryo is thus blocked.

This is a manifestly bad counterargument. It runs the danger of begging the question with respect to whether an embryo's value as potential person can in principle prohibit abortion decisions. It does this by construing the very concept of 'potentiality' in terms of future outcomes resting on decisions partly or primarily based on the interests of third parties. By construing potentiality in this way it excludes any purely independent or intrinsic to the embryo grounds of potentiality such as would allow the embryo's value to be weighed against the goods or interests of third-party decision-makers. It seems to me highly questionable to derive the moral status of the embryo from an all-encompassing utility algorithm where the interests of all stakeholders (biological parents, stem cell researchers, possible recipients of stem cell research, etc.) are viewed as contingently possible consequence- or outcome-determinants for the embryo, hence potentiality-definers

for the embryo. Such arguments reveal the need for careful definition of the concept of potentiality in arguing for the embryo's value.

This paper takes the view that an entity's potentiality is not just *any* more or less probable, contingently related, extraneously mediated outcome. Rather, it is the outcome determinable by the processes of a particular nature outworking itself according to its proper function. Probabilities of outcomes dependent on factors and decisions alien to the entity's own causal powers and proper function do not affect the potentiality of the entity, just its chances of fulfilling that potentiality. On this notion of potentiality, it seems one can almost say that in realizing itself, an entity becomes what it fundamentally, in some sense, already *is*. Stephen Buckle's definition goes a considerable way to capturing this notion of potentiality:

> An entity is a potential x if it has the power to become x, i.e., if it will become x in virtue of the operation or expression of properties of its own, given circumstances conducive to the operation or expression of those properties.[5]

I am interested in a present-capacities argument that distinguishes a present *capacity to actualize* a certain sort of nature from *full realization* of that nature. Full realization of a nature occurs in a mature individual who actually exercises and manifests properties distinctive to beings of that kind. I will attempt to persuade that human nature's capacity and proper function is to realize beings with expressed human properties supportive of personhood. And it should thereby count as a present capacity that is already morally significant.

Stone's individualist potentialism can be construed along the following lines (my paraphrase; note that 'P' in this argument does not designate personhood, 'R' does):

(P2)

1. The embryo possesses property, P, i.e., an actual capacity for continued development;
2. P is grounded in an actual nature, Q (the embryo's gene code);
3. Out-working of Q incorporates end-state R (self consciousness) that is a significant value/good for that embryo who is developing.
4. Therefore the embryo has an actual (objective) interest in continued living.
5. So in actually possessing P the embryo has a present morally significant property according to which death is a harm to him or her, and which grounds for him or her an intrinsic right to life which we should respect.

Thus Stone denies that the moral status of the embryo is directly based on the achievement of end or future properties. Moral status rests on *present* and *actual* properties. These ground objective interests of the embryo. The morally relevant properties are identified with an individual's having a certain nature. However, it will be shown later that there is an inherent weakness in Stone's argument related to an equivocation surrounding the notion of the embryo's 'nature.' The ideas of a

type of nature, and a token or individual nature, are not adequately distinguished or conceptually reconciled in his argument. It may be that Stone's account suffers from failure to make sufficient use of teleological insights, relying instead on a substantive materialist and causal basis of continued identity.

2. Individualist Present Capacities Argument

An embryo[6] possesses "strong potentiality" according to Stone insofar as if it grows normally there will be an adult human animal that was once the fetus. It is sufficient for something X to be a potential Y that: (i) X can be an element in a causal condition that produces a Y; and (ii) the matter of X will be, or at least help produce, the matter of Y; and (iii) X will produce a Y if X develops normally and the Y produced will be such that it was once X. "Weak potentiality" includes only the first two of these conditions.

This strong/weak potentiality distinction, if sustainable, can rule out extending morally relevant potentiality to the sperm, or the ovum, or even an individual cell that could be subject to cloning. While the sperm, the egg, and the cell, taken alone in relation to the production of a new human being, may satisfy the first two conditions of potentiality, they do not satisfy the third granting strong potentiality. And it is strong potentiality that is arguably morally significant and underlies premise (iii) in (P2).

Stone's language sometimes obscures his own explanation of strong potentiality, speaking of an X "producing" a Y. But by adding his third condition we gain the ability to shift from the concept of power-to-produce (weak potentiality) to power-to-become (strong potentiality).[7] Eggs, butter, and flour have the weak potentiality to produce a cake. Strong potentiality requires the spatial-temporal continuation of an existing identifiable entity, through changes to itself brought about by its own nature. A house can become a heap of ashes, but this is not the outcome determined by a house's nature, which is to provide a habitable building. An acorn can become a piece of jewelry, but this is not the outcome determined by its intrinsic nature, which is to grow into an oak tree. The sperm's nature is not to change itself into an embryo that grows up: it is to swim to a target, if there is one present, and then expire.

At fertilization an existing egg and an existing sperm come together to form a new distinct entity, not just in conjunction or aggregation wherein they maintain their own identity, and it is this entity's new nature to grow up:

> Sperm and ova share the genetic code of their owners and cease to exist at the moment of conception, zygotes possess their own quite different genetic codes and begin at the moment of their conception.[8]

The emerging embryo then is a substantive and integrated, organized, self-perpetuating whole, whose stages of development are temporally determined

by its possession of a specific genetic code, which is the biological basis of its nature. It is this entity that many strong potentialists argue has linear continuity with the adult it becomes. As we shall see however, this identity claim remains contentious.

Stone's *moral* argument turns on rejecting the idea that only a being that can consciously experience being harmed by death or benefited by life can have a moral right to life. Stone holds that because the development of an embryo is the actualization of a living nature which amounts to the incorporation of a great conscious good for the adult the embryo is becoming, i.e., personal self-consciousness and all it entails, the embryo itself has from the beginning an actual, present and continuing, interest in continued living.

A nexus of concepts is brought together: nature, good, and identity, in an integral unity. Stone describes each of these as 'determining' the other and 'being an aspect of' the other: an animal's *nature* determines a developmental path which preserves its *identity*, the outcome of which incorporates a conscious *good* for the identified animal.

> What the fetus is finally, is something that makes itself self-aware; that good is the fetus'[s] good—this is its nature.[9]

Since the embryo's very nature is to embody and realize its good, it possesses an actual, objectively conferred interest in existential continuation, even while it may not, subjectively, have conscious desires concerning its welfare. The intervention of death is a harm to the embryo in that it thwarts its interest in growing up and deprives the individual of the conscious goods it was his or her nature to make him or herself possess.

> The right to life begins when the harm of death begins, as soon as we get a biologically human creature that can grow up.[10]

An embryo's moral claim to care and protection, then, is based, according to Stone, on its right to life, grounded in a present interest in growing up. Thus Stone offers a *present capacities individualist potentialism*.[11] There is a prima facie moral duty not to deprive a living human animal of its continuation to a conscious good it is *already* his or her nature to realize. This argument requires a definite end state for a definite individual that will be the outcome of a path of development the individual's nature determines. This end state must involve a specific kind of conscious good for the individual. If the initial biological state were compatible with a really wide range of outcomes, so that *no definite conscious goods were determinable*, there could be no coherent notion of a *welfare* for the individual, and thus no way the initial state could ground an interest *of the individual* in developing. So a nature is required to determine the specific good, and continuing identity is required for the good the nature encompasses to be a good for *that particular embryo*, grounding *his or her* interest.

Stone does not base his moral argument on teleological definitions of an embryo's identity-preserving nature. A teleological definition would view the developmental pathway typically followed by an embryo to be what nature "intends" or as what it is the gene code's pre-designed "purpose" to achieve. Stone refers only to "normal" pathways as the "usual" pathways, given evolution and natural selection. Stone insists that his argument need not presuppose either that there are only a very small number of normal pathways that are preserving of an embryo's identity, or that a specific valuable end state is teleologically "contained" in the beginning. Stone dissociates himself from future capacities potentialism by denying:

> that there is any property P such that the embryo should be treated as if she already has P because she will develop P.[12]

Indeed,

> the moral importance of strong potentiality is not that it determines what kind of creature the infant is, but, rather, that it grounds an interest in continued life.[13]

3. Objections to Individualist Potentialism

For Stone, a *nature* (a) preserves the identity of an individual interest-holder, and (b) ensures some end-state incorporating a conscious good for the individual. The process of the individual growing into an adult is described as the individual's own nature being actualized as a conscious good. Thus we have an end state, an actualized nature, which is valued: being a specific person. And we have an initial state, which undergoes actualization. This initial state is also identified with the individual's identity-preserving nature. If we consider nature in relation to the initial state, embodied in the individual's gene code, we could further say that it is the *capacity to grow itself*. If we consider that nature *qua* end state we can say it is the phenotypically expressed properties underlying self-awareness incorporated for a particular grown individual. Now if we want to truly represent our argument as a present capacities and not a future capacities argument we have to explain why nature prior to fulfillment of its actualization, genetic nature merely as capacity to grow itself, should have a significant moral value of *its* own, since we cannot simply help ourselves to the moral value of nature phenotypically actualized in a self-conscious end state of a particular individual.

Stone's attempts to deal with this problem are not wholly convincing. The initial nature of many animals, as instantiations of DNA governed by causal laws controlling gene expression, is also to grow itself. Thus genetic nature per se does not simply in its guise of organic self-actualizer count as morally significant, or a basis for granting moral rights, as our treatment of animals shows. Stone seems unwilling to posit a certain kind of distinctively human state already prefigured as

the end state unique to human genetic nature. Such a nature in its phenotypically expressed state is clearly not present from the beginning. This leaves the causal and logical relation between the initial state of nature and the expressed state of nature open to allegations of manipulability and contingent deviation, disrupting definition of a nature sufficient for the individual identity and outcome preservation Stone's moral argument depends on. Objections around this point form the bulk of the scientific criticisms to individualist potentialism.

I will restrict the terms human 'genotype' or 'genome' to human genetic material insofar as it can be type-differentiated from other species' genetic material. And I will use 'gene code' to refer to a concrete particular (or particularized process): i.e., the specific set of chromosomes in the cellular nuclei of a newly conceived zygote, viewed as a genetic blueprint or algorithm for ongoing organic development of the entity characterized by the gene code.

In a sense, Stone is correct to say the moral importance of potentiality of the human embryo is not that it determines the kind of creature the embryo is. Because in fact it is the kind of creature the embryo is that determines the potentiality is has. But I don't think Stone is clear enough about this. A token nature claim concerns the nature of an entity existing in space-time insofar as it continues on being *this* self-same *individual*. It concerns what makes A A, where A is an organic concrete particular (or particularized process) incorporating a specific gene code. A type nature claim concerns what it is about human genetic nature or biological natural kind-hood per se which makes the capacity of instances of that nature so much more morally significant than the capacities of instances of other types of animal nature.

It seems rational and legitimate, where A's gene code reveals A to belong to the natural kind *human being*, to speak of A's "end" to be to grow itself by means of its gene code into *itself-as-an-F* (*individual instance of humankind*) where *individual personhood uniquely supervenes on F-ness*. A view developed more fully below is that it is the "proper function" or "purpose" of embryonic instantiations of human gene codes to be progressive embodiments of particular persons. It is only when we consider an embryo (A) thus as a token instantiation of human nature viewed teleologically as a type of life-form (being an F), where that life-form is further describable in a metaphysically and morally appropriate way, that a present capacities potentiality argument has a chance of standing up. The task then is to show that we can describe distinctively the human life-form in the metaphysically and morally appropriate way.

We need a metaphysical account of how individual personhood supervenes on biological human kind-hood. This account should illuminate how the mere fact of supervenience generates moral value not dependent on properties of discrete things at separate times. I will try to support the thesis that if a type of life-form understood essentially in dynamical terms is intrinsically valuable, i.e., valuable for what it *is*, then a token instantiation of that life-form that actualizes itself at

a particular time and place can, simply by virtue of being a token of the type, participate fully in the value of the type in a trans-temporal way. These value claims need not depend, as individualist potentialist claims must, on identifying the embryo with a *specific* discrete substantial *thing* (potential person) who exists and continues from the beginning in virtue of some essential property he or she possesses.

Trying to identify the embryo from the beginning with a specific discrete substantive potential person, as individualist potentialism does, is empirically problematic. Natural irreversible identity of an individual seems not to be guaranteed until at least the fourteenth day after fertilization. And given the increasing scope of human interventions it may not be guaranteed even after that.

Some individualist potentialists identify the inception of the potential person with the zygote.[14] The zygote is the original single-cell that results from synergy, i.e., the twenty-four hour process fusing the genetic material from sperm and egg. The original zygote immediately replicates and does not continue as a single substance. Hence Stone believes it cannot be identified with the potential person, not satisfying the second condition of strong potentiality, which Stone takes to require continuity of substance. Only after the first cleavage, about twenty-four hours after conception, is there a discrete organism that develops without further fission, though its cells fission.[15] Cell division within a single substance is compatible with continuing identity. Insofar as embryonic cell divisions are controlled by the entity's own gene code, and not, as with the initial behavior of the zygote, partly controlled by the mother's gene code, the very early embryo can be understood as *growing itself* by virtue of its own intrinsic causal powers.[16] These intrinsic causal powers are fully operative about three days after fertilization.

Objections have been raised to identifying the potential person with the very early embryo. References are made to its cellular toti-potentiality, and the fact that differentiation leading to the separation of embryo proper and embryonic sac has not yet occurred. About six days after fertilization the early embryo has migrated from the fallopian tube and divided to the eight-cell stage. It begins to embed in the uterine wall and is known as a "blastocyst." Implantation is completed by the end of the second week, when the utero-placental circulation system is established. The blastocyst differentiates into the embryonic sac and the embryo proper on which the 'embryonic streak' appears by the fourteenth day after fertilization.[17] The embryonic streak marks the beginning of an embryo's backbone. The budding and speedy growth of its own limbs, nervous system, brain, and organs immediately follows. An embryo proper is now generally deemed to have irreversible identity in that it is no longer possible for it to replicate into multiples (or fuse multiples into singles). Thus not even numerical identity is assured until the embryo is embedded and the embryonic streak appears. Cellular toti-potentiality is only lost completely after three weeks.[18] Even after this an embryo could undergo engineering or environmentally induced changes to its

gene code, which could affect its outcomes. After two months the placenta and protective membranes have separated from the embryo proper, and all the main organs and limbs of the embryo have been formed, from which time the embryo as a tiny fetus is recognizably human.

Stone identifies the potential person with the very early (twenty-four-hour-old) embryo that supersedes the zygote and which, along with the three-day-old embryo, or even the early blastocyst, some others prefer to think of merely as the "pre-embryo." Embryo researchers, not surprisingly, favor the fourteen-day embryo proper as the earliest possible point at which a potential person can be recognized. Many abortion proponents appear to be gradualists, favoring, at the very earliest, the point at which the fetus is observably human, with a recognizable human form.

John Andrew Fisher, in his purported rebuttal of Stone's potentialism,[19] attempts to debunk the postulation of an identity-preserving nature of an embryo. Fisher accuses Stone of confusing the informational sufficiency of the early embryo's gene code with causal sufficiency to bring about a predetermined end for a pre-existing individual. Fisher maintains that a gene code gains its specific meaning and function dependent on the physical uterine context, and that this is alterable in ways that can affect outcomes. So the causal process is not determined from the outset by the gene code in a way that guarantees identity. Artificial wombs or biological engineering could let scientists manipulate embryos (control time of development, correct genetic flaws, introduce genetic material from other species, alter expression of genes, etc.). Thus the outcomes could be significantly phenotypically different from outcomes that would have come about otherwise, perhaps not even conforming to the currently usual end states for human individuals (e.g., bigger brains and different mental capacities; or 'atavistic phenotypic effects from an earlier stage in evolution').[20] Since many different individuals could thus result from divergent pathways, there is no individual whose nature is determined from the outset by its gene code, thus no one to whom we are morally obligated.

I do not believe that Fisher is justified in drawing his morally negative conclusion, even if the empirical facts he cites are plausible. Even if it is the case that we cannot rely on an original gene code to identify a specific individual guaranteed to continue from the beginning, we can still postulate from the beginning the existence of a life that is morally worthy of protection. What does continue from the beginning is a living token instantiation of the type *human nature*, and this instantiation if viable will, *ceteris paribus*, ultimately embody human individuality regardless of any initial inherent ontological, epistemological, or methodological indeterminateness with respect to *who* the individual(s) embodied will turn out to be. Moreover as I will suggest below it is the concept of normal function that will allow us to give shape and substance to these ideas.

Moral gradualists and anti-potentialists define a person as an entity in possession of certain manifested actual properties. There is a time before which the entity does not have the properties and a time after which it does. Thus they conclude there exists a time after which intrinsic value is attributable to the entity and a time before which it is not. Stone does not deny these claims about personhood properties but asserts some *other* properties of the entity that are actual and manifested from the beginning and on which he claims value can be based. Stone assumes that these latter properties continue to inhere to the same and continuing individual whose substantive *identity* is secured by possession of some *essential* property, a particular gene code, which it continues to have. But this identity claim, we have seen, may be problematic.

I will make a case for a potentialism where the primary argument is based on the potentiality of instantiated human life per se, or human natural kind-hood, instead of on an identifiable individual. Admittedly, scientistic bioethicists have argued that it is no more possible to biologically type-differentiate human nature per se than it is to posit an identity preserving individual nature. Researcher and bioethicist Karen Dawson,[21] for example, points to recognizable humans who have an extra chromosome, or who are missing a chromosome, diverging from the standard number of forty-six chromosomes. Gene definition is ruled out because of gene variation and mutation, as well as the possibility of importation of new material through gene therapy or engineering (trans-genetics). Dawson concludes there is no way to biologically define what constitutes *the state (or type) of being genetically human*. If this is so then there is no basis for a concept of human nature grounded in a human genotype, and no type-identifiable basis on which the property of personhood can uniquely supervene. A commonsense proposal by J. T. Noonan[22] that human nature be defined biologically in non-reductive terms as simply: what is 'conceived by human parents,' is deemed unacceptable because of interventions possible through IVF techniques, and because it assumes species breeding true to kind. The possibility of 'transgenic' individuals is raised against the conception of species as 'discrete breeding unit.'[23]

But we do not need to cede the last word to scientistic bioethicists on the matter of human natural kind-hood. In section 5, I apply the biological teleological notion of "proper function" to the human embryo in the context of type potentialism. That account will show why the sorts of deviance Dawson and Fisher raise against human nature or kind-hood are not unanswerable. In any case, whether or not we have available a strict immutable materialist definition, we can accept as a commonsense truth that the physical constitution and configuration of the naturally occurring human genotype *can be* differentiated from that of other animals.' Scientific practices already recognize this. Proposals are currently being made by scientists who advocate setting up a DNA bank in which to store the DNA of endangered species. Thus there may soon be a row of shelves for tiger DNA, or great white shark DNA. The fact that scientists could no doubt tinker

with and alter these samples of DNA, or creatively interfere with their future expressions, in no way detracts from our ability now to materially recognize species type-differentiated DNA types.

A reductive physical vocabulary need not be the only or even the most useful one in relation to legitimate reasoning about biological natural kinds. Theorists and ordinary people generalize over and classify biological natural kinds for many purposes in terms of phenotypically expressed similarities and differences that can be correlated with etiologies and outcomes. Instances of human genotype are by and large reliably and predictably causally correlated, in terms of derivation and outcomes, with instances of a phenotypically expressed life-form that is recognizably uniquely human in appearance and capacity. Intuitively, an account of humankind thus cannot be given in isolation from what are the distal etiology (human parents) and the distal product (human offspring in community) of individual instantiations of the human genotype. And a *human* gene code instantiated in a human embryo can be counted an instance of *humankind* in virtue of its natural derivation from human parentage and its causal and normal capacity to realize individuals who if they engage in reproductive functioning will produce human offspring.

Generally speaking, where natural kinds are found, so are widespread and successful predictive *ceteris paribus* generalizations over instances of the kind. All other things being equal, the intrinsic causal powers of the product of human reproduction reliably predict and result in the self-actualization of human infants, which subsequently grow into human adults. On these facts the world has for a long time turned. Of course they wont do this if they are interfered with or for intrinsic reasons are unviable, but this is covered by the *ceteris paribus* clause governing the generalizations. The kinds of counterexamples Fisher, Dawson, and others use are, because of techno-scientific interference, *cases where all other things are not equal*, and thus do not disprove the existence of the commonsense natural kind.

Potentialism's opponents argue that since potentialists cannot provide either a strict biological definition of an embryo's nature as human type, or as determining a pre-specified continuing individual from conception, no entity or identifiable potential person of moral value exists. According to Dawson, "*if there is no potential person identifiable from the beginning, there is no entity from the beginning who has a moral claim on our protection*,"[24] which view many of those engaged in embryonic research naturally enough hold. Mary Warnock[25] confidently asserts, in summing up the reasoning behind British legislation governing permissible research on human embryos up to fourteen days old, that an individual exists only after the fourteenth day when the primitive streak has appeared, whereas until that time there is only un-individuated human tissue. John Fisher, in his critique of Stone, concludes that

> [i]f the embryo can develop into various different creatures which will be identical to it, then, if these creatures differ from each other in important ways, potentialism collapses.[26]

> [I]f an embryo may or may not develop into a creature with morally relevant property P, then, it cannot possibly be treated as if it were already a creature possessing property P.[27]

4. Can Individualist Potentialism Be Rescued?

Fisher believes Stone has to either cash out 'same nature' in terms of an embryo's 'normal' developmental pathway teleologically understood, or the embryo has the 'same nature' materialistically, so long as it has the same genetic code causally determining development. Fisher thinks the materialist criterion will collapse, for reasons summarized above, forcing Stone back to the normal paths criterion, which is scientifically problematic. Stone will have to say that identity-preserving paths are those 'normal' paths that are predetermined by the embryo's nature. But this would be circular if there is no independent (non-teleological) way of defining what that nature is. The teleological option whereby the normal pathway is the pathway a viable naturally occurring embryo *would* take, because it is in a sense "meant" to take it, if not interfered with or damaged in some way, is ruled out by both Fisher and Stone. Fisher himself contends that the embryo has as many 'natures' as there are distinguishable possible developmental paths, regardless of whether those paths are determined by external or internal factors.[28]

In my view, neither Stone nor Fisher sufficiently sorts out the two interlocking levels of nature (as type/as token) or the way these affect potentialist claims. Stone's treatment of nature straddles the two levels but leaves them ineffectively reconciled. Stone identifies an embryo's identity-preserving individual nature with its gene code, and seems to offer a partly material and partly functional account of it. The same nature exists, hence determines the same individual, so long as most of the genetic material of the original gene code remains in place as the source of the individual's development (material criterion), and as long as the pathway followed determines an appropriate conscious good for the individual realized (functionalist criterion). But propositions about the determination of qualitative end states are best viewed as type-nature propositions. As such they are formally, though not materially, distinct from token-nature propositions. Materialistically, all token embryonic gene codes (the pigeon's, the pig's, and the panther's) incorporate the same intrinsic causal powers. What differentiates gene codes in a way that is morally relevant is what genotype they represent. This is reflected in their type functional roles whereby embodied gene codes of different genotypes reliably result (because they are designed to) in qualitatively different types of

lived end states. That is, what matters is teleologically explained functional roles by virtue of which tokens of instantiated gene codes can be viewed as belonging to different biological natural kinds.

Fisher, from the above (as well as misconstruing Stone as a future capacities potentialist) appears to accuse Stone of holding that it is the token-nature of an individual gene code to grow an individual into a certain natural kind. But it is not. It is because the gene code is already an instance of an existing natural kind or genotype, that the gene code will grow an incipient individual into a mature individual of the sort the natural kind marks. Thus right from the start instantiated gene codes are type distinguishable in a way that is arguably morally relevant.

The impression scientifically minded potentiality-detractors often leave us with is that a particular fertilized egg, conceptus, zygote, or even embedded embryo, could plausibly become or turn into all sorts of things and thus cannot be identified as the beginning of a potential person or anything of significant moral value. In real life however, if we understand as an instance of human life that conceived from gametes of male and female human parents, we know that these products will only tolerate a certain level of deviation before the life is naturally unsustainable. If we take the "viable" zygote to be one which in virtue of its intrinsic properties is such that it would not bring about variations of itself incompatible with gestational survival of a recognizable human, then the vast majority of very early embryos will incorporate properties determining an end state for some highly specified entity(s) which will be a great good to this entity. That is not made false by the possibility that factors could exist to prevent or distort the process of this end being achieved, either by bringing about spontaneous or clinical abortion, or by inducing alterations that affect the outcome of *who* the valuable end state will be achieved for. A viable potential person need not be, from inception, an *in*violable particular person.

Stone (1994) claims only that in order to identify an individual potential person from the beginning, an embryo's original DNA must just be the *primary material determinant* of the embryo's developmental path. Divergent paths of development are unproblematic for Stone so long as they (1) are identity-preserving in that there is spatially-continuous causal-substantive development in which *most* original DNA remains operative, and (2) they determine a definite and particular conscious good for the self-identical embryo if the path is followed through. The conscious good of the end state involves properties resulting from *complete expression* of the embryo's gene code.[29] Although uterine environment can interfere with, and sometimes transiently affect, embryonic development (drugs, caffeine, hormones, etc) there is no evidence that it 'guides development, regulates genetic expression, programs cell differentiation, or . . . significantly determines the outcome.'[30] Thus Stone argues that because intra-uterine factors extrinsic to the embryo do not, normally, significantly determine gene expression

and embryonic development, it is substantively the entity's nature qua gene code which determines both (1) and (2).[31]

But this is not entirely clear. It is the determined end state that constitutes the morally significant good that is the basis of the entity's value. Since it is what is distinctively human about the human end state that morally type differentiates it from other animal end states, giving it supreme moral worth, it seems more accurate analytically to view the type functionalist category of human *genotype* as the determinant of (2), with the token materialist category of individual gene code the determinant of (1), i.e., of particular causally individuated human beings.

Stone's habit of trying to rely exclusively on the concept of an entity's gene code to explain his position leaves him open to subtle but significant objections. We need to see that references to a valued end state shift the logic of explanation up from the token-nature level (of what determines the continuation of A as A) to the type-nature level (what makes A an F). Fisher's criticisms exploit an unresolved tension between these levels of description. If a purely materialist criterion of individual nature and continued identity is being offered, the appropriate level for describing its causal powers would seem to be the reductively physical. But, as Fisher observes, at the purely physical level the causal powers of human genes are just the same as the causal powers of other species' genes. Fisher charges that in relation to nature materialistically construed Stone makes a fundamental mistake:

> Stone characterizes a nature as an 'inner principle' but there are not different kinds of principle in each organism which *make it* develop as the natural kind that it is. The inner principles of genetic development are the *same* for all kinds of organism and have to do with the constitution of DNA and the mechanisms of gene expression.[32]

However if the causal powers of a gene code are said to be to bring about gene expressions that *realize a certain qualitative type of end state* for the individual concerned, the gene code is not being described purely materialistically, but in terms of its being a gene code of a certain teleologically describable genotype. Two levels come together in the living embryo but they are formally or conceptually distinguishable in a way that is important for the moral argument. Viewed purely materialistically, the causal powers of the individual gene code provide for the engineering of phenotypic features of a specific living individual organism according to physical laws. But viewed as an instance of a genotype, the instantiated gene code provides for the supervenience of a qualitatively distinctive form-of-life mediated for developed individuals who possess it by individually realized type-distinctive phenotypic features.

Fisher argues there is no principled way to claim one path was in the embryo's nature, and its potentiality, rather than another. In reply Stone protests:

> It is hard to take seriously the claims that if we alter genetic expression by poisoning, infecting, or depriving the embryo of oxygen, the unusual path she takes as a result is 'no different in principle' from the path she would have taken if we had left her alone.[33]]

But Stone concedes that variations to gene composition and/or expression *could* destroy continuation of identity, of A as A. A might acquire radically different phenotypic features than he or she might have had otherwise. Foreign gene importation Stone allows to be compatible with continued identity so long as its expression would nevertheless still result in end states incorporating the relevant conscious goods for the individual, and do not radically alter major features and functions of the individual animal by changing very many cells in very many places. But by fixing huge genetic deficits through genetic engineering in relation to features and functions involving many genes and traits, an originally existing embryo could be supplanted by a new individual.[34] By allowing this possibility of radically creative modifications, Stone remains susceptible to troubling moral implications for individualist potentialism.

Is the proposition that A remains A if in linear spatial-temporal continuity with A's initial state even if a lot of the deeply specificity-relevant characteristics of A (like personality, intelligence, appearance, sex) are changed along the way by creative gene manipulations? Or would changing deeply specificity-relevant characteristics always require changing many genes involving many functions, in which case A would no longer be A, but have become B instead? In principle, if you accept the mere *potentiality* of scientific interventions that could turn A into B as a real possibility, how can it simultaneously be claimed that all embryos from their beginning have a right to life based on *their* nature as identifiable interest-holders with an interest in growing *themselves* up? That is: A has the right to become and enjoy being A, B has the right to become and enjoy being B. But if A or B have a causal potential compatible with them becoming lots of different individuals, how can the idea of A's interest in growing A's self up and B's interest in growing Bs self up, ground the moral obligations we have from the outset to A and to B respectively? It is the persistence of questions such as these which have lead me to shift the primary focus of defending potentialism from individual to type potentialism.

5. Proper Function and Type Potentialism

Stone's lack of a developed teleological account of an individual embryo's identity-preserving nature seems unfortunate. He prefers to depend instead on a materialist causal criterion of particular identity. The possibility of materially deviant pathways for a particular embryo then threatens ontological assurance of its continuing identity as a specific potential person in a way that undermines Stone's moral argument. Fisher, in his criticism of Stone, seems to assume that any

appeal Stone can make to teleology to rescue his notion of an identity-preserving nature will be illegitimate. However it may be that we can make legitimate appeals to teleology. An application of the biological notion of proper function may enable us to firm up the basic intuition behind Noonan's concept of human nature or natural kind-hood mentioned in section 3 above. What matters with respect to an embryo's nature is its *derivation* from human parents and ancestors, that is, its *history*, not, in the first instance, its own actual properties or possible causal pathways. The identity of an individual embryo will turn out to be a derivative function of the more generally describable and direct proper functions of human nature per se.

The basis and standard of morality is human life. Human life alone brings personhood, autonomy, and moral valuing into the world. It is in virtue of a distinctive mind and psychology that humans are the basis and standard of morality. This is the material fact that distinguishes humans from the other species. It has allowed humans to flourish and proliferate across a range of environments without being the strongest or swiftest. Human mentality employs a highly individualized self-consciousness. Individuals who are persons seek reciprocity through participation in personal relationships and social groupings. Thus humans by nature actively seek the sorts of enduring personal and intimate relationships that best suit the conception, nurturing, and bringing up of human children. So characteristics of personhood (where personhood is intrinsically, objectively, and uniquely, morally significant), as evidenced by the behaviors of human ancestors, provide part of the explanation of why new human beings come into embryonic existence today.

The distinctive mind and psychology that are the basis of human-nesses, thus moral value, are underwritten by an equally distinctive brain and nervous system. The latter are constructed and programmed by gene codes of only human DNA. DNA, in the form of a gene code incorporated as germ plasm in living cellular protoplasm, can be understood as both language and machine. We understand it so not in virtue of lower level physical causes and effects. An existing rich cellular metabolism is needed to provide the mechanism wherein the information encoded by source DNA is accessed, transcribed, functionally interpreted, and causally expressed. Biologically, a cell acts as though it 'knows' which information-instruction to access at the exact time and place. Its pure physical-causal processes are blind, but it acts in its protein-building projects as though purpose-driven. That is to say, later structural expressions depend upon the emergence of prior structures as the necessary context within which subsequent expressions of genes can have the 'desired' effects. Such a complex and dynamical process can only be understood as a whole, in terms of an anticipated end: an animal capable of personhood can only come into existence if certain prescribed levels of organic complexity can succeed one another in exactly the right way. The early organism's cells must implement instructions at exactly the right time: and gene

codes provide algorithms that control the process. So although it is true that gene codes do not have sufficiency of causal powers by themselves, they still have determinative control of causal powers, operating in conjunction with intracellular causal powers in stable contexts or 'normal' organic environments.

Human embryos instantiate potential personhood by virtue of the instances of human genotype (whose function is personhood building) encoded into each human embryo. It is the positive correlation of instances of human genotype and personhood in the past that is part of the explanation of why humans, by flourishing and enduring through the formation of meaningful bonding relationships, can bring into existence new instances of the human genotype today. Thus, adapting the basic idea behind the natural teleology of Ruth Millikan and others, we can say that the realization and embodiment of personhood is the "proper function" or purpose of (only) the human embryo.

According to Millikan,[35] *A* has the *direct* proper function *F* if it originated as a copy of some prior item(s) that, due in part to possession of the properties reproduced, have actually performed *F* in the past, and *A* exists because (causally historically because) of this. The machanism of transcriptions of genes could be subsumed under this definition. A zygote's gene code has the direct proper function to unfold certain biological processes that grow living animals of a certain biological kind, because it incorporates transcriptions of genes that did this in the past, and, in virtue of so doing, the present transcription is able to occur. *A* has the *derived* proper function *F* if *A* originated as the product of some prior device that, fiven its circumstances, had performance of *F* as a proper function and that, under these circumstances, normally causes *F* to be performed by *means* of producing an item like *A*.[36] An individual human conceptus or zygote has the derived proper function to develop a human person who will be the son or daughter of his or her parents. *While an item may have many possible effects or causal trajectories, its direct proper function is the one responsible for its reproduction as a matter of historical fact.* A derived proper function concerns how a new particular item, not directly reproduced by a literal exact andestral model, is generated to perform a proper function, even if it turns out not to perform it on the occasion. For example, because the biological mechanism we call 'imprinting' has the direct function of fixating on and following the first moving object a gosling is aware of, it can be said that gosling Charlie's imprinting mechanism has the derived proper function of—i.e., is meant to, has the purpose of, was intended to result in—Charlie fixing and following Mary, who is his mother. This remains the case even if Charlie first happened to spot Steve the rooster and actually follows Steve around instead of Mary.

Likewise, perhaps we can say that the derived proper function of a human embryo is a progressive embodiment of a *specific* person, even if in fact any given embryo is in circumstances where it fails to turn into an originally specified person. Part of the 'normal explanation' for the derived proper function of human embryos

is the general mechanism of gene replication from sets of parent genes. These reliably result in development of phenotypical functions supporting new instances of personhood. It is the *direct* proper function of human genes to replicate other genes whose function is to engineer and program the unique brain and nervous system. The latter are what underwrite human mental characteristics of a kind that make the difference in human flourishing and proliferation. In virtue of this it is the *derived* proper function of a particular gene code(s) to embody some specific new person(s) from a new combination in time of specific parent genes.

A specific embryo continues to have this derived proper function even if Fisher's and Dawson's imaginary scenarios were to occur. Proper function concerns what, biologically speaking, a human embryo should do, not necessarily what it will do. What it should do is determined by its history.[37] General properties of a given human embryo (its derivation of a gene code from parent genes drawn from the human gene pool) have been correlated with personhood characteristics in the past in a way that is part of the explanation of why this specific human embryo exists now. Any particular embryo's actually going on to embody personhood for itself depends upon an environmental status quo being maintained similar to the one wherein human embryos have been positively correlated with personhood embodiment in ancestral cases. We could refer to these (non-malfunctioning gene replicating mechanisms and the contextual status quo) as part of 'normal conditions.' The 'normal conditions' are the conditions that have *actually predominated* in the ancestral cases. They have resulted in a positive correlation between instantiated human gene codes, i.e., living human embryos, and embodied personhood, in a stable environment, over against genetic entities that are not instantiated human gene codes.

Doubtless, complexities and multiple levels of explanation will face any complete account of the human embryo or gene code in terms of 'proper function.' A more detailed account would advert to: the modus operandi of initial gene replication in humans wherein like reproduces like; the laws governing the human gene-pool which ensure compatibility of genes and minimize the disruptive effects of alleles; the reasonable constancy of selective pressures that have allowed stability in the human genome preserving a well-adapted status quo. But the important principle linking all these would be the idea of human embryos/gene codes, qua personhood-embodiers, as *resulting from* historically prior examples of personhood-embodiers in a way where the distinctive characteristics of fully embodied personhood (e.g., entering personal bonding relationships), are part of the normal explanation of the existence of later examples.[38]

Cloning is possible and stray bits of human tissue in a petri dish, or any somatic cell in our bodies, or even a single sperm or egg, *could*, since it incorporates human DNA, *under certain conditions*, eventuate in the inception of human embryonic development. But these facts in no way undermine the idea that it is the unique proper function of only the human embryo to embody personhood. Your eyes

can twinkle in the sun the way a light is made to twinkle on a Christmas tree. This does not mean that it is the function of your eyes, like that of the Christmas decoration, to twinkle. Likewise, the fact that a given existing human embryo *could* find itself under conditions where it will not in fact result in the embodiment of personhood, in no way detracts from the embodiment of personhood being the proper function of human embryos. As proper function is a normative concept the possibility of 'mal-function' is essential to it. The proper function of a blind person's eyes is still to see. Something can fail in its purpose if the environment does not cooperate. Abnormal conditions could affect the mechanisms of gene replication at conception. This could result in mal-functions blocking the engineering of a brain and nervous system supportive of personhood. Likewise, post-replication technical interventions by scientists could result in radically phenotypically deviant outcomes. Proper functions, however, depend upon actual biologically established historical-etiological background, not on performance of the thing itself. The sorts of deviant events raised above would have to occur in such a way to establish stable histories and law-governed 'normal explanations' of their own before they seriously threaten to undermine the proper function of human embryos.

An individual gene code qua instance of human natural kind, functions to specify and grow a particularized individual of that kind, not the kind itself. *It is because it is the proper function of humankind to realize individuals who are highly differentiated from each other along dimensions going far beyond that of other animal kind-hood, that humankind is uniquely valuable*. The general derivative proper function of human genotype is to unfold the general phenotypical capacities supportive of morally significant full and reflective individual self-consciousness. Particular instantiations of this genotype, in the form of particular token gene codes, have the specific proper function of embodying particular self-conscious individuals distinguishable from others of the kind, in ways that are deeply morally significant.

Scientific objections to potentialism raised earlier deny the possibility of a materialist definition of human nature qua biological natural kind. But these arguments seem spurious insofar as they demand strict, immutable, necessary, and sufficient materialist conditions or explicit definitions of kind-hood, and then proceed to raise speculative causal interventionist possibilities to disprove immutability and introduce vagueness into candidate definitions. The *moral* debate should be the basis upon which decisions about permissible technological interventions establishing new causal pathways for embryos are reached. Thus merely speculative assumptions by researchers and pro-destructive research philosophers about possible interventions should not be allowed to beg the questions simply by shaping the terms of the moral debate to suit their own agendas. In any case, we have seen that the life sciences themselves provide biological-teleological concepts of proper function that may be applicable to the human embryo in a way that

allows one to deflect many of the objections. The proper function of something, which depends upon its actual history and not what its present causal powers will turn out to be, allows us to explain and accommodate mal-function and deviance without these possibilities disrupting the criterion of natural kind-hood.

In thinking of human-kind-hood and its potentiality we need to distinguish three levels: the biological, the psychological, and the socio-relational. The socio-relational depends on the psychological which depends on the biological. The psychological also shapes the socio-relational. You have to already be a human being in order to be capable of becoming a person and you cannot fully be a person without being in relation and community, which depends on the presence of certain psychological capacities. So personhood depends on psychological and socio-interactive capacities, dependent on phenotypically expressed properties correlated only with human genotype, at least on this planet. The biological function and goal of the human genotype is to specify first general, and then more specific, capacities supportive of sentience, rationality, and a high-order individual self-consciousness.

We can think of the proper function of the human genotype as establishing the "what" of biological existence: i.e., a law-governed ordered and purposive program for unfolding organic processes and structures on which rationality and individual self- consciousness supervene. The derived proper function of an individual gene code is to bring about a causally instantiated system determining the "who," whereby rational individual self-consciousness is protected and supported as it comes to be, *for* some particular individual(s). The 'natures' of chicken-kind, sheep-kind, or sea-gull-kind, result in little variation between realized individuals. Because the human genotype prescribes developments whose complete expression incorporates radical and reflective *individuality*, it is of special significance. Human genetic nature is thus intrinsically morally special. It special-ness is not affected by the fact that, materialistically speaking, the proximal engineering feat accomplished by human DNA is no different in principle from that accomplished by other species' DNA.

6. The Intrinsic Value of the Human Life-Form

Potentiality in the form of human embryos is valuable right now because it is equivalent to a nature existing right now whose proper function is *realization of* an incorporated existential end state for specific individuals that is of value, both to the individuals themselves, and in itself. Since the potentiality of any entity intends an end state that will be a good for it, one can only assess *comparative* value by considering the uniqueness of the distinctively human end-state. What is distinctive about the human end state makes it a good in itself. The moral weight of any species of actual biological potentiality is derivative on the moral weight of the kind of target-state it is its proper biological function to bring about. A

current capacities argument, while it need not *confuse* the actual property—of being a human gene code unraveler—with a morally valued end property, must nevertheless *in the case of human life advert to morally relevant end properties* in *saying why* the present property of being a human gene code unraveler should *itself* be considered morally weighty.

The good a genotype underwrites for particular members of a biological natural kind concern the experiential-psychological life-form organisms of that kind ultimately enjoy. The crucial component of *human* good is subjective existence as a highly particularized self-conscious individual. Anti-"speciesist" Peter Singer, in *Practical Ethics*, belittles appeal by potentialists to the uniqueness of the individual who is lost if an early human embryo is destroyed. In this paper I have been emphasizing in the first instance the uniqueness of human kind-hood. But the uniqueness of human kind-hood is integrally linked to the uniqueness of individual human beings.

In attempting to deflate individual uniqueness, Singer raises the possibilities of embryos twinning, or being cloned, as well referring to the fact that many other animal embryos also determine unique individuals. But there *is* a defensible concept of uniqueness in the human case that is very important to potentialism. The form of life that has ultimate moral significance is the life-form experienced by beings who know themselves and morally evaluate themselves and other things. This involves more than sentience or rudimentary self-consciousness. It involves individuality in which people understand themselves as both subjects and objects. Individuality is more than occupying a spatial-temporal zone of conscious awareness in terms of which to interact with the world. *True individuality depends on capacity to reflect on one's life and make meaningful choices for oneself across time.* Individuality is at the heart of what is centrally important about human life and what contributes to the greater human good: viz., love, personal relationships, morality, spirituality, and capacity for originality and diversity in creative engagement with the natural and human world. Individuals interact with the world in terms of integrated, partly chosen and partly discovered frameworks of meaning within which they pursue the continuing narratives of their lives. This could be termed *embodying an individual viewpoint*, as opposed to merely occupying an area of numerically and phenomenally distinct space.

Bio-genetically determined human phenotypical uniqueness is *not necessary* for individuality: thus the facts of twinning and cloning do not affect it. Whereas it does not matter how biogenetically unique, a cow or chimpanzee conception is, it is not of a biogenetic *type* to allow it to realize full-blown individuality.[39] So we need not deny token uniqueness to some animals. But we recognize that the uniqueness they realize does not embody full individuality hence it does not have the moral significance of the uniqueness integral to the human life-form.

To attribute value to a human embryo, we do not have to know *who they are or are going to be* before we begin. We just need to know *that they will be some*

'who' (individual subjectivity) or other (or several). It need not matter whether genetic alteration takes place through the course of development resulting in a *different appearing* individual than would otherwise have occurred, *so long as it remains an individual within the core boundaries of the human genotype which genotype's proper function is to determine capacities supportive of personhood.* An initial instantiation of human DNA may be compatible with several or different individual subjectivities being realized, or with 'changes of mind' during the course of development. None of these empirical contingencies need affect the grounding of value in the instantiated DNA.

The moral view I have been putting is that the potentiality of human genotype makes it a life-form of premium and intrinsic value, and thus all instances of it are *ipso facto* intrinsically valuable. Since any living human embryo is an instance of it, it is itself intrinsically valuable. My claim is that a human embryo, as an instance of the human life-form, participates absolutely and trans-temporally in the value of that life-form. I turn now to whether such a view can be seriously defended. In doing so I will bring together the concept of proper function with a more explicitly process metaphysics approach to the nature of embryonic existence.

7. A Metaphysical Framework for Type Potentialism

If process metaphysics proves more useful than substance metaphysics for capturing the ontological reality of potentiality, it will also be the discourse better suited for moral reasoning about the embryo's value. Stone bases potentialism on a particular thing having a particular nature present almost from the beginning. This nature is equated materially with the entity's gene code, as though the gene code is the property *possessed by* the entity the existent embryo already substantially *is*. But at the very start there *is* no existent over and above the gene code incorporated by the zygote, and it is the development of this original protoplasmic material itself which *is* the ongoing existent being superceding the zygote. The notions we ordinarily associate with substance and property seem to break down in relation to the embryo's inception.

Biological conception and existence may be better thought of as consisting in, and understandable in terms of, processes rather than things. With respect to the embryo, the existent entity present from the beginning can be viewed not as a thing but as essentially a living process or biological program the proper function of which is instantiating an instance of the human life-form, i.e., becoming a person.

Complex biological entities forming natural kinds may be more a matter shared law-governed patterns of functional operations that have been established in response to selective pressures and which unfold distinctive organic programs in now reliably predictive (*ceteris paribus*) ways, than of finding the essential shared properties of substantive things. The embryo as living being has development

governed by the anticipated end it is its type proper function to realize. Natural process by its very nature passes on to the future a construction made from the materials of the past.[40] So in the embryo's case there is a material continuation. But, *pace* Stone, the material gene code need not remain essentially the same *thing* for the embryo to retain is identity as a potential person. The embryo's present constitution projects itself into an as yet unrealized but nevertheless intended future. Personhood preservation remains the intended pathway for an incorporated human gene code, even if its genes are interfered with, so long as the entity remains within the laws governing the behavior of the human gene pool and provides a positive correlation with personhood. Personhood preservation is the function replicated human genes serve in virtue of the history of the human genotype. In virtue of this history a given embryonic temporal structural unfolding across time amounts to the unfolding of a personhood-characterizing *program* through determinate stages in a way that realizes a particular person. This remains its proper function even if abnormal conditions prevent it or alter who the person realized is.

In sum, *the self-identity of the processes of embryonic existence obtain because its stages are united by virtue of being assembled by the systemic functional agency which it is a human gene code's proper function to be, according its history and underwritten by normal conditions that establish law-like regularities*. The human genome comprises a natural kind in virtue of the fact that its proper function is to implement processes outworking a distinctively human common project with a common goal, issuing from a common lawful and adaptively established mode of operation. We do not need to locate an original and continuing substantive entity with a materially inviolate gene code in order to classify an instance as a member of human natural kind, and we need not deny that some of the same physical laws govern the instantiated life-forms of other species.

The human life-form is a dynamical existence which necessarily realizes itself through particular instances realized in time. Given the normal function of human genotype, instances realized in time can be viewed as stages of personhood-supporting humanity-embodiment, each stage dependent on earlier stages in existential continuum. Biological human-ness is the sole patent for embodied subjective individual consciousness, or personhood. Embodied subjective individual consciousnesses necessarily come into existence temporally as processes that are potentialities to be actualized. In light of this I would argue (1) if qua type, the proper function of a biological nature is to uniquely specify embodied personhood, and (2) if instances of this type are deemed to be highly and uniquely intrinsically valuable; and if (3) by necessity and ontologically, all instances of this type come into existence only as temporal processes whose identity is derived from their law-governed biological purpose, and hence (4) are vulnerable while temporarily dependent, then (5) given that, prima facie it is an acceptable moral axiom that we should judge what is intrinsically valuable and simultane-

ously vulnerable to deserve protection (6) it follows that an appropriate moral response to the existence of a human embryo is to accept toward it a duty of care or protection.

The argument just sketched supports an all or nothing view, in contrast to the more pervasive "gradualist" positions like the one expressed by Mary Warnock:

> there need be no instant when a conceptus becomes an embryo, an embryo a fetus, a fetus a baby. And as the development goes on so we accord more importance to that which is developing. . . . [U]nless one is blinkered by a dogmatic commitment to the idea that all human life is *equally* valuable, it would be difficult to deny that we value the human embryo more the further the pregnancy has lasted.[41]

But moral reasoning, I am arguing, *should* lead us to the view that if human life-form is itself valuable and temporally actualized then all temporal instantiations of human life should be recognized as equally intrinsically valuable. If moral weight is directly attached to a *type* of potentiality itself, and not only to actual end properties of a token individual, then there is no reason to attach more moral weight to an embryo at a later stage of development than at an earlier stage. The moral weight of the life-form is based, it is true, on the qualitative end properties it is the proper function of human embryos to realize. But the moral weight of the embryo as a token of the life-form is itself based simply on its being a token of an essentially process-ive type.

The human life-form, essentially a self-actualizing life-form of the highest order, should be valued in its temporal entirety because temporality is essential to its being. An entity is either an instance of it, or not. So neither degree of complexity underlying the embryo's development, nor transient location in the hierarchy of actualized sentience, nor the way these factors affect the natural attitudes of other's toward it, should undermine reason-based judgments concerning its value. Ontologically, human life qua *type*, is valuable in virtue of the distinctive proper function of that form of life, only fully realized through processes in time. Human life qua embryonic *token*, participates in that value simply because if its *actual and present property* of *being a token of that type*.

It is time to try to draw together some of the threads of this paper and be clearer about what precisely the argument is or, to be effective, needs to be. Consider the following possible argument:

(P3)
1. H-ness (Human Nature) has intrinsic value.
2. *x* is potentially H.
3. Therefore *x* has intrinsic value.

This is *not* the argument I want to put. My argument is that H-ness has intrinsic value, in virtue of what it is its teleological proper function to be: (if anything has value, it does, as it alone is designed to realize individualized consciousness, which is the source of all valuing.) On my argument, *x* (a human embryo) is *actu-*

ally, not 'potentially,' an instantiation of H-ness (even though it has not realized individualized consciousness). It is simply that *being* an instantiation of H-ness entails *being* a potentiality of a certain sort. The nature and purpose of this life-form is to realize individualized embodied self-consciousness or personhood. Realizing personhood/consciousness necessarily entails being at some temporal stage of H-existence. An early embryo is at a very early stage.

As it stands, (P3) is another failed version of future capacities potentialism. As it is fully expressed human nature that is the basis of the kind's value, and *x*, according to (P3), only potentially has expressed human nature, why should *x* now be granted that value? Whereas I am arguing that in *actually being* a potentiality of a certain H-ness kind, *x* is *already* of intrinsic value. This argument turns on present capacities of human nature understood dynamically and in the teleological framework of proper function. The argument being put is not directly based on future capacities of individual embryos. Indirectly, it has implications concerning the projected and intended future capacities of individual embryos, by virtue of these being recursively derived proper functions of human genotype understood more generally.

Now consider another possible argument (P4).

(P4)
(1) H-ness has intrinsic value.
(2) H-ness is realized only as embodied instances of H-ness.
(3) Realization of embodied instances of H-ness *necessarily existentially requires* H-ness-instances to exist as H-type potentialities, i.e., as entities whose proper function is to develop from an initial primitive state across sequential temporal segments to culminate, by means of their own internal determinations, as fully functionally expressed individualized instances of H-ness (though not necessarily one individual rather than another.)
(4) Therefore, each existentially temporal stage of H-type potentiality that *is* (constitutes) an H-ness instantiation, has intrinsic value.
(5) Therefore, given the vulnerability of dependent stages, and moral axioms about protection of the valuable-vulnerable, we have a duty of care to protect H-type potentialities qua instances of H-ness (i.e., protect human embryos).

(P4) captures much of the position I have been working toward. But the interim conclusion (4) requires further support and explanation. Premises (3) and (4) together contain an ambiguity: it could be meant that each instance of potential H-ness per se has intrinsic value, or that each instance in a sequence culminating in a fully realized end state has intrinsic value retrospectively in virtue of that end state. I intend the former. I have maintained that teleological class membership is all that is required for entry to intrinsic value. In rejecting contingent future capacities potentialism I have argued that value be postulated somehow a priori, applying equally across all temporal stages of instances of H-ness. But why should this be so, especially if a particular embryo is in fact seriously 'defective' and thus, while remaining biologically human, will never manifest to a significant

degree fully expressed H-ness which grounds the value of the human life-form? Even for non-defective embryos, it still cannot be taken as self-evident that granting intrinsic value to the human life-form per se has the further consequence of importing value onto its instances trans-temporally and distributively, rather than gradually and accumulatively.

What is being proposed, in relation to (P4), is that a human embryo, as a token of H-type, where H-ness has value, itself has value *synchronically*. The embryo has that value wholly insofar as its value is considered at any time in its development. If we ask why H-ness is valuable, we have to return to the teleology of the human geno*type*. We have to ask what makes the human genome morally distinctive as a biological type. To understand this distinctiveness we have to grasp the proper function of processes reproduced with the human genotype with regard to its historical correlation with personhood. Process metaphysics combined with the concept of proper function allows us to *intrinsically* view the intended ends in understanding what the *nature of the process* is. As a multiply instantiable life-form, the human genotype is most highly valuable for the peculiar qualities of the life-form it is designed (in the sense earlier outlined) to progressively manifest in its mature temporal expressions. Synchronic transference of value to the embryo is based on the reality that even immature expressions of human life-form exist as one hundred percent tokens of the essentially temporal and dynamical type, and recognition that the very existence of the life-form, which is the basis of all value and valuing, depends on temporal continuance of H-instantiations.

By addressing these considerations we may be able to formulate a final version of type potentialism:

(P5)

(1) For all valuers, H-ness must be a life-form of premium and ultimate value, in virtue of its uniquely grounding the possibility of all valuing;
(2) H-ness instantiations are type-classifiable by virtue of their derivative proper function based on a common derivation and (personhood supporting) project, unfolded according to law-governed functional regularities vested in direct proper functions of human DNA;
(3) H-ness instantiations are necessarily realized as token progressive embodiments (processes) of H-ness in space and time;
(4) H-realizing instantiations, since they exist ontologically as processes, are evaluable as dynamical whole's;
(5) The significance of a biological process as a whole depends on the proper function it realizes in constructing its present states from the material of its past states in light of its projected target state, and not on the basis of causal or otherwise manifested properties exhibited by it as a substantive entity and which characterize it at some but not all temporal points of H-realization;
(6) Therefore the value of particularized instances of H-ness is intrinsically possessed in its temporal entirety by the instantiation, regardless of *who* is being realized or what temporal stage they are temporarily at.

The synchronic attribution of value to the embryo is not the attribution of an a-temporal property. The attribution rests on a formal analytic judgment. At any point in time, across the embryo's development, when we say what the embryo *actually is*, ontologically, we can truly say it is a full and not partial dynamical instance of human life, wherein its current actual states are the determinants of its imminent actual states. An individual human gene code functions according to the human genotype. Thus the imminent actual states of an embryo, by virtue of these capacities of its gene code, are functionally-teleologically designed to culminate in the fully qualitatively expressed embodiment of the human life-form. And this life-form the embryo at all times *already is*. The form of life has intrinsic value for what it *as a whole does* (that is, its proper function is to unfold processes on which personhood processes unfold themselves). Value is not based on what any particular temporal stage of its instantiation, viewed as a distinct substance or thing, *does* at any one temporal stage.

Since a particular instance of the life-form comes into existence as a temporally-spatially located embodiment, then, by virtue of the points made immediately above, the particularized entity realized by a human gene code *essentially* participates in the value of the life-form across the totality of its lived localized temporal developments. The mere fact of the necessary temporality of instantiations of this intrinsically valuable process-ive life-form is the basis of value transference to instances as wholes, and not some late emerging qualitative properties an existent, viewed as a substantive entity, may come to possess. The *nature of human life-form* per se can only be grasped in its essentially dynamical ontological reality. Therefore, I am suggesting, the value attributable to this life-form, in view of its uniqueness as a basis for valuing, should be viewed as temporally indivisible in its particularized instantiations.

It is factually true that immature stages of the human life-form do not discretely manifest the properties on which the value of the life-form per se is based. Furthermore, some 'defective' embryos, if left to develop, will never attain those properties.[42] However these embryos may be viewed nevertheless as flawed instantiations of H-ness. From a moral perspective, defective embryos, since their small numbers will not significantly distort the functional pattern that distinguishes the biological natural kind, may be counted by us as co-participators in the value of H-ness, since they are in fact (if imperfectly) participators in the human life-form which is valued on the basis of its proper function and not on the actual causal properties of individual instances.[43]

The potentialism I have argued for is essentially one proposing that in the case of living human embryos it is the ontological fact of *shared human life and origin* that is the important one for moral valuing. As each embryo is a living token of this type equally with us, indeed is a work in progress if not interrupted or abandoned, it should be valued accordingly. I am not assuming that the ontology of the embryo alone dictates this 'ought.' But the ontology of the embryo logically

permits and makes coherent, in a way anti-potentialists have denied, the adoption of such an 'ought' *Pace* Singer and his misplaced accusations of 'speciesism,' biological teleology allows us to say that the dynamical ontological nature of the embryo, as potentiality qua instance of human life, provides an objective if abstract basis for the ought of value and protection, when taken together with other facts about humans and norms of valuing.

8. Science and Moral Reasoning

There appears to be widespread resistance to recognition of, and solidarity with, fellow instances of human life in its embryonic state. This is evidenced by some articulated positions in the abortion and embryonic stem cell research debates.

Where science deepens our knowledge of reality, it can only add clarity. However it can also do the opposite by imposing analytic and ontological reductionism beyond the scope of its own jurisdiction. Science presents us with knowledge of DNA and gives access to developmental biology which was previously opaque to us. But on what basis do we decide this extension of knowledge should change basic concepts of human life and identity in a way that precludes certain formulations of relevance to morality about the significance of potentiality?

The concept of human life needed to consider potentiality and the value of the embryo is one we already possess: a historical one. Science can provide us with explanatory mechanisms filling out our understanding of how reproduction and potentiality work. But science should not force us to forego commonsense moral premises in arguments concerning the value of human life on the grounds that basic concepts could, conceivably, be open-endedly redesigned in the light of projections by scientists, when those projections are both empirically untested and perhaps implausible, and in any case themselves need to be monitored and regulated in the light of moral judgments about the value of human life.

Tension exists between what science reveals and where it makes possible for us to go, and what our spirits and moral health demand we should respect and forebear from doing. By following unquestioningly where science leads we risk harms to metaphysical as well as concrete realities: to values, attitudes and principles. With Mary Midgely[44] I would argue for the rationality of respecting our pre-theoretic intuitions concerning where we are morally wise not to go. Yet we have seen that possible transgression of species boundaries is one of the scenarios both Fisher and Dawson use as grounds for denying a biologically definable human nature.

The non-diminishing prevalence of abortion in a sex-educated, contraception-facilitated society, should be of moral concern to us as a community. Statistics should be treated cautiously, and infanticide and abortion have always existed, but we need to ask whether a perceived and practical degradation of the value of human life in our own society has co-occurred with the increasing volume of

the messages implicitly delivered by both the activities of science and continued assertion of jealously protected 'rights' of some feminists, about the easy expendability of very early human life.

The potentiality of the embryo fails to capture the ethical imagination of our individualistic, liberal, society. Rights are politically asserted and demanded by those with articulate or passionate voices. Embryos are invisible and silent. And many as a result will never live the life it was their purpose in being to live. Factors devaluing the embryo prevalent in our society are not *caused* by science, but may be harder to correct while science is used to persuade that early embryos represent no life worthy of moral value or protection. Any moral philosophy that succumbs to scientism will inevitably embrace anti-potentialism. Proponents of the early embryo's moral value will be dismissed as "yesterday's" ideologues who can be virtuously ignored. In such a context, any efforts, even if grounded in good reasons, to re-connect our imaginations and emotions to embryos as valued human beings face an uphill battle.

To know the true worth of something we need to understand its real or intrinsic nature. Only beings with reason can know the true worth of things. How things appear to be at any one time is not always what they really are. In a world of processes, realities take time to be what they are. On the other hand, there is an emotional explanation for gradualism's attractiveness to us. We feel more emotionally invested in a potentiality that is more fully realized than one less fully realized. This has something to do with a sense of futility. We feel a sense of sadness when time and effort directed to a certain end only just fails to come to fruition: the almost-made-it quality. But these emotions should not affect the judgment of reason on the true nature of a thing and value based on that true nature. If something participates in a certain nature it has that nature one hundred percent of the time, regardless of how much potentiality it has fully realized.

Potentiality always implies vulnerability. This is so because when something's true value is not grounded in what is an immediately apparent, fully realized power, or capacity, or manifestation of the thing concerned, it is at risk of being treated by the undiscerning as would be appropriate to something of lesser value, with a lesser nature. The gifted child may be kept strictly within the standard second grade curriculum; the substance abusing pregnant woman regarded as merely doing what concerns her own body. In many situations, if value was imputed and treatment determined only on the basis of actually manifested or exercised powers, we would live in a very impoverished world. But of course we don't do this, because experience and understanding have taught us otherwise.

What happens then, when we consider the human embryo? For many, a woman's right to an abortion for any reason at any time is a settled issue. It is not considered an acceptable topic of moral discussion. Legislation has been passed ordering the mass destruction of human embryos, as debris from IVF. In this paper we have been considering the true nature of the embryo. It is a living biological

process-ive entity existing as a temporal stage of a complete instance of human life. The proper function of human life is to realize the unique, non-interchangeable self-consciousness of personhood that is the basis of moral value. Any particular human embryo has the derived proper function to be some particular person or other. *An instance of the human life-form is thus an instance of what essentially is a form of morally valuable being-to and being-for itself.* It is never merely a "part" of a woman's body or a piece of human tissue frozen in a test-tube.[45] If a viable embryo were destroyed, it would (under normal conditions) have been at least one specific individual like us, with the enormity that entails, whose intended existence was denied it. This is the *reality* that our theoretical knowledge, if not our emotions and imagination, reveals to us.

Several factors, besides interests of the already-born, may help explain indifference to the embryo. Images matter. Epistemologically, we have until recently been unable to directly observe the early embryo. We have also self-censored ourselves from viewing the reality of what abortion across the range of legally permissible stages involves. What we have seen in the text books about the very early embryo looks decidedly "un-human." The terminology of "synergy," "zygote," "blastocyst," "gastrulation," entirely appropriate in the context of clinical embryology, does not when transported into the moral debate foster in us recognition of or connection to a new living human being. Recent new photo-imaging techniques reveal to us for the first time how surprisingly early recognizable human traits appear in the developing embryo. We have here an example of the tension between science and concerns of the spirit. Science is providing this humanizing knowledge by means of the very technologies that have been associated with increased disposal of embryos.

What can instill a sense of wonder in us at the creation of human life per se if we are devoid of a metaphysics of the spirit? Rational beings cannot make intelligible sense out of complex biological organic behavior without speaking in terms of design in nature. The kind of scientism that is hostile to all teleological-purposive explanation, natural and non-natural, is sometimes itself an ideology. While this paper has considered only natural teleology in seeking to deflect the scientific objections to individualist potentialism, one is sometimes caused to wonder whether only a higher-order non-natural teleology could be the factor required to make the difference in inspiring spiritual solidarity with human life so easily disregarded in the form of the human embryo.

9. Conclusions

Evaluation of potentialism has been distorted by the arguments of overly scientistic philosophers and scientists. This has come about by philosophical deference to arguments seeking to re-define the discourse in reductivist terms, while offering speculative and morally questionable scientific interventions as

reasons for abandoning otherwise morally appropriate descriptions of human nature and identity. My own proposal of type-potentialism has been developed partly to accommodate scientific arguments questioning the possibility of identifying from the beginning an individual potential person as recipient of our moral consideration. Even though in the general course of events, in the vast majority of abortion decisions, an identifiable potential person is not in question. However we cannot avoid the fact that science has confronted us with new possibilities. We should not shy away from new knowledge, but neither should we be intimidated by real or imagined scientific technologies and discourse into abandoning acceptable humanistic frameworks for moral reasoning in relation to new human life in these troubling contexts.

Rationally acceptable frameworks seek consistency in evaluation, evaluate according to the true nature of things, and take potentiality into account as a morally significant consideration. Potentiality in the human embryo amounts to being an instantiation of human life, and thus the temporal inception of a developmental program of personhood morality makes the basis and pinnacle of moral value and meaning.

I do not suppose that we have a duty to protect every potentiality: I discard some seedlings in my garden to give other seedlings the space to grow. The force of my appeal is that (1) human life-form, which necessarily comes into process-ive existence as potentiality to be actualized, is *uniquely* significant in its existential and normative import; that (2) in its fully realized instantiations it occupies the pinnacle of value, and is the basis from which all moral valuing proceeds; that (3) the human embryo is an instance of that process-ive life-form whose nature is to individually participate in that value; that (4) the moral health of the human spirit and community depends on our using our theoretical or intellectual knowledge of these facts, in the absence of easy emotional or imaginative props, for properly valuing and fostering reverence for and feelings of connection with, very early human life; even if this means (5) accepting a prima facie duty to protect it in all its transmissions and manifestations.

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NOTES

1. Jim Stone, "Why Potentiality Matters," *Canadian Journal of Philosophy*, vol. 17, no. 4 (1987), pp. 815–830.

2. Jim Stone, "Why Potentiality Still Matters," *Canadian Journal of Philosophy*, vol. 24, no. 2 (1994), pp. 281–293.

3. Stephen Buckle draws this distinction in "Arguing from Potential," *Bioethics*, vol. 2, no. 3 (1988); reprinted in *Embryo Experimentation: Ethical, Legal and Social Issues*, ed.

Peter Singer, Helga Kuhse, Karen Dawson, and Pascal Kasimba (Cambridge: Cambridge University Press, 1990).

4. Such as H. Tristram Engelhardt, Jr., who, in *The Foundations of Bioethics* (Oxford: Oxford University Press 1986), p. 122, claims an embryo is only a "possible" person who will only become a potential person depending on whether it will be aborted or not.

5. Buckle, "Arguing from Potential," p. 239.

6. "Foetus" or "fetus" is often retained for the slightly older embryo once its phenotypically human characteristics are sufficiently expressed to be recognizable, with "embryo" used for the earlier stages of development. I usually respect that terminology but am particularly concerned with the status of the very early, hence much more vulnerable, embryo.

7. Stephen Buckle makes this distinction in his useful conceptual analysis of potentiality. Buckle, "Arguing from Potential."

8. Robert Larner, "Abortion, Personhood, and the Potential for Consciousness," *Journal of Applied Philosophy*, vol. 12, no. 3 (1995), p. 243.

9. Stone, "Why Potentiality Matters," p. 821.

10. Stone, "Why Potentiality Still Matters," p. 283.

11. Stone, "Why Potentiality Matters," p. 818.

12. Stone, "Why Potentiality Still Matters," p. 284.

13. Ibid., p. 282.

14. The Australian Senate Select Committee on Human Embryo Experimentation finds 'the embryo (zygote) may be properly described as genetically new human life organized as a distinct entity oriented toward further development.'" *Human Embryo Experimentation in Australia*, Senate Select Committee on the Human Embryo Experimentation Bill 1985. Canberra: Australia Government Publishing Service (1986), p. 25.

15. Stone, "Why Potentiality Matters," p. 819.

16. Mark B. Devorkin, and Eva Devorkin-Rastl, "Functions of Maternal RNA in Early Development," *Molecular Reproduction and Development*, vol. 26, no. 3 (July 1990), pp. 261–297.

17. This is the position defended by potentialist Stephen Buckle in "Arguing from Potential."

18. Teresa Iglesias, "What Kind of Being is the Human Embryo?" *Embryos and Ethics: The Warnock Report in Debate*, ed. Nigel M. de S. Cameron (Edinburgh: Rutherford House, 1987).

19. John Fisher, "Why Potentiality Does Not Matter: Reply to Stone," *Canadian Journal of Philosophy*, vol. 24, no. 2 (1994), pp. 261–279.

20. Ibid., pp. 270–271.

21. Karen Dawson, "Fertilization and Moral Status: A Scientific Perspective," in *Embryo Experimentation*, ed. Singer et al.

22. Dawson refers to views of J. T. Noonan's. "An Almost Absolute Value in History," in *The Morality of Abortion*, ed. J. T. Noonan (Cambridge, Mass.: Harvard University Press, 1970).

23. Dawson, "Fertilization and Moral Status," pp. 45–46.

24. Ibid.

25. Mary Warnock, "Experimentation on Human Embryos and Fetuses," in *A Companion to Bioethics*, ed. Helga Kuhse and Peter Singer (Oxford: Blackwell, 1998), p. 394.

26. Ibid., p. 265, fn. 8.

27. Ibid., p. 266.

28. Ibid., p. 267–268.

29. Stone, "Why Potentiality Still Matters."

30. Stone, "Why Potentiality Matters," p. 289.

31. Ibid., pp. 288–289.

32. Ibid., p. 271.

33. Ibid., p. 287.

34. Ibid., pp. 290–92.

35. Ruth Garrett Millikan, *Language, Thought, and Other Biological Categories* (Cambridge, Mass.: MIT Press, 1984), chaps. 1–2; and "In Defense of Proper Functions," in *White Queen and Other Essays for Alice* (Cambridge, Mass.: MIT Press, 1993).

36. Millikan, "In Defense of Proper Functions," pp. 13–14.

37. Etiological accounts of proper function are most commonly applied to the traits of individuals, and embryos are individual entities, not traits of individuals. But Millikan herself certainly envisages much broader scope for the notion of proper function, exploiting the explanatory apparatus of direct and derived proper functions.

38. Millikan, *Language, Thought, and Other Biological Categories*, pp. 22–23. Also, *On Clear and Confused Ideas* (Cambridge: Cambridge University Press, 2000), pp. 20–23.

39. This is an empirical matter, but I believe my claim is substantiated by objective appraisal of the best evidence. I would not deny that some animals have subjective viewpoints, and even quasi personalities, but this falls short of what I am calling 'being an individual.' It may also be that some humans fail to achieve, or experience the deterioration of, the full status of being an individual. But that does not mean that the creation of full individuality is not uniquely the potentiality of the biologically human genotype.

40. Nicholas Rescher, *Process Metaphysics* (Albany: State University of New York Press, 1996), p. 39.

41. Warnock, "Experimentation on Human Embryos," p. 395.

42. The logic of my position commits me to the view that a defective embryo should be equally valued with all other human embryos, giving us prima facie duty to protect its life. It should be included by choice in the human community, as a member functionally deprived of all the benefits such membership usually bestows. It would follow that it should be provided the best quality life possible, though extraordinary measures need not be taken to extend a life of very poor quality.

43. Arguing that the 'defective' embryo should be counted and protected as a member of the human community does not rule out the possibility that in some cases there may be overwhelming reasons why the termination of its life would be morally acceptable. The moral status of the embryo is an important, but not the only, factor in decisions about abortion.

44. Mary Midgely, "Biotechnology and Monstrosity: Why We Should Pay Attention to the 'Yuck Factor.'" *Hastings Center Report* (September–October 2000), p. 9.

45. Except in the very rare case where it would be sex-indeterminate or a hermaphrodite.