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**Designing Genes: The Moral Permissibility of
Germ Line Genetic Engineering**

by

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ABSTRACT

In this thesis, I discuss the moral permissibility of germ line genetic engineering. In particular, I examine those objections to germ line genetic engineering which, if successful, would represent objections *in principle*. *In principle* objections are those objections which point to some feature or set of features about the act which are either intrinsic facts about the act or are necessary and inseparable side effects of the act. By contrast, objections *in practice* refer to a feature or set of features about the act which are neither necessary nor inseparable side effects of the act. Therefore, while objections *in practice* may be transient and at some later time cease to exist, objections *in principle* are permanent objection to the act.

The Royal Commission on New Reproductive Technologies states that germ line genetic engineering is unacceptable both *in principle* and *in practice* and has thus recommended that any research on, or practice of germ line genetic engineering be prohibited. In this thesis I suggest that the only two classes of arguments that could be formulated as objections *in principle* to germ line genetic engineering are, as I will refer to them, the “Playing God and Mother Nature” arguments and the “Human Nature” arguments. After outlining exactly what each objection entails, I will argue that none of these objections succeed as objections *in principle* to germ line genetic engineering.

Finally, I will discuss some positive arguments for the permissibility of germ line genetic engineering by reference to the moral status of future generations. In particular, I examine a rights-based approach and an obligation-based approach to establishing the permissibility and perhaps the obligatoriness of germ line genetic engineering.

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CHAPTER 1

INTRODUCTION

What they were envisioning in principle was that in due course it could become possible to extract from normal human cells the sequence of DNA that was missing from or wrongly made in the patient. Once isolated these could be used as the pattern, the template, for the synthesis by bacterial enzymes of numerous replicas of itself. This is acceptable as a possibility in the foreseeable future. The next step would be the crucial and probably impossible one: to incorporate the gene into the genetic mechanism of a suitable virus vehicle in such a fashion that the virus in its turn will transfer the gene it is carrying to cells throughout the body and in the process precisely replace the faulty gene with the right one. I should be willing to state in any company that the chance of doing this will remain infinitely small to the last syllable of recorded time.

Burnet (1973)¹

Today we can identify some of the genes which, mutated, are responsible for cystic fibrosis, Duchenne muscular dystrophy, adenosine deaminase deficiency and several other hereditary disorders. More will be discovered. Already we are beginning to be able to moderate some of these diseases. Fairly soon we should be able to introduce undamaged genes into the germ cells of afflicted patients and so correct such disorders for generations to come...In time we shall learn the genetic bases, such as they may be, of social inadequacy, criminality, and other behavioral aberrations – even, perhaps, of aspects of intelligence and creativity.

Postgate (1995)²

And such begins the discussion of genetic engineering. It is not an uncommon problem in the ethics of technology that our discussion of the moral issues surrounding the new developing technology lags far behind the technology itself. Then, when the possibilities are actualized, we are unprepared to deal with them in a morally responsible manner. As Jonathan Glover notes

Our present wave of problems exists partly because modern physical technology has come too early in our social development: before we have outgrown our tribalism and our wars of religion. The parallel danger is that biotechnology will come too soon, and we will shut ourselves into a world more cramping than we need. We may fall into what would seem,

¹ Burnet, M.. (1973). *Genes, Dreams and Realities*. Harmondsworth: Pelican. p.81. Sir Macfarlane Burnet was one of the most eminent geneticists of his time. He was awarded the Nobel Prize for medicine and held the Order of Merit.

² Postgate, J.. (1995), "Eugenics returns" *Biologist* 45: 96.

from the viewpoint of a more developed consciousness, to be a contented stupor.³

Any moral society must consider the various technologies we are likely to see actualized in the early years of the approaching new millenium. This becomes particularly important as the prospects for manipulating the human germ line become more and more real. Nothing is likely to have a more intimate effect on our lives than the engineering of our own DNA – our “immortal coils.”

The purpose of this thesis is to examine some of the arguments against germ line genetic alteration. An emphasis will be placed almost exclusively on those arguments which are *prima facie* objections *in principle* to germ line genetic alteration. The ultimate aim of the thesis will be to show that such objections either collapse into objections *in practice* or else are not cogent arguments at all. Finally, I will spend one chapter attempting to formulate some plausible arguments in favor of germ line alteration. I will provide a more detailed outline of my approach later in this chapter. But first, let me introduce some of the working distinctions in the literature.

1.1 Distinctions

Each individual has two distinct cell lines in their body. Somatic (from Latin for “pertaining to the body”) cells are those cells containing a full copy of the individual’s DNA and comprise the bulk of our cells. The genes found within these cells are not transmitted to offspring but rather are limited to the individual. Germ line cells are those cells stored within the reproductive organs and include spermatozoa and ova. The genes found within these cells will be transmitted to any offspring the individual produces. This

³ Glover, J., (1984), *What Sort of People Should There Be?* Harmondsworth: Penguin. p.186.

leads to the first distinction needed to discuss the morality of genetic engineering. Human gene manipulation involves either the introduction of genetic material into humans or the modification⁴ of existing DNA in humans. *Somatic cell gene manipulation* introduces genetic material into, or modifies the genes of, the somatic or non-reproductive cells of the individual. Manipulations are therefore limited to the individual undergoing the procedure and consequently, any changes made to the genes are not inheritable. By contrast, *germ line gene manipulation* is the manipulation of the germ line or reproductive cells of the individual, thus targeting future unborn persons and any changes to the genetic composition will be transmittable from one generation to all subsequent generations. Germ line genetic engineering may also be the effect of gene manipulations performed on embryonic or early fetal gene therapy if the cells are not yet differentiated.⁵

In addition to the somatic/germ line distinction, manipulations may be further characterized by the intention of the manipulation. Manipulations performed on the somatic or germ line cells of the individual with the purpose of correcting a genetic disorder are termed *gene therapies* or *alterations*⁶, respectively. These procedures are referred to as “Negative Genetic Engineering”. Manipulations performed on somatic or

⁴ Currently, methods of insertion are being employed, modification of existing genes is much more complicated involving replacement of a faulty gene by gene surgery and is likely not to be available until more refined methodologies are developed. But as mentioned previously, that the technology is not yet available ought not to and will not limit my discussion of the ethical ramifications of such technology when it does become available.

⁵ Immediately following conception and the initial cleavages, the cells of the embryo are *totipotent*. That is, they are as of yet undifferentiated and therefore retain the potential to become cells of any part of the ensuing fetus’ body. This raises the possibility that even somatic cell gene manipulations performed on early term fetuses can have germ line effects. This point will be discussed in greater detail in the next chapter.

⁶ There is a strong resistance to use the term “therapy” in the context of germ line genetic engineering due to the fact that “therapy” refers to the treatment of an actual, existing person. Germ line manipulations instead involve gametes or embryos, neither of which are actual existing persons. Therefore, in this thesis, I will refer to the genetic manipulation of germ line cells for the therapeutic purposes of future persons as “germ line gene alteration.”

germ line cells with the purpose of enhancing or improving certain normal characteristics are termed *gene enhancements*. Somatic and germ line genetic enhancements are referred to collectively as “Positive Genetic Engineering”. We now have the main technical distinctions to work with and a table may be useful to summarize.

Table 1. The Classifications of Genetic Engineering

TYPE OF MANIPULATION	PURPOSE OF MANIPULATION	TARGET CELLS	TARGET INDIVIDUALS
Somatic Cell Gene Therapy (SCGT)	Therapeutic	Somatic	Only recipient of treatment
Germ Line Gene Alteration (GLGA)	Therapeutic/ Preventative	Germ line	Future persons
Somatic Cell Gene Enhancement (SCGE)	Enhancement	Somatic	Only recipient of treatment
Germ Line Gene Enhancement (GLGE)	Enhancement	Germ line	Future persons

This is probably a good place to mention that the positive/negative distinction is not a straightforward one. The question of where therapy ends and improvement begins is not merely a medical/biological distinction, but also a normative/value distinction. The distinction is not clear for a variety of reasons and in a variety of ways, three of which I will mention here.

First there is a point about the range of expression of a trait. Obviously normal height is a range of heights rather than one specific height. If, by the application of genetic engineering, we were to increase the height of an individual from the lower end

of the range to the higher end of the range without exceeding the upper limit of normality, would this procedure be an enhancement or a therapeutic intervention?

From a wider perspective, the procedure is not an improvement *beyond* what is considered normal for that particular trait but is rather a movement upwards *within* a normal range. This interpretation suggests that the procedure is neither an enhancement nor a therapeutic intervention, for enhancement requires that we enhance normal characteristics but in our case we've stayed within the normal range, and therapy requires the correction of a genetic disease but again, in our case we're beginning with a state that falls within the normal range.

The second point has to do with statistical averages of the prevalence of certain traits. The averages of certain traits are bound to differ from community to community, and while *this* is normal, it is problematic for the distinction between positive and negative genetic engineering. The problem is that if an individual in a particular community who is normal for a certain trait by reference to the statistical average in that community moves to a community whose statistical average for that trait is, for example, much higher, then that person is not normal by reference to their average. Thus, whereas an improvement of that trait in his community would be considered an enhancement, in the new community, it could be considered therapy. An example may help illustrate this point.

The Mbuti pygmies of the Ituri forest of Zaire have an average height of four feet six inches. The Maasai herdsman of Kenya by contrast, are among some of the tallest men in Africa averaging a height of six feet four inches. Now, suppose we performed genetic engineering on a pygmy child in order to make him taller. This, in the Mbuti

community would be an enhancement. However, by Maasai standards, this would be considered gene therapy.

Finally, there is a point about the straightforward influence of societal values in making the distinction between positive and negative genetic engineering. The phenomenon of *steatopygia* (extremely ample buttocks) is widely observed in many African tribal communities.⁷ In these communities, a woman that is steatopygic is considered a very healthy, attractive and desirable woman. By contrast, by most North American standards, steatopygia is considered an unhealthy and unattractive trait. Clearly what is at work here are the conflicting values of two separate cultures. The way in which this would entail a conflict in the respective positive/negative distinction is obvious – what is normal in one community will be abnormal in another and vice versa.

So what we have is a distinction we would like to be able to use to guide the discussion of the ethics of genetic engineering, but the distinction can't do much work in a broad sense because it is in itself controversial.

Sheldon Krimsky has persuasively argued that there are two potential moral boundaries for genetic engineering: the boundary between somatic cells and germ line cells, and the boundary between the amelioration of disease and the enhancement of normal traits.⁸ But as he has noted also, the first involves a clear distinction but a dubious rule regarding permissibility, whereas the second involves an at least *prima facie* desirable rule about permissibility, but a fuzzy distinction. It can be argued with

⁷ The Webster's Dictionary defines *steatopygia* as "and excessive development of fat on buttocks, especially of females, that is common among Hottentots and some Negro peoples." I want to point out that this definition is not *etymologically* accurate. The word "excessive" is inappropriate since in those cultures where steatopygia is common it is not considered "excessive" but rather desirable and attractive.

plausibility that the concepts of health and disease are *essentially contested*. Some have even argued that the distinction between disease and health has no objective, scientific basis; disease is constantly being redefined.⁹

While I have not nearly exhausted the issues concerned with defining the concepts of “normal” and “disease”, suffice it to say that the characteristics I am here and now concerned with are clear-cut cases of diseased and healthy conditions. For example, disorders such as Huntington’s Chorea and Tay Sach’s Disease will clearly be seen as painful and debilitating diseases by all while characteristics such as intelligence and beauty will undoubtedly be considered targets of enhancement.

1.2 The Current Ethical Status of Genetic Engineering

The ethics of SCGT are not unique to it. Many of the issues raised are the same as those which arise for any other new medical treatment and include benefit and risk assessment (including an analysis of the potential safety and effectiveness of the therapy and the presence of alternative treatments), selection of candidates, informed consent, confidentiality, review boards and allocation of scarce resources. The current literature in the ethics of SCGT is scant and unenlightening because of its relatively strong parallel with other forms of medical treatment – primarily organ transplantation. SCGT is currently used for disorders such as PKU and artery replacement. The benefits are extraordinary, as the procedures are much less demanding on the patient and much less intrusive than, say, open-heart surgery.

⁸ Krimsky, S., (1990), “Human Gene Therapy: Must We Know Where to Stop Before We Start?” *Human Gene Therapy* 1: 171-3.

⁹ For an excellent discussion of the notions of health and disease see Margolis, J., (1976), “The Concept of Disease,” *The Journal of Medicine and Philosophy* 1(3): 238-255; and Boorse, C., (1975), “On the Distinction between Disease and Illness,” *Philosophy and Public Affairs* 5: 49-68.

The issues surrounding GLGA have been much more contentious and morally suspect, consequently generating a much larger pool of philosophical literature. By contrast to SCGT, many authors have been reluctant to give the moral stamp of approval to GLGA because of its distinct intergenerational consequences. The objections have been both constant and stern with warnings of great perils and disaster ranging from the wrath of the Almighty as we attempt to change human nature and engineer individuals to more secularized warnings of tampering with evolution and natural selection. These considerations among many others have led the Royal Commission on New Reproductive Technologies to place an adamant blanket ban on any research on, or application of germ line genetic alteration.¹⁰ Finally, positive genetic engineering, in either of its somatic or germ line forms, has been ferociously attacked mostly based on fears concerning social risks and possibilities of eugenics and has consequently also been prohibited.

1.3 The Focus

SCGT and SCGE will not be the focus of this thesis – I will devote only the following chapter to the issue of somatic cell genetic engineering. The purpose of that chapter will be to question the arguments given for the permissibility of SCGT and against SCGE by the Royal Commission on New Reproductive Technologies. I feel the arguments lack the force taken for granted by most authors. What I hope to show is that to answer the question of whether or not we ought to permit SCGT, a closer examination of the arguments for and against GLGA will be required. The rest of the thesis will then focus exclusively on GLGA.

¹⁰ Royal Commission on New Reproductive Technologies, (1993), "Gene Therapy and Genetic Alteration," *Proceed With Care: final report of the Royal Commission on New Reproductive Technologies* p. 921-48.

The Royal Commission states that GLGA (as well as GLGE) is unacceptable both in principle and in practice.¹¹ The Commission does not however, give a detailed account of what will count as unacceptable in principle or in practice. For the purposes of this thesis then, I will adopt the following terminological stipulations.

In Principle: An act X is unacceptable *in principle* if there is a feature or set of features F about X which are either intrinsic facts about X or are necessary and inseparable side effects of X, and are such that they make X morally unacceptable regardless of the form, intent, possible benefit and time of X.

In Practice: An act X is unacceptable *in practice* if there is a feature or set of features F about X which are neither necessary nor inseparable side effects of X, and are such that they make particular uses of X unacceptable only under certain circumstances and only at particular times.

Objections *in practice* need to identify some feature which is contingent to GLGA such that *if* the feature obtained, then GLGA would be morally impermissible. So what makes GLGA objectionable is not the act itself, but rather the property which is contingently associated with it. Objections *in practice* thus do not point to anything *intrinsically* objectionable about GLGA. So if the objectionable feature associated with GLGA at some point ceased to be associated with GLGA, and there are no objections *in principle* to GLGA, then GLGA will be permissible. However, that an argument is an objection *in practice* should not be confused with the view that GLGA will inevitably become permissible, for it is possible to have an objection *in practice* that is permanent. Permanent *in practice* objections point to features associated with an act which, though

¹¹ Ibid. 944.

not intrinsic to the act and therefore capable of ceasing to be associated with the act, are not likely to ever be dissociated from the act. Such an objection, if successful would place a more permanent restriction on our behaviour with respect to the act.

Objections *in principle* by contrast need to identify some feature about GLGA that is both necessary and inseparable to it, and are such that it would make GLGA impermissible as a general rule at any time. So while an objection *in practice* still leaves open the question of future permissibility of GLGA, objections *in principle* place permanent limitations on our behaviour regarding that act.¹²

The main focus of this thesis will be to examine those arguments against GLGA which are *prima facie* objections to GLGA *in principle*. Of the arguments presented against GLGA in the literature, there are two which I believe might serve as objections *in principle*.

1. **Human Nature:** This objection claims that we ought not to perform GLGA/E because in so doing, we will be introducing a permanent change in human nature, which is in itself, it is claimed, a morally objectionable act.
2. **Playing God:** This objection may be formulated in both a religious version as well as a secularized version. The religious version states that we may not interfere with the genetic material of future persons since that would entail taking over the role of God which is in itself, it is claimed, a morally objectionable act. The secular version replaces god with her secular equivalent, for example, evolution and natural selection, claiming that it would be wrong to interfere with the forces of nature.

¹² I need to stress that it is only a general rule that could be established and not an absolute rule, for, there may be a situation in which the generally impermissible act could be permissible for the sake of a greater good in a particular instance. This issue will be presented in greater detail in chapters 3 and 4.

In chapters 3 and 4, I will examine each of these objections, respectively. What I will conclude is that neither of these groups of arguments are successful objections *in principle*.

Finally, in chapter 5, I will explore some positive arguments for GLGA based on the ideas first that future people have rights, and secondly that we have obligations owing to future generations. The issue of obligations towards, and rights assigned to future generations is a complex and difficult one to work through. While I do not claim to be able to make any strong conclusions in one chapter, I do feel that for the sake of being thorough, a brief discussion of future generations and their moral status must be included.

Before I move on, I need to clarify a few issues about my approach in this thesis. While I am restricting my discussion to an analysis of *in principle* objections to GLGA, I in no way intend to trivialize the importance of objections *in practice*. I will have more to say on this issue in the final chapter but let me just say that my reasons for preferring this approach have to do with firstly limiting the scope of this thesis and secondly to try and build a foundation upon which further discussions about GLGA can proceed. To try and give an adequate discussion of *all* of the objections, both *in principle* and *in practice*, to GLGA, much more than the space I have here would be needed. So, confronted with the choice between the two kinds of objections, it seemed sensible to focus on the *in principle* objections since, if they are successful as objections to GLGA, then there is no point in even considering the objections *in practice*. Of course however, as I mentioned above, this does not mean that alternatively, if the objections *in principle* fail, that GLGA will automatically be permissible. What it *does* mean is that if the objections *in principle* fail, we can then proceed to see if there is anything wrong with GLGA *in practice*. What

this means is that there might even be an objection *in practice* that is so important that even though there is nothing wrong with GLGA *in principle*, it will still be morally impermissible.¹³ So, the bottom line is that only once we have examined all the objections to GLGA, both *in principle* and *in practice*, will we be able to make a final judgment about the permissibility of GLGA.

1.4 One Final Distinction

If there is one thing that any discussion of genetic engineering, and in particular GLGA, is guaranteed to achieve, it is the arousal of heated emotions. It is not uncommon to hear at the end of a debate, those in strong opposition to the practices say in total exasperation, "I just have a feeling that it is wrong."¹⁴ While ultimately it may be that our "feelings" are the building blocks for our moral principles, though some would of course deny this in anything other than its most trivial forms, a word of caution is needed. We must take care not to confuse our moral feelings with any feeling about a moral issue. My intent here is not to trivialize the feelings of those who are strongly opposed to germ line genetic engineering, but only to stress the importance of considered moral judgment. As John Harris warns

Feelings per se, of course, may well lie at the root of morality itself and it is not impossible that brute feelings lie at the root of any moral principle. But such feelings also lie at the root of many immoral principles and bare prejudices. We know of so many analogous feelings: that women are innately inferior and it is unseemly and unfitting for them to indulge in many 'male' occupations or to appear in public unless swathed from head

¹³ A controversial example here is sexual relations between brother and sister. I would argue that *in principle* there is nothing objectionable about such conduct (note that social conventions do not count as *in principle* objections). However, the *in practice* objection regarding the increased risk of genetic disease among the offspring of incestuous couples may be a strong enough objection to make intercourse between brother and sister impermissible.

¹⁴ Of course these sorts of emotions are not limited exclusively to GLGA/E. One need only recall the ongoing debates on abortion, euthanasia and surrogate motherhood, just to mention a few.

to toe, that many people have felt ashamed to live in a society that permitted marriage between members of different ‘races’, or in which public institutions and resort were not racially segregated, or in which homosexuality was treated other than as a vice so abominable that its mere presence is an offence.¹⁵

So while genetic engineering is indeed a moral issue and we are all bound to have feelings *about* it, we must be wary of constructing any moral prescriptions *based on* those feelings until we are sure that our feelings are appropriate ones.

1.5 Methodology

I need to say a word about the methodology that I will be using in this thesis before proceeding. My approach will basically be one of *wide reflective equilibrium* along the lines formulated by Norman Daniels.¹⁶ The method of wide reflective equilibrium is a procedure for selecting some moral theory consisting of particular moral principles by finding a set of moral principles which can be brought in to reflective equilibrium with a set of considered moral judgments, in a way *constrained by* the best background theories concerning the nature of persons, psychology, social theory, *how* to select the moral theory about principles, etc.

In most of the thesis I will be working mostly at the levels of moral principles and considered judgments. My lack of analysis at the level of background theories, with the exception of chapter 3 which I will discuss in a moment, is due to the fact that the mid-level principles that I will be appealing to are fairly well-established in the literature, and furthermore can be derived from *most* of the leading moral theories. However, in chapter

¹⁵ Harris, J., (1998), *Clones, Genes, and Immortality: Ethics and the Genetic Revolution* Oxford, NY: Oxford University Press. p.157.

¹⁶ Daniels, N., (1979), “Wide Reflective Equilibrium and Theory Acceptance in Ethics,” *Journal of Philosophy* 26: 256-282.

3, although I am explicitly dealing with the human nature objection, I am essentially rejecting one of the background theories – namely a theory about the nature of humans.

CHAPTER 2

SOMATIC CELL GENETIC ENGINEERING

In this chapter I will be examining some of the ethical issues surrounding somatic cell genetic engineering both with respect to therapy and enhancement. In doing so, the need to examine germ line arguments will become apparent. One of the risks of somatic cell gene therapy (SCGT) is the possible modification of germ line cells.¹ Little attention has been given to the fact of this risk and instead something like the Doctrine of Double Effect (DDE) has been assumed and implicitly applied in the justification of continued use of, and research on, SCGT, though more typically the need to deal with this risk in such justifications is ignored or not noticed. In addition to some inherent problems with the DDE, I will show how this application yields inconsistencies within the Royal Commission's recommendations and also how it leads to some bizarre and implausible implications. Following this I will argue that the very sort of analogies that have been appealed to as supporting arguments for SCGT, will also justify the use of somatic cell genetic engineering for enhancement purposes, a procedure currently prohibited. The initially plausible sounding hard lines are therefore, I will argue, beginning to crumble. But first it will be useful to review the current technological status of SCGT.

¹ Elias, S. and G.L. Annas, (1992), "Somatic and Germline Therapy," in G. J. Annas and S. Alias (eds.), *Gene Mapping: Using Law and Ethics as Guides*. Oxford University Press; Lappé, M., (1991), "Ethical Issues in Manipulating the Human Germ Line," *The Journal of Medicine and Philosophy* 16: 621-639; Suzuki, D. and P. Knudston, (1990), *Genethics: The Ethics of Engineering Life*. Ontario, Canada: Stoddart. p.186.

2.1 Somatic Cell Gene Therapy

Given the current limited knowledge of multifactorial gene complexes and their expression², SCGT is limited to single gene, recessive disorders.³ Chromosomal diseases such as Trisomy 21 (Down's Syndrome) are also excluded from gene therapy since the deletion of such large portions of DNA as whole chromosomes is not yet safely possible. French Anderson summarizes the technical criteria for the ethical application of SCGT as follows.⁴

1. **Delivery** – The new gene must be able to be inserted into the correct target cells and must remain there long enough to be effective. This first criterion immediately excludes certain neural degenerative diseases such as Tay Sach's disease since the target cells would be the non-replicative cells of the brain which are not accessible for treatment.
2. **Expression** – The gene must be expressed at the appropriate levels. If the genetic material integrates successfully but the expression of the gene product is insufficient, the procedure may simply keep the patient alive longer than without the therapy without actually curing the disease or even alleviating the suffering.

²Traits arising from multifactorial gene complexes or *polygenic traits*, are those traits, the expression of which relies on the interaction of several different genes. Because manipulation would require a thorough understanding of not only the genes involved but also the mechanisms of regulation of interaction, these traits are currently not capable of being manipulated. Such traits include intelligence, beauty and athletic ability.

³ All traits are inherited in a double copy - that is on two separate alleles. An allele may be either dominant or recessive. The presence of a dominant allele will result in the expression of that genotype regardless of the other allele. The expression of a recessive genotype requires two copies of the recessive allele. For this reason, gene therapy is limited to recessive genetic diseases since the insertion of a new gene would not mask the effects of a dominant gene. Genetic therapy for a dominant genetic disease would require the excision of the faulty dominant gene and replacement with another functional gene.

⁴ Anderson, W.F., (1985), "Human gene therapy: Scientific and ethical considerations," *Journal of Medicine and Philosophy* 10(2): 275-291.

3. Safety – The new gene must not harm⁵ the cell and by extension the individual.

These three criteria are of the same nature as those applicable to new drug administrations, therapeutic procedures and surgical operations. Given this and the fact that the intended subject of treatment is limited to the single individual, SCGT is seen by most authors on the ethics of genetic engineering, as an uncontroversial addition to currently accepted procedures. Suzuki and Knudston write

[T]he application of gene therapy techniques to the blood-forming somatic cells of a person suffering from sickle cell anemia differs little from the use of bone marrow transplants for victims of leukemia. In both cases, cells with genotypes that differ from the patient's genotype are imported to correct a life-threatening genetic disorder. Thus, gene therapy can be seen as the ethical equivalent of an organ-transplant operation – a local transformation in a patient's phenotype, without a corresponding change in the underlying genotype of his or her reproductive cells.⁶

Furthermore, these considerations have led policy-setting committees to endorse SCGT under the same criteria as other medical procedures. The Royal Commission writes

There seems to be no reason to object in principle to somatic cell gene therapy, which can be seen as a natural extension of commonly used medical procedures. For example, people with diabetes who are unable to produce normal amounts of insulin are given this missing gene product by daily injection. If the insulin-producing gene could be inserted into someone with diabetes, the effect would be the same as the daily injection, except that gene therapy would provide lifetime relief. The same permanent result would occur if the diabetic received a tissue or organ transplant, which would also provide cells containing the normal gene. By itself, then, the idea of somatic cell gene alteration does not seem to raise any new moral problems.⁷

⁵ The word "harm" is an essentially contested word in the literature. I will not, in this thesis, embark on a detailed discussion of "harm." Instead, for the purposes of this thesis I will be borrowing from Joel Feinberg the following usage:

An organism is harmed in circumstances C if C involves the impairment of the organism's interests.

⁶ Suzuki and Knudston, (1990), p.183.

⁷ Royal Commission on New Reproductive Technologies, (1993), p.931.

Similarly the Clothier Committee writes

We conclude that the development and introduction of safe and effective means of somatic cell gene modification directed to alleviating disease in individual patients, is a proper goal for medical science. Somatic cell gene therapy should be regarded, at first, as research involving human subjects and we recommend that its use be conditional upon scientific, medical and ethical review. Although the prospect of new therapy heightens the familiar ethical concerns which attend the introduction of any new treatment, we conclude that it poses no new ethical problems.⁸

Consequently, many of the arguments in favor of SCGT come in the form of what I will call *Bioethical – Pragmatic Arguments*. Based on the aim of gene therapy, these arguments are related to the medical context of gene therapy of an individual, therapeutic indication and intention of gene transfer, and place a premium on the physician's duty to cure, efficacy of treatment and risk-benefit ratios. In their most naked forms, these arguments appeal to patient autonomy, self-determination and the duty of beneficence/rescue. The risk of germ line gene modification as a result of SCGT falls under the rubric of risk-benefit analysis. Although I am confident that the majority of arguments in favor of SCGT parallel the usual arguments in favor of medical treatment, and furthermore that these arguments are successful, I am less certain about the defense of SCGT against the germ line side effects, i.e., the application of the DDE. In the next two sections, I will therefore examine the application of the DDE to SCGT and its possible germ line risk.

⁸ Clothier Committee, (1992), p.17.

2.2 The Germ Line Risk

The most effective method of inserting the new genetic information into the somatic cells is via viral vectors. Viral vectors are inactivated or attenuated retroviruses that have the corrective DNA incorporated into their own genome.⁹ Attenuated viruses are those which have been grown under abnormal culture conditions and selected as avirulent organisms. There is an associated risk of reversion to a virulent form and for this reason, the preferred vector is the inactivated form. In this form, the virulent pathogen is inactivated by chemicals or irradiation with gamma rays thus rendering the virus permanently avirulent.

The germ line risk arises in two ways. In adults and children, there is the possibility of what is known as *viral escape*. That is, there is a chance that the virus will “go off route” and travel to the germinal epithelium and transfect the gametes instead of the intended somatic cells.¹⁰ The second possibility arises in the SCGT of early stage embryos and fetuses. As mentioned previously¹¹, there are certain genetic diseases that will only be treatable if SCGT is performed early in development – in some cases before the cells are differentiated. If SCGT is performed at this time, germ line cell DNA is almost guaranteed to be affected.¹² In both cases then, the results of SCGT can yield

⁹ Retroviruses, which can infect virtually any type of mammalian cell, are a common vector used to clone and insert DNA in mammalian cells. They are RNA viruses that contain the enzyme *reverse transcriptase*, which catalyzes conversion of the viral RNA genome into DNA. The DNA then integrates into the host chromosome DNA where it is retained, replicating along with the host chromosomal DNA.

¹⁰ Alias and Annas, (1992); Lappé, (1991); Suzuki and Knudston, (1990).

¹¹ See chapter 1.

¹² Ibid. Also, for a more scientific discussion of this consequence see Brinster, R.L. and R.D. Palmiter, (1984), “Transgenic Mice Containing Growth Hormone Fusion Genes,” *Philosophical Transactions of the Royal Society of London – Series B: Biological Sciences* 307(1132): 309-12. Dec. 4. In the article, Brinster and Palmiter report their findings in an experiment in which the rat gene coding for a growth hormone was microinjected into newly fertilized mice ova. The F1 transgenic mice successfully integrated the gene and expressed an almost double sized phenotype. Upon mating, it was observed that the F2 generations also

inadvertent changes in the germ line cell DNA that will affect all future generations. The operative word here is *inadvertent*. The danger is that any changes that do occur in the germ line have not been “designed” to occur. Thus, the new gene may insert anywhere into the resident genes of the germ line. Experimental results have shown that while insertional mutations do not necessarily represent a health hazard to the genetically modified somatic cells, when reproductive cells in the organism inadvertently suffer insertional mutations, the results may prove more sobering. For example, Orian *et al*, in 1990 found that transgenic mice have multiple gene insertions, higher mutation rates, and a greater propensity to cancer than their normally generated counterparts.¹³ Thus we are faced with a situation in which SCGT with inadvertent germ line effects may have the potential to cause more harm than that which has been attributed to GLGA.

What is curious from an ethical point of view is why the various ethics committees have found SCGT so easily justified in the face of such a risk as the germ line risk, especially given the adamant rejection of any type of germ line genetic engineering be it for therapeutic or enhancement purposes. The answer lies in the distinction between intention and foresight and particularly as it is embodied in the Catholic Doctrine of Double Effect. Lappé writes

From an ethical viewpoint, the eventuality of secondary [non-intentional] germ cell conversion raises more intergenerational problems than does pure [intentional] germ line therapy. While there would be no basis in

displayed the enlarged phenotypes. After DNA analysis, they were able to conclude that the original gene sequence had been incorporated into the F1 mice's germ line cell DNA. These results were not difficult to understand. As Suzuki and Knudston explain, “Because the rat genes were introduced directly into newly fertilized eggs and integrated into resident chromosomes before the cells had undergone the first mitotic divisions of embryonic development, copies of the rat DNA sequence were subsequently distributed to every cell in the mouse's developing body – including its reproductive cells.” (p.187)

¹³ Orian, J.M., Tamakoshi, K., Mackay, I.R., *et al*, (1990), “New Murine Model for Hepatocellular Carcinoma: Transgenic Mice Expressing Metallothionin-ovine Growth Hormone Fusion Gene,” *Journal of the National Cancer Institute* 82: 393-397.

theory to restrict procreation for a somatically engineered individual, the uncertainty of *what* genetic alteration has actually occurred in a secondarily impacted germ line would make procreation of such a person more risk-laden than when there was a reasonable foreknowledge of just how the germ line was likely to have been changed...In principle, a carrier of deleterious genes who accepted a risk for himself in germ line therapy to permit the well being of his offspring and future generations is morally more acceptable than when offspring were inadvertently jeopardized...

This possibility [accidental germ line modification] makes it important to consider the achievement of germ cell engineering as a secondary consequence of somatic cell therapy under the 'law of double effect'. Under this provision of Catholic doctrine, an act which is otherwise ethically objectionable may be morally acceptable if it is the inevitable and unavoidable consequence of carrying out primary morally desirable intervention. Thus, if it is necessary to terminate a tubal pregnancy to save a mother's life, the fact that a fetus is by necessity also destroyed is considered a tragic but acceptable moral consequence. By analogy, if some forms of somatic cell engineering were also to alter the germ line as an indirect consequence of an ethically approved attempt at genetic engineering, they might also be an instance of double effect.¹⁴

2.3 Somatic Cell Gene Therapy, The Germ Line Risk and the Doctrine of Double Effect

Though there are many formulations of the DDE, traced as far back as Thomas Aquinas'

*Summa Theologiae*¹⁵, I will adopt the following fairly standard formulation:

DDE: It is morally permissible for an agent to perform a certain act that has both a good¹⁶ outcome¹⁷ and a bad outcome provided

- a) the intended primary end of action must be good;
- b) the intended means to this end must be morally acceptable;

¹⁴ Lappé, M., (1991). p.626,629.

¹⁵ Aquinas, T., *Summa Theologiae*, II-II, Q.64, art. 7.

¹⁶ I am using the word "good" synecdochically since the end might simply be better than any alternative. My use of the word "bad" should also be understood synecdochically.

¹⁷ "Outcome" is not here (or elsewhere in the discussion of the DDE) to be given a purely consequential reading. Rather it should be understood synecdochically, specifying value or disvalue attached to the act OR its consequences, or any right infringement or failure to perform duty intrinsic to the nature of the act.

- c) the bad outcome is foreseen as a non-intended consequence of the act; and
- d) the good end must be proportionate to the bad outcome (that is, must be important enough to justify the bad outcome).¹⁸

So in the case of SCGT, the intended target of manipulation are the somatic cells and the correction of disease within the individual undergoing therapy. The germ line effect is merely foreseen as a non-intended¹⁹ consequence. Therefore, under the DDE, SCGT is permissible. The formal argument may be stated as follows:

1. SCGT has as its primary intended goal the correction of disease in individuals suffering from the disease.
2. Alleviation of suffering and treatment of disease are morally desirable things.²⁰
3. A possible foreseen but non-intended consequence of SCGT is a change of a kind that, if caused intentionally would count as germ line genetic engineering.
4. Germ line engineering is a morally undesirable thing.
5. BUT, the DDE is true; AND
6. SCGT and its possible germ line effects satisfy the DDE.
7. Therefore, SCGT is morally permissible.

¹⁸ This fourth clause is included in the original formulation by Aquinas and although not commonly seen in more contemporary formulations of the DDE, I include it here for the following reason. In order to avoid the permissibility of an act that has a trivially good outcome and a great evil, the clause must be added such that the good is at least proportionate to the evil produced by the act.

¹⁹ I have deliberately chosen to use *non-intentional* rather than the more conventional *un-intentional*. I am adopting Grice's distinction between *non-* and *un-* first introduced in his example of a dentist who by performing a certain procedure on a patient thereby causes the patient pain. While we don't say the dentist *intentionally* harms the patient, it seems incorrect to say that he *unintentionally* harms the patient since he fully aware, in advance, that the procedure causes pain and he thus comes to expect the pain. In fact, he would be surprised if the patient was pain-free. So, in the same way, SCGT performed on early embryos and fetuses that did not result in germ line modifications would present a surprising exception to what is expected though not properly intended.

²⁰ "Morally desirable" in this context should be interpreted as the synecdochic "good."

Since premise (1) is true *ex hypothesi*, and (I hope) no one would want to say that premise (2) is false, it seems that premises (4), (5), and (6) are the premises that may be attacked in this argument. Skepticism regarding the moral status of germ line genetic engineering as a morally undesirable thing will make my earlier claim apparent about needing to examine arguments for and against germ line modifications before reaching any conclusions about SCGT in light of such a risk. It is not at all obvious that germ line alteration is morally undesirable. In fact, Lappé seems confused as he writes

In theory it would be difficult to object to germ line changes arising as a consequence of somatic cell therapy since they will reduce the likelihood of future transmission of the genetic defect in question, *in itself a morally praiseworthy thing* [italics added].²¹

It is very interesting to note here that “in itself a morally praiseworthy thing” suggests that he believes that there is nothing intrinsically objectionable about germ line alteration. However, the Royal Commission states that germ line genetic engineering is unacceptable *in principle*. This raises the question of course of whether germ line alteration is in fact objectionable *in practice* or *in principle*. This is a question which will be examined in the rest of this thesis and therefore I will not spend much time here discussing it.

But let us assume just for the sake of this argument that germ line alteration is a morally objectionable act whether *in principle* or permanently *in practice*. Two problems

²¹ Lappé, (1991), p.630. Lappé’s facts here are somewhat inaccurate. It can not be known whether in fact the germ line effect will be a positive one: i.e. the reduction of the transmission of the genetic defect. As mentioned previously, given the fact that any changes that occur in the germ line as a side effect of SCGT will be undirected and spontaneous, the likelihood of adverse effects is more plausible. However, for the purposes of examining the DDE and its application to SCGT, the nature of the germ line effect is rather inconsequential. Therefore, I will assume for the remainder of this chapter that any germ line effects would in fact confer similar effects as the SCGT to future persons.

arise with respect to step (6) – that SCGT and the associated germ line risk satisfy the DDE. Recall the fourth criteria for the application of the DDE: the good end must be proportionate to the bad outcome (that is, must be important enough to justify the bad outcome). Would this be the case with non-intended germ line modification? Probably not. Given the effects of germ line modification are intergenerational, it is a bad effect that would be multiplied through all generations to come. The benefit of SCGT – namely the correction of disease in one individual – is limited to a single interval in time, precisely the life span of that individual who has undergone the SCGT. It would seem then that premise (6) is false. That is, SCGT does not satisfy the DDE since the negative outcome would outweigh the positive. This would make SCGT impermissible by appeal to the DDE. Proponents of SCGT would then have to come up with some more powerful arguments for allowing SCGT in the face of germ line effects.

Finally, one may question the truth of premise (5). There are inherent problems with the DDE and these are most apparent when considering the cases of embryonic and early fetal SCGT. Can we logically separate the intended and foreseen outcomes for every act? The reality is that we may not be able to define ‘intention’ narrowly enough to distinguish between those outcomes aimed at from those brought about but not aimed at. This has been a longstanding problem for the DDE. In many cases, it allows for too much and permits those things that proponents of the DDE want to prohibit, namely the negative outcome being intended rather than foreseen.²² An example will better illustrate this point. In the famous case of Captain Oates who “walked out to a certain death in a

²² My point here should not be misunderstood as the epistemological point that in some cases it is hard to tell which outcomes are intended and which are merely foreseen – indeed sometimes the person herself may have mixed motives. My point is rather a conceptual point about separating foresight from intention.

blizzard to give his friends a better chance of survival,” Captain Oates is ill and can not keep up with the rest of the group who are trying to save themselves.²³ He may either intentionally kill himself with a pistol or go out into the blizzard knowing that the cold will kill him but with the intention solely of physically removing himself from the group. Accepting suicide as one of the ends that may not be brought about intentionally, Captain Oates chooses the latter option. Duff attempts to justify Oates decision and clear up the ambiguity inherent to the DDE.²⁴ He writes

Death we may suppose is equally certain in either case, the end aimed at – of bringing his friends to go on without him which he knows they will not do while he is there with them – is the same. But the means adopted are crucially different For in one case they will go on because he is dead and he intentionally kills himself, by shooting, as a means to this. But in the other case . . . he intends them to go on because they realise that he has chosen to withdraw from the group; and to achieve this, he needs simply to walk away.

Of course, he knows, and they know, that he will certainly die; but this is now a consequence not a part of his intentional action . . . this logical gap between what he intentionally does and his consequent death – is important, not because it allows him or them to hope that he will in fact survive (they had no such hope), but because it shows that his intentions, and attention, need in no way be directed towards his death, all he is deciding to do is walk away; the rest is up to God.

This explanation seems to be little more than sophistry. As Harris notes, “had Oates lacked the strength to remove himself from the group physically but possessed a revolver, he might have equally effectively dissociated himself by putting the barrel in his mouth, pulling the trigger and thinking, “Whether I die or not is up to God.””²⁵ Duff is not oblivious to this point and offers a stronger example of a man jumping onto a live grenade in order to save others. If it is the case, as above, that the man is not killing

²³ Duff, R.A., (1976), “Absolute principles and double effect,” *Analysis*, 36: 68.

himself because the grenade might fail to go off, then by parity of reasoning, if someone were to have thrown the man onto the grenade for the same reason, he is not committing murder. Duff unfortunately has no reply to this.

Other proponents of the DDE have traditionally been inclined to invoke a principle of “closeness.” This principle states that those consequences that are very close to those which are intended should be counted as intended as well. This response however is vague and not very helpful. Philippa Foot recognizing the ambiguity, questions this idea of “closeness” and writes, “What is to be the criterion of closeness if we say that anything very close to what we are literally aiming at counts as if part of our aim?”²⁶ In an attempt to define the idea of closeness, Hart suggests that a “foreseen but unwanted outcome will be taken to be intended if it is of a kind so immediately and invariably connected with action of the kind done that the connexion is regarded as conceptual rather than contingent.”²⁷

Now we can reformulate the DDE incorporating, as a fifth criterion, Hart’s “closeness” condition:

DDE: It is morally permissible for an agent to perform a certain act that has both a good outcome and a bad outcome provided

- a) the intended final end of action must be good;
- b) the intended means to this end must be morally permissible;
- c) the bad outcome is foreseen as a non-intended consequence of the act;

²⁴ Ibid. 79.

²⁵ Harris, J., (1980), *Violence and Responsibility*. London: Routledge & Kegan Paul. p.54.

²⁶ Foot, P., (1978), “The Problem of Abortion and the Doctrine of Double Effect,” in J.M Fischer and M.Ravizza (eds.), *Ethics: Problems and Principles*. New York: Harcourt Brace Jovanovich College Publishers. p. 62.

- d) the good end must be proportionate to the bad outcome (that is, must be important enough to justify the bad outcome; and
- e) in the case of ambiguity between the intended and foreseen outcome of the act, a foreseen but unwanted outcome will be taken to be intended if it is a kind so immediately and invariably connected with action of the kind done that the connection is regarded as conceptual rather than contingent.

Now, applying this reformulated version of the DDE to the examples above, in the case of Captain Oates, his death is invariably and immediately connected with his going out into the blizzard in his condition and thus, we must count the death as part of his intention to separate himself from the group. Likewise, the man who jumps on the grenade must include his death as part of his aim to save his friends. These results seem to better fit our considered judgments about these sorts of cases. But how then does this all fit in with SCGT?

Recall that SCGT which results in non-intentional germ line manipulation is permissible by appeal to the DDE. Recall also that some diseases that would be candidates for SCGT must be treated at a very early stage in development if the irreversible and cumulative debilitating effects of the disease are to be avoided. This means that the best prospect for effective treatment, which is one of the criteria for the application of SCGT, will be early embryonic SCGT. In this case, the germ line cells are not yet differentiated. Therefore, any change introduced into the genetic composition of the embryo will effect not only the somatic cells, but also *invariably and immediately* the

²⁷ Hart, H.L.A., (1968), *Punishment and Responsibility*. New York: Oxford University Press. p.123.

germ line cells. Following Hart, by parity of reasoning, no sense can be made of the claim that what is intended is SCGT, and that the germ line modification is, by contrast, non-intentional and foreseen. Rather, the germ line effects must, by Hart's standards, and I think correctly be taken to be intended as well as the somatic effects. So, with Hart's reformulated DDE, things are even worse for Lappé-like uses of the DDE. However, for various reasons outside the context of genetic engineering discussed above, the Hart-like change is necessary for the DDE to be plausible. The problem is that once the change is made, it makes a mess of the argument in the context of genetic engineering. What this all means is that actually, by appeal to the DDE, SCGT that runs the risk of germ line modifications can *not* be justified.

This is not to say however that we ought to abandon the endeavor of attempting to cure diseases using SCGT. In fact, I think we ought to continue doing so – this, of course a claim in need of qualification and argumentation. However, the point of this section if nothing else has been to point out the negligence obvious in the literature about SCGT and the need to reevaluate germ line arguments. For, if germ line modifications can be justified, then there will be no problems aside from technological limitations for SCGT. Alternatively, if germ line gene modification is found to be objectionable *in principle*, (or perhaps permanently *in practice*) then it may be the case that SCGT must also be prohibited until the risk is no longer present.

Now, since my thesis addresses germ line genetic engineering, I could just proceed to that specific discussion now since the main points that I wanted to establish have been established. However, I cannot resist pointing out that the discussion of the DDE above reveals what a mess the Royal Commission and others are in here, *for*, given

that my argument works, not only are there implications for germ line genetic engineering, there are also implications for SCGE – implications which it might be useful to spell out as a preview of what is to come in the discussion of germ line genetic engineering.

2.4 Somatic Cell Gene Enhancement and The Argument from Analogy

Somatic cell gene enhancement (SCGE) involves the improvement of already normal functioning genes in somatic cells. Setting aside germ line side effects, the changes incurred as a result of SCGE, like SCGT, will be limited to the individual and will not be inheritable. Such traits as intelligence, beauty, body size and shape are among the desired candidates for enhancement. This will not be an easy task to accomplish given most of these traits, with the exception of height, are multifactorial. However, this is a technical difficulty that will likely be someday overcome. The interesting question is whether SCGE should be morally permissible? Currently there is unanimity among policy-setting committees in prohibiting any type of enhancement projects among humans although animal experiments are permitted.²⁸ The fears about genetic enhancement – somatic or germ line – are side effect fears, *for example*, that genetic enhancement will inevitably lead to a society with increased tendencies towards discrimination and inequalities.²⁹ SCGE is not a form of medical treatment, so the objection goes, and since the medical profession is first and foremost concerned with the amelioration of disease and suffering and the promotion of good health³⁰, SCGE is not viewed by critics as a priority and the

²⁸ Royal Commission on New Reproductive Technologies, (1993); Clothier Committee, (1992).

²⁹ Ibid.

³⁰ Of course as noted in chapter 1. the promotion of good health is a very open ended project, open enough to include eye surgery for astigmatism as an acceptable alternative to glasses and indeed cosmetic surgery

use of resources in this area cannot be justified. The following is an extended but important quote from Chapter 29 of the Royal Commissions Report on New Reproductive Technologies regarding non-therapeutic enhancement

A caring society values people for themselves and for their uniqueness. Our ethical principles tell us that all individuals should be valued equally. Genetic enhancement raises the prospect of a society where some people would be accepted only if they were “improved” – they would not be acceptable as themselves. This is a form of commodifying individuals – people are treated as things that can be changed according to someone else’s notions of human perfection. This shows a lack of respect for human life and dignity and intolerance for human diversity, which is likely to lead to discrimination against and devaluing of certain categories of people. Any use of genetic enhancement raises troubling and potentially discriminatory judgments about what sorts of enhancement would be allowed and who would have access to them...The non-therapeutic use of genetic alteration technology would draw away needed resources and skilled personnel from real medical problems. To allow DNA alteration in healthy individuals when there are so many other pressing calls on social attention and resources would be irresponsible and unethical.³¹

I believe everything the report says here is true and representative of what most people’s moral principles dictate. I also believe however, that the report represents one of the greatest inconsistencies within medical ethics. The Royal Commission’s argument may be summarized as follows:

1. There are a number of values V which society holds.
2. SCGE will challenge the maintenance and stability of V.
3. Medical resources must first be allocated to therapeutic procedures.
4. SCGE is not a therapeutic procedure.

for people in addition to those disfigured. I am here using the phrase in a non-specific way. However, as I will discuss below, it is not clear that what is considered to be the “promotion of good health” is the primary goal of medicine. It may be one of the goals, but not exclusively so. This may be representative of a larger and deeper problem in within healthcare, SCGT and cosmetic surgery of which are simply an illustration.

5. Therefore, SCGE ought not to be permitted.

The inconsistency becomes apparent when examining the analogy between SCGE and cosmetic surgery. In fact, as I will show, the analogy is so strong that if SCGE is prohibited, then cosmetic surgery must also be prohibited. Alternatively if the latter is accepted, then the former must also be accepted. Many authors have recognized the similarities and have argued that SCGE presents no new ethical problems thereby agreeing with my own position on this issue. Tännsjö writes

I fail to see any special problem with this kind of therapy [SCGE]. It will have low priority, of course, being a kind of 'plastic' surgery, but, if we could repair, say, a less than perfect vision, not curing thereby a disease, but eliminating a handicap, and if we could do so by gene therapy rather than by surgery, this would hardly be objectionable. These are only different means to the same end, and there doesn't seem to be anything problematic with one kind of means that does not pertain to the other. Moreover, if we allow the correction of a less than perfect vision, we should also allow the correction of, say, a less than perfect pitch.³²

Let me now consider the analogy between SCGE and cosmetic surgery in greater detail.

Cosmetic surgeries are procedures whereby certain "normal" phenotypes may be enhanced (or diminished). The effects are limited to the individual and like SCGE are therefore not inheritable. As for the worries the report raises about SCGE, the beauty of this analogy lies in the fact that we have decades of experience by which to judge the effects of cosmetic surgery. Cosmetic surgery also raises the prospect of a society where some people would be accepted only if they were "improved." Not only does it raise the prospects – it is a reality; cosmetic surgery has in fact led to an *un*acceptance of people as they are. Men are having hair transplants, women are injecting adipose tissue into their

³¹ Royal Commission on New Reproductive Technologies, (1993), 943-44.

lips, and we even have our dogs' ears and tails cropped to make them more attractive. In this sense, cosmetic surgery is also a form of commodifying individuals. It is the utmost spectacle of intolerance for human diversity. Individuals of Asian origin can now have "eyelids" molded by surgeons in order to have a more Caucasian look. Alternatively, individuals can have their eyes surgically slanted for a more seductive look. Now that we have allowed penial and clitoral augmentations as well as skin color lightening and darkening, what sort of regulation with respect to the kinds of enhancements that are allowed can we possibly hope for. Given the cost of such procedures, the decisions are often decided upon by the recipients of the procedures – that is, to the highest bidders. Any procedure is available – available to those who can afford it. Ought it be surprising then that there are so many celebrities that can barely smile due to the numerous face lifts they've undergone, or the number of Baywatch "beauties" who can run in braless swimsuits and defy the laws of gravity? Yet the Royal Commission worries about SCGE while cosmetic surgery continues to flourish (or shall I say augment?). It seems then foolish to deny that cosmetic surgery, like SCGE, violates the values held by a "caring society". Yet this is exactly what the commission has said. They write

Proponents argue that genetic enhancement is really no different from cosmetic surgery, and that the desire to improve oneself is natural and commendable. However, comparing enhancement genetics to cosmetic surgery or to other ways of helping individuals "make the best of themselves" is misleading and neglects the potential harms [those listed above]...Many of the risks of cosmetic surgery are documented but we do not know the risks of inserting genetic material, such as the risk of disrupting a tumour suppressor or activating a cancer related gene.³³

³² Tännsjö, T., (1993), "Should We Change the Human Genome?" *Theoretical Medicine* 14: 231-247.

³³ Ibid. 943-44.

The claims made by the Royal Commission are not terribly convincing. My point is very simple and obvious. Cosmetic surgery, despite the social risks, is considered by most, including the Royal Commission, to be morally permissible. Insofar as SCGE shares the very features that make cosmetic surgery permissible, SCGE can only be prohibited as the cost of inconsistency unless there is some unnoticed and unstated difference between SCGE and cosmetic surgery. But as a matter of fact, the one difference that we might draw attention to is the fact that they are different means to the same end and this seems not to secure the conclusion that we can say one thing for cosmetic surgery and a different thing for SCGE. As Tännsjö noted, they seem to be simply different means to the same end. Given this, I cannot help but ask why would we not prefer the less invasive and traumatic means, i.e., SCGE, to the more painful alternative, i.e., surgery? It seems almost deliberately wicked to prefer surgery.

Furthermore, given the identical nature of the ends of SCGE and cosmetic surgery, according to the Commission, cosmetic surgery is also non-therapeutic and likewise *irresponsibly* draws away from needed personnel and funds for more *pressing* medical issues. What this means is that both premises (2) and (4) of the Commission's argument against SCGE are true of cosmetic surgery as well. Given the truth of premises (1) and (3), the conclusion will follow that cosmetic surgery ought not to be permitted by those very standards that have led the Commission to prohibit SCGE.

Finally, I find it odd that whereas the Commission is invoking what is essentially an argument about social risks in most of the paper, e.g., discrimination, allocation of resources, etc., the analogy with cosmetic surgery is only referred to in the section on medical risks. These risks are related to technological difficulties and issues of safety. So,

since “many of the risks of cosmetic surgery are documented but we do not know the risks of inserting genetic material,” then does this mean that once the risks of SCGE have become well documented and manageable, then it too ought to be permissible? This must be exactly true unless we wish also to prohibit cosmetic surgery.

The dilemma? We either allow both cosmetic surgery and SCGE or we prohibit them both. Morally they are on equal footing – both affect only one individual with no inheritable effects and both have the potential to lead to the same social consequences. If we prohibit both we may be violating some other higher order values such as the personal rights of the individual to do as they please with their bodies and their right to autonomous decision making. Alternatively, if we permit both, I suspect we will continue to see a rise in the number of anorexic children, discriminatory behaviour and low self-esteem that we currently observe in society. Again however, the purpose of this section is not to argue for one or the other of these alternatives but rather to clarify the issue and present the alternatives in their proper classifications such that useful philosophical analysis may begin. SCGE is a form of cosmetic surgery.

There is one final possibility that may underlie the inconsistency that is here seen between the permissibility of cosmetic surgery and the impermissibility of SCGE, though will not explain it away.

2.5 The Deeper Problem

Traditionally, when characterizing the role of physicians and the goal of medicine, there has been a tendency to view the physician as a “healer” and the discipline of medicine as concerning itself with the elimination of disease. But of course, to heal there must be

some sort of wound and in order to eliminate disease there must be a disease to begin with. I suggest that it is this kind of mistaken reasoning that has led to the inconsistency I described above. The reluctance to accept more than one aim for medicine and a broader role for the physician may have in fact led the Commission to recommend the prohibition of SCGE. To insist on the above characterization of medicine yields some awfully bizarre consequences. For example, what are we to make of sports medicine where the role of the physician is to counsel athletes on how to achieve superior health and the aim of this specialty seems to be the development of excellent athletes? Certainly here we are not speaking about the physician as a “healer” or sports medicine as eliminating disease. We are clearly concerned with *improving* the average performance and health of athletes. Similarly, cosmetic surgery cannot be seen as an attempt to “cure” anything more than the patient’s desire to enhance themselves. I suggest however, that there is nothing wrong with a physician wanting to help an athlete become more athletic or wanting to help someone become more beautiful (by the patient’s standards). What this means is that there will be at least one more goal in medicine than the traditional elimination of disease – in this case, the enhancement of desirable qualities. I’m not even sure that I would want to fully deny that the Commission has considered this possibility. Rather a more generous reading is appropriate. The more plausible reading suggests that the difficulties arise when, after deciding that there is more than one goal in medicine, deciding how the goals are to be ranked in order of importance. Perhaps the fear has been that in allowing SCGE as a valid concern for medicine, they are somehow committing themselves to the view that SCGE will have an equal priority as therapeutic procedures. This however, is a

logical error. That SCGE is an appropriate goal for medicine does *not* entail that it will be the most important goal.

2.6 Concluding Remarks

The main aim of this chapter has been to address in a preliminary way, one of the main platforms of the attacks on germ line genetic engineering, viz., that SCGT with all of its wonderful possible benefits can be said to be permissible and we can still prohibit germ line genetic engineering. However, I am not willing to grant those opposed to germ line genetic engineering, including the Royal Commission, even this little. The conclusion to be drawn is that they cannot avoid making the following choice. Either (a) if they choose to prohibit germ line genetic engineering, then not only the benefits of *it* are lost, but also the benefits of SCGT; or (b) if the benefits of SCGT are secured by allowing it, then the attack on germ line genetic engineering must be thought out again.

CHAPTER 3

HUMAN NATURE

What if germ line genetic alteration resulted in an alteration of our human nature? Those who object to germ line genetic alteration have often appealed to this possibility as grounds for concern. Generally the objection takes the form of something like the following:

1. We ought not to change human nature.
2. Germ line genetic alteration may change human nature.
3. Therefore, we ought not to perform germ line genetic alteration.

Although the objection seems to present itself as consistently as papers are published on genetic engineering, it has never really occupied more than a paragraph. As tempting as it is to simply bypass it altogether, it does seem to be one of those objections that, if successful, would represent a reason *in principle* not to perform GLGA. For this reason, I believe it necessary to examine it in greater detail.

There are a number of unstated (and dubious) premises in the objection as presented above. The first and perhaps most important question is ‘why?’ Why shouldn’t we change human nature? This will require both interpretive work – in figuring out exactly what is meant by the objection, and critical analysis – deciding whether or not the objection is justifiable.

There are really three ways in which to interpret the objection. The first draws on the ‘playing God’ objection. What might be meant by the objection is that during the act of genesis, God created us in a certain way, with a certain nature. That fact alone, it might

be argued then is enough of a reason not to interfere with human nature. To go ahead with GLGA would then be portrayed as presumptuous and stepping outside of the limits of activities within the rights and authority of humans to perform. This reading has the potential to turn into a “sanctity of human nature” argument very closely paralleling the ‘playing God’ objection and therefore I will discuss it in fuller detail in the following chapter. The second objection I will call the ‘Objective Value’ objection. This interpretation suggests that there is some kind of objective value in nature as it is and that it would therefore be wrong to alter nature in any way. The final reading appeals to the role that a notion of human nature plays in moral theory. I will call this the ‘Moral Theory Objection.’

3.1 The Objective Value Objection

The objection that we ought not to perform GLGA because it might alter human nature may be understood as involving the specific claim about human nature that there is for some reason some moral objection to changing it. The reason, it might be argued is that there is some kind of objective value in being the sort of beings that we are. Therefore, the objection might continue, it would be wrong to alter that nature in any way. There are two ways to respond to an objection thus formulated. The first is to accept, for argument’s sake, that human nature is objectively valuable and then show that GLGA is still permissible despite this. The second way is to deny that human nature is objectively valuable. I will not be addressing the second response since, given the first response, the issue of whether or not human nature has objective value becomes a moot point for the purposes of this thesis. It may be interesting to examine that issue within a different

context, however, that in itself is an issue for a whole thesis and not something which could be addressed within the confines of my thesis.

3.1.1 Human Nature is Objectively Valuable

To start with, we must note that this objection requires at least two assumptions. First we need to assume that there is such a thing as “human nature,” and second we need to assume that by germ line genetic engineering we would thereby be altering human nature. Both of these assumptions are highly questionable and will be dealt with in the sections to follow. However, in this section I will for the sake of argument assume their truth.

First and foremost, we must resist the temptation to assume that to say that an object has objective value is to say that it has overriding value – these two claims are logically independent. Unfortunately, this is a mistake not rare in the literature. In a very influential article included in Peter Singer’s popular *Companion to Ethics*, Nancy Ann David clearly commits this logical error.¹ She writes

Many people profess to believe that acting morally, or as we ought to act, involves the self-conscious acceptance of some (quite specific) constraints or rules that place limits both on the pursuit of our own interests and on our pursuit of the general good. Though these people do not regard the furtherance of our own interests or the pursuit of the general good as ignoble ends, or ones that we are morally required to eschew, they believe that neither can be regarded as providing us with morally sufficient reasons to take action. Those who hold such a view believe that there are certain sorts of acts that are wrong in themselves, and thus morally unacceptable means to the pursuit of any ends, even ends that are morally admirable or morally obligatory...Philosophers call such ethical views ‘deontological.’²

If this sort of view were true it would lead to some very bizarre results. Imagine the following claim were true, ‘The duty of non-maleficence has objective value and

therefore overrides any amount of utility that would be produced by an alternative action.' This statement borders on absurd. An example will help to illustrate the point. Imagine that a man is about to place his hand, unknowingly, on the trigger to a bomb planted one kilometer away that will kill twenty children. There is no way to contact him to tell him not to touch the trigger. However, I have a rifle (and fortunately impeccable aim) and could shoot his hand. The consequence would be that he would not set off the bomb but only at the cost of losing partial function of his hand.³ If the above statement were true, I could not under these circumstances shoot the man's hand. It would not make a difference if there were 50 children instead of 20 or even 100 instead of 20. These are seriously counterintuitive results and it is not clear that any moral person would want to allow these conclusions. Rather we want to be able to say that it would be morally permissible (and perhaps even obligatory) to shoot the man's hand to save the children. And note that we can do this without sacrificing the principle that the duty of non-maleficence is objectively valuable.

By parity of reasoning, there is no inconsistency in claiming that human nature is objectively valuable and that we may change it by GLGA (or even GLGE) if the good produced is great enough. In fact, the claim that human nature is objectively valuable is completely compatible with the claim that it could have a greater objective value if it were improved. If the critics of GLGA wish to maintain the stance that human nature has *overriding* value under all circumstances, then something more is needed than simply the claim that it has objective value.

¹ Davis, N.A., (1991), "Contemporary Deontology," in P. Singer (ed.), *A Companion to Ethics*. Massachusetts: Blackwells Publishers.

² Ibid.

Perhaps if we made the value claim a more conservative claim then the argument might escape the objection I have outlined above. It might be the case that what really has objective value is staying the way we are, i.e., not altering our current human nature. But it is just not clear that accepting this principle either would entail the moral impermissibility of changing our natures if it were for the better. The objection falls victim to the same problems as the above formulation. Consider the following example. Suppose for the sake of argument that there were drastic genetic differences in the intelligence of different races. Further, suppose that these differences were essential such that they were part of what we consider to be “natural” or part of our “human nature.” Now suppose that by germ line genetic enhancements, we could eventually bring everyone up to a minimal level of intelligence and while variation would still occur within the whole of the human population, the wide disparities inter-racially would cease to exist. Could we really justify the claim that it would not be a good thing to proceed with the GLGE because maintaining our natures is objectively valuable? If proponents are prepared to answer yes, then note this would entail the abolition of special education classes for the developmentally delayed as well as the gifted, elimination of tutors etc. It would be odd indeed to accept such consequences. But once again note that we could logically deny these conclusions without sacrificing the more conservative principle for the same reason as above – namely because objective value is not equivalent to overriding value. So in this case, increasing intelligence to eliminate racial-specific disparities seems to have a higher priority than maintaining the status quo. Furthermore, it seems more likely that germ line genetic engineering will represent, if at all, a change

³ John Baker brought this example to my attention.

in degree rather than a change in kind. If we are moving to a better, more advantageous degree of human nature, I don't see the objection has much force at all.⁴ Again, the point is that there is a logical difference between the claim that a value, any value, or a duty, or a right, is objective and the claim that that value, that duty or that right, in Dworkin's evocative wording "trumps" all other considerations.

There is, in addition to the confusion of thinking that objective value entails nonoverrideability, an inconsistency that the "objective value objection" has the effect of bringing to light. It seems that if germ line genetic engineering would in fact result in a change in human nature, the same would be true of SCGT. The only difference would be in permanence. That is, while the effects of SCGT would be limited to an individual and would not be present in following generations, thereby perhaps changing the nature of only one human, GLGA would affect all future generations, thereby introducing a permanent widespread change in human nature that is capable of being propagated through generations. Perhaps it is precisely this difference between a localized and temporary change in human nature versus a permanent change in human nature that makes SCGT permissible and GLGA impermissible and is at the heart of the objection. However, this is not a plausible view. Harris discusses the possibility of a temporary versus a permanent change in human nature by referring to the eradication of small pox.⁵ This example is very appropriate given it is the sort of thing we would hope to accomplish by GLGA. Historically, the eradication of small pox by vaccination represented a great achievement for medical science. It was a welcome change in our

⁴ I will discuss this point in further detail below.

⁵ Harris, (1998). .

physiology. Why was there no resistance to such a widespread change in this aspect of our natures, i.e., susceptibility to small pox? Harris suggests that perhaps the reasoning is that in the case of eradication we are making a change to the world rather than to ourselves. But as Harris notes, this is an inaccurate portrayal of the eradication of a disease. He writes

[S]mall pox has been eradicated in large part because vaccination has been successful. And vaccination is a somatic modification in the sense that it modifies only the particular individual vaccinated, so it was the removal of our susceptibility to the disease that was instrumental here. It looks as though we have again come back to the difference between a permanent removal of that susceptibility and a temporary one. Again we seem to be worried by the idea of permanent changes to human beings, perhaps because we fear this may change human nature?⁶

Well, there are two things to be said in response to the appeal to a morally important difference between temporary and permanent changes to humans. The first is that there is no reason to suspect that a permanent change in something like disease resistance of the sort that GLGA would confer would in fact make us any less “human”. In fact to say the opposite would be quite dangerous socially given the already naturally occurring resistance to malaria of certain racial groups.⁷ The second thing is that even if by GLGA we did thereby alter human nature and make ourselves less human, so what? This second point will be discussed in greater detail below.

⁶ Ibid. 175-176.

⁷ Sickle cell disease is a blood disorder that results from a mutated hemoglobin molecule in the red blood cells of the affected individual. In venous blood, the altered molecules tend to stack into narrow crystals, distorting the smooth contour of red blood cells, thus giving the cell its characteristic sickle shape. Affected persons are homozygous for the sickling allele; they often suffer attacks of shortness of breath and severe fatigue from deficient oxygenation of the blood. Those who are heterozygous for the allele are said to have the sickle cell *trait*; they are generally asymptomatic. Heterozygotes also display resistance to malaria – a parasitic infection. The frequency of the disease and the trait is highest among African Blacks in regions with a high incidence of malaria.

Finally, those opposed to GLGA for the “objective value” reason might claim that to change our natures in any way might just be flat out dangerous. They might argue that certain traits that we think are undesirable and thus candidates for change may actually have an instrumental value. Again here we might appeal to the sickle cell/malaria example to illustrate. While the sickle cell trait may be undesirable, it confers resistance to malarial infection which is potentially life threatening. Thus, removal of the sickling allele could result in higher rates of malaria related mortality. However, if this is in fact their line of argument, we have moved outside of the arena of *in principle* objections and back to *in practice* objections in which case the reply is quite simple. We would simply have to acquire enough knowledge and expertise⁸ so as to bring the level of risks down to a negligible level (and of course this would include ongoing research on malaria and the development of a vaccine). And when that has been accomplished, what will their objection amount to? Precisely nothing.

3.2 The Moral Theory Objection

This objection suggests that our notion of human nature somehow plays a special role in moral theory and because of the role assigned by moral theory we ought not to alter it. Since germ line genetic engineering has the potential to alter human nature, it follows that, according to the objection, we ought not to perform germ line genetic engineering. Note that this objection, if successful, would work against GLGA whether we espoused an objectivist/realist metaethical stance or an antiobjectivist/antirealist stance. To deal

⁸ One might question whether we should distinguish between (i) knowledge and expertise and (ii) *wisdom*. Some might allow my moves about knowledge and expertise but then worry about whether we have the *wisdom* to address these pressing issues. I think that this may be the sort of idea Suzuki is driving at in his objection to GLGA. This possibility will be examined within the context of a secular “playing god” objection in the next chapter.

with this objection, we need first to understand in what capacity it is that human nature plays a role in moral theory. So let me focus the ideas by providing a bit more detail to the kinds of connections which a story about human nature might have to moral theory.

One suggestion which has a very long history – one going back to the Stoics – is the suggestion that a morally right action and indeed a morally good life is one in which the agent *acts in accordance with nature* and avoids actions which are contrary to nature. Rejections of this suggestion have, it should be noted, a history almost as long as the suggestion itself. For example, there is one Christian tradition which thought that our human nature was essentially evil (see the doctrine of *original sin*) and that moral living consisted in resisting our natures, overcoming original sin, and living in accordance with the word of Jesus and God. Such a life, it was believed, could in certain circumstances, secure a good life and eventually salvation. (Other sects, of course, argued that a morally virtuous life might, but might not, lead to a good life and salvation – that these were *dei gratia* and that good works were not enough.)

For the purposes of this chapter, I will be focusing on the perfectionist tradition in the sections to follow. Perfectionists describe an *idealized* version of human nature and suggest that living in accordance with this idealized human nature constitutes virtuous action. This in turn constitutes the good life and hence humans are to strive to live in a way which perfects their own natures as defined by the ideal. The role of human nature in constructing the theory is therefore crucial to the perfectionist tradition.

Before moving any further, let me take a moment to outline the approach I will take in the following sections and to explain why I will be taking this approach. The first section will explore exactly how a notion of human nature must be defined in order for

the original objection, i.e., that we ought not to change human nature due to its role in moral theory, to be plausible. While much of what I present might appear to be straw-man argumentation, I ask the reader to bear with me.⁹

I start with a simple non-essentialist notion of human nature and move to a stricter essentialist approach. After showing how both of these approaches will not work, I examine a weaker, yet somewhat more plausible, essentialist reading such as that adopted by Thomas Hurka in *Perfectionism*.¹⁰ My plan is essentially to build up what I think is the most plausible notion of human nature as used in a moral theory and then argue in the following section that even this sort of moral theory will be unacceptable. In doing so, the overall aim is to undermine the role of human nature in moral theory, thereby demonstrating the wrongheadedness of this objection to GLGA.

3.2.1 What is Human Nature?

Defining human nature, I suspect, would prove to be a difficult task and perhaps even in principle impossible because wrongheaded. First off, there are two general categories under which one might attempt to define human nature. The first is a broad, non-essentialist category where “human nature” is a concept denoting those psychological characteristics which are *typical* of human beings *at their present stage in development*. Human nature understood in this way might be constituted by a set characteristics describing individuals as they behave and socially interact with one another at a specific time in history. On this interpretation, there is nothing in talk of human nature which

⁹ I fear this might be a common problem in this chapter. The problem with this objection is that given the lack of substance the human nature objection has received in the literature, an attempt must be made in this chapter to first formulate it and then respond to it. What I am finding however, as I am sure the reader is painfully aware of, is that the objection, once formulated, is just obviously dismissable. Any attempt to provide a response to the objection might easily therefore be accused of straw-man argumentation.

excludes the possibility or the moral permissibility of changes in human beings, who after the change, remain human beings.

For this reason, I think that this cannot be the sort of “human nature” appealed to in this version of the “human nature objection.” The objection states that human nature plays a special role in moral theory; since GLGA is expected to alter human nature in some way, we ought not to do it. Now, if human nature is being used in the broader sense described above, then the objection would not make sense since this first interpretation allows for human nature to change over time. There are no requirements of stability but rather human nature is a concept denoting something dynamic, changing over time. Thus, any role that human nature plays in moral theory on this account would not depend on its being something static but rather would depend on its characterization at the time the theory is being developed or appealed to. GLGA would then present no difficulties even if it did alter human nature since human nature would already be understood as something time-related and the moral theories would have to take that into account.

Although a human nature argument in this form will be unsuccessful in this context, it might turn out that the objection is even simpler than here formulated. For instance, perhaps the objection is to be understood in a theological setting. So maybe it is something like the following: god has endowed us with the characteristics that at any time make up the nature of humans. Therefore, we ought not to interfere with the natural course of events. A discussion of this possibility is inappropriate at this time but will be examined in greater detail in the next chapter on playing god.

¹⁰ Hurka, T., (1993), *Perfectionism*. New York: Oxford University Press.

The second way to try and understand human nature is to adopt a stricter essentialist reading. To assert a human nature in this sort of deep metaphysical sense has traditionally required that we find certain traits that are all and only properties of human beings, an idea contested by most evolutionary biologists and philosophers of science.¹¹ Upon inspection, moral theories that are grounded in assumptions about human nature in this essentialist sense tend to result in a lack of clarity and tend to be full of implausible consequences. The problems generally arise because of the foundational error made in claiming that species are natural kinds and that species, in particular the human species, have an essence or human nature. According to this view of human nature and species, if our natures changed, then we would cease to be human. Presumably, this is what would be objectionable about changing our natures, though quite why it would be objectionable is less clear. Thus if GLGA is likely to change our natures, then we ought not to do it. If successful, this argument would represent an objection *in principle* to GLGA. However, theories of this form have little chance of being successful and plausible theories for a variety of reasons.

First of all, in formulating a strict essentialist concept of human nature, we need a story about which properties we should include in our list of “essential” properties.

Presumably, as “essential”, these properties must satisfy the second order properties that

- (i) the set of essential properties must uniquely identify human beings (distinctiveness),
- (ii) it must identify *all* human beings (universality), and

¹¹ See for example Hull, D., (1978), “A Matter of Individuality,” *Philosophy of Science* 45: 335-60; and Mayr, E., (1963), *Animal Species and Evolution*. Massachusetts: The Belknap Press of Harvard University Press.

- (iii) the properties must be of a kind suited to their projected role in moral theory – presumably, for example, they will be reasonable important (suitability).

If a list of suggested properties does not meet these criteria, it will be susceptible to what I will refer to as the “wrong properties objection.”

Wrong Properties Objection: A suggested list of essential properties will be guilty of the wrong properties objection if it lists properties that are wrong either because they are only contingently connected to being human, or they are not interesting/revealing about human nature properties.

So, to illustrate, although only humans make fire, masturbate and have nonfunctional appendices, properties hence distinctive of humans, these would not be the sorts of characteristics we would include in our list of essential properties. To be sure, they are certainly the sorts of properties that are only contingently connected with being human and more importantly, they reveal nothing important about our natures. Therefore, the list fails the universality and suitability criteria.

By contrast, rationality does seem to be the sort of property that is reasonably important and that we would want to include in our list of essential properties. However, an attempt to apply the other two criteria (distinctiveness and universality) will reveal that rationality does not meet the distinctiveness criterion. That certain primates have the ability to reason and communicate has long been empirically established. Given that what is presumably required of the rationality property is not some higher order, complex rational ability but rather a basic minimum rationality, then the property must surely apply to certain primates as well.

A less demanding essentialism, which sacrifices the distinctiveness criterion, may be able to circumvent this sort of problem. But even if we take the tack of working with a relaxed account of the “essential” properties (one which makes us wonder in what sense they are now “essential”) we still seem to face problems, problems which I believe are significant enough to cast doubt on the adequacy of the moral theory itself. Now if the moral theory which is grounded in such a notion of human nature fails to be acceptable, then the objection to GLGA will also fail. But first, what exactly are the difficulties with this relaxed essentialism?

Rationality seems to be the most plausible candidate for characterizing humans (as well as primates). The problem though, is that if we try to make rationality as strict a requirement as even the relaxed essentialism requires, then we will leave out a number of individuals like the severely handicapped and those who are in a permanent coma that are clearly human, though not rational, from our species. This fact is extremely counterintuitive and requires further examination. In order to facilitate the discussion, I will be addressing only one theory, perfectionism, which appeals to rationality as our essence. It is only for the sake of clarity and simplicity that I am working with only one theory. However, since any moral theories that appeal to human nature in an essentialist way will yield similar consequences (and I have shown how this is the only reading with which the objection to GLGA might work), I feel confident that conclusions drawn in this section may be generalized to other similar moral theories.

3.2.2 Perfectionism and Human Nature

Perfectionism, as formulated by Thomas Hurka in *Perfectionism*,¹² is rooted in a distinctive view of human nature. Following closely the Aristotelian tradition, the ultimate goal of the theory is to outline ideal human nature and offer a morality compliance with which would consist in the development of that person's nature in accordance with the ideal. The nature is very much an essentialist nature invoking both kind and individual essentialism but it is an "ideal" essentialism since the *nature* which provides the template for morally appropriate action is *ideal nature*. According to kind essentialism, there is an essence to being the natural kind¹³ "human beings" and it is each individual human being possesses this essence. Thus, if an individual *o* is a member of the natural kind *K*, then in every possible world, *o* must have those properties *P* that are essential to being a member of the *K*. Individual essentialism differs in that the individual's essence is the property or set of properties it must have in order to be that individual. Therefore, in every possible world in which an individual *o* occurs, *o* possesses those properties *P* that are essential to being that individual. Hurka clearly makes use of both types of essentialism in formulating his view of human nature. He writes

The essence view makes double use of the concept of essence: to define human nature, and to tie that human nature to individual humans. The properties fundamental to the human species are in the same way fundamental to its individual members.¹⁴

¹² Hurka, T., (1993).

¹³ The term "natural kind" is a term of art first discussed by Quine.

¹⁴ Ibid. 12.

In an attempt to avoid the wrong properties objection, Hurka surrenders the distinctiveness criterion and instead adopts a relaxed essentialism in his formulation of human nature, focusing on those properties that are shared by all humans but are not necessarily distinctive of humans. As a matter of fact, the only property Hurka requires as essential for being a human being is rationality.

Now we may formalize his notion of humanity:

Human Beings: For all x , x is a living human animal iff x is capable of rational action and thinking.

In other words, the natural kind “human” is composed of a set of objects that possess the essential property of being rational. There are no possible worlds where some object is human and does not, on Hurka’s account, possess rationality.

This then is a brief account of the perfectionist notion of human nature. There are at least two objections that can be raised against this notion of human nature. The first may be presented as follows:

- (i) If x is human, then x is necessarily rational.
- (ii) Fetuses, the severely mentally retarded and those that are in an irreversible coma are not necessarily rational.
- (iii) Therefore, foetuses, the severely mentally retarded and those that are in an irreversible coma are not human.

But to deny them the status of human is absurd.¹⁵ Surely they are still members of the species *Homo sapiens*. In fact, they would satisfy the requirements for species

¹⁵ This claim is not without controversy – especially with respect to fetuses. I am not here referring to “human being” in a manner suggestive of full moral standing or personhood. I use the term only to denote membership in the species *Homo sapiens*.

membership on any species account one prefers – be it interbreeding, ecological or phylogenetic. They may not have the properties “normally” associated with members of the species, but that is irrelevant to their status as members of *Homo sapiens*. Hurka attempts to respond to this by defusing the implications of such a view. He writes

What then is the status of fetuses, babies and the demented? Although fetuses are not human, they are descended from humans and may later turn into humans. They are closer to the human species than to any other species and can therefore be classified as *almost human*. Babies are probably almost humans at least for a short time after birth... The demented are likewise almost humans, although many other of the mentally disabled are humans.¹⁶

What exactly is almost human? And even if the term made sense in itself, could it be applied? I suspect not in this context. For Hurka, the individual must have the essential property to be a member of the kind “human.” The only property he requires qua human is rationality. If one fails to possess this property, then they are not human. So, if fetuses, babies and the demented are not human, why not treat them like any other living thing that is an animal? For example, why not have them for supper or breed them for body parts, killing them before they become rational?

One possible response to why we should not treat our infants the same way we treat grazing cattle or sniffing dogs is a quasi-potentiality argument. Hurka writes

On any view, what matters morally about a foetus or baby is that it develops its capacities in later life, and regardless of its present status, perfectionism can tell us to promote this development.¹⁷

¹⁶ Ibid. 47.

¹⁷ Ibid. 47.

One immediate problem with this reply is that it leaves out individuals who have no potential for developing rationality. What are we to do with all the Tracey Latimers¹⁸ of the world? They are simply not human in Hurka's view and they never will be. Second, Hurka himself seems to reject "potential rationality" as appropriate grounding for moral consideration. In discussing a notion of human nature that uses a notion of potential rationality, Hurka writes

First, the potential rationality that it [the theory of human nature] makes essential to humans must be a real property, which persists through time and involves more than just the fact that a being will be rational-at-some-time or could be rational-in-some-possible-world. These last properties, which are indexed to times or worlds, cannot play the role essential properties play in grounding identities across times and worlds. If a foetus is identical to a future adult, the explanation cannot be given in using properties that presuppose identity, as indexed properties do...But I am not certain that the concept of potential required by the theory is available and will therefore assume that it is not.¹⁹

It seems that Hurka's skepticism with regard to "potential rationality" as a real property casts doubt on the idea that we can ground our moral obligations to fetuses and babies by concern with their "capacity" to develop rationality.

A second possible reply to the objection is to invoke two different uses of the word "human", one as a noun and another as a descriptor. Hurka employs this method and writes

If denying that fetuses are humans seems odd, one reason may be an ambiguity in the word "human." In a narrow sense, this word applies to full-fledged members of the human kind, that is to human beings. In a broader sense, it applies to anything connected with the human species;

¹⁸ Tracey Latimer was a 12-year old girl mercy-killed by her father in Saskatchewan, Canada. She was born severely disabled, including 90% of her brain damaged and severe cerebral palsy. Tracey had never in her twelve years of life realized anything even remotely similar to "personhood." Her level of consciousness was estimated to be less than that of a one-year old.

¹⁹ Ibid. 46.

thus we speak of human hair, a human corpse, and human sperm. That fetuses are not human beings does not mean they are not humans in the broader sense: they are human fetuses, not dog fetuses or chimpanzee fetuses. But their being human in this sense does not imply that they are members of the species.²⁰

One obvious problem is that we do not believe that human hairs should be treated with respect but we probably should not use human fetuses to decorate our cardigans with.

How are we to account for the difference in moral considerability?

I suspect the main problem is that Hurka's account of species is completely inconsistent with current evolutionary biology and furthermore, he does not attempt to explain why he has chosen to deviate from evolutionary theory. In biology, rationality is considered a contingent property and not essential to being a member of *Homo sapiens*. While our capacity for complex rational functions of the brain are recognized as features common to many humans, it is equally recognized that developmental errors and mutation can lead to decreased function or perhaps even complete absence of such functions. This however, does not jeopardize membership in the species. If Hurka wishes to maintain this rationality-based view of human nature, he must argue why current evolutionary theory is incorrect, or at least suggest that *humanity* is not a biological category in his discussion. Then, he needs to explain *why* and *how* his notion of human nature plays the central role it does in his moral theory.

A second objection to Hurka's theory of human nature appeals to his use of individual essentialism. If an individual, at one point in her life, is a rational fully functioning member of society, and at some point later in her life slips into an irreversible

²⁰ Ibid. 47.

coma, the theory suggests that we no longer have the same individual. In fact, it suggests that stronger claim that she is no longer human. Recall that individual essentialism holds that the individual who has the essential property *must* have it in order to exist. Perhaps we would want to say that she is no longer a person and this would require some sort of story about personhood, but we would not want to deny that she is still a human being, i.e., a member of *Homo sapiens*. Much more can be said here regarding the specific theory of personhood one chooses to adopt but suffice it to say this is a very bizarre implication of the perfectionist theory.

On this more plausible account of species membership, rationality can still be an important property that some humans have but it is contingent and not essential to being a member of our species. This creates a fundamental problem for the perfectionist theory of human nature and indeed for any moral system that is grounded in a similar notion of human nature.

What does this all mean for GLGA? Recall that the objection was that because a notion of human nature is necessary for grounding moral theory, we ought not to change it, and since GLGA runs the risk of altering human nature, we ought not to pursue or engage in it. So, in this section, I first examined what sort of notion was needed in order for the objection to be consistent. I concluded that our notion of human nature had to be an essentialist, nonchanging one since under a non-essentialist construal, we could allow for a change in human nature (which of course would be inconsistent with the objection). Of the moral theories which in fact appeal to this kind of “essentialist” human nature, I chose to examine perfectionism which seems to me to be the least counterintuitive moral theory making use of the notion of human nature. Now, in showing how the use of such a

construal of human nature in perfectionism yields implications that are seriously counterintuitive, I hope to have shown how such a theory will be unsuccessful.

Consequently, if this is the sort of theory that the objection to GLGA appeals to, and it is unsuccessful, then we really have no objection to GLGA since I will have not only undermined the role of human nature in moral theory but also the theory itself.

3.2.3 Is Human Nature in Our Genes?

Earlier I stated that two assumptions had to be made in order to discuss the claim that human nature has objective value.²¹ The first assumption that had to be made was that there is such a thing as human nature. This claim was discussed in the preceding section. The second assumption was that germ line genetic engineering would introduce a change into human nature. In this section I want to examine this second claim. This discussion will have to assume once again, for the sake of argument that there is such a thing as human nature.

The first thing to note is that the claim that germ line genetic engineering will change human nature *assumes* that any change in the DNA sequence of our genes will amount to a change in human nature, which assumes at least that human nature is a function of our genes and maybe even a reductionist account of human nature – it being reduced to our genetic structures. This is essentially what I will refer to as the “genetic reductionist” account of human nature. This view however, is misleading and ought to be rejected or at least revised in a way that I will describe below.

Adhering to genetic reductionism in any strict sense – the sense required for the objection to work in the first place – implies that our natures are not influenced by the

environment, thereby ignoring the fundamental interaction of our genes with the environment. There is nothing to suggest that if we have a nature it is to be found *exclusively* at the level of our genes. In fact, the way that most of our genotypes are expressed at the phenotypic level are a function not merely of what the genes are, but of what the environment is as well. As Mange and Mange write

A person's phenotype unfolds during development and maturation when genes and gene products interact with one another and with life's circumstances...It is not appropriate to ask whether a trait is "due to genes" or "due to the environment" since a person cannot exist without both. The nature-nurture question is one of degree rather than one of kind. We can ask, for example, how much of the observable phenotypic variation in hair color is due to people having different hair color alleles and how much is due to hair being put in different environments.²²

Those traits that are governed solely by our genes, such as blood type or hair follicle number, are certainly not the sorts of traits that we would include in our description of human nature. However, traits like intelligence and rationality, which we would be more inclined to include as defining characteristics of human beings, are highly dependent on our environments. For example, it is highly unlikely that Einstein would have developed to be the physicist that he was had he been completely isolated from the rest of humanity, without the influence of his family, friends and teachers. The point is that even if the traits that make up our natures are in some way circumscribed by the genes we possess – and in a certain sense they indeed are (just imagine that I had been born without the genes encoding for the development of my brain) – we can not assume that the traits that make up our natures are those governed exclusively by our genes.

²¹ See § 3.1.1

²² Mange, A.P. and E.J. Mange, (1990), *Genetics: Human Aspects*. Massachusetts: Sinauer Associates, Inc. p.459.

If we do have a human nature, I suggest the more plausible view will be that human nature will be determined both by our genetic make up and by the environment in which we live, such that a change in either need not necessarily entail a change in human nature. As Mange and Mange continue

Because the genes provide the initial guidelines for the development of a new person...the genotype of an individual determines a *range* of possible phenotypes, and within that predetermined range, a specific phenotype is molded by environmental influences.²³

But suppose we did accept genetic reductionism in the original form. The acceptance of such a genetic reductionist account of human nature would have a rather bizarre consequence. Recall that the one objection to GLGA based on human nature was that our concept of human nature somehow plays a role in moral theory. If this is true, *and* we commit to a genetic reductionist account of human nature, exactly what kind of moral principles would follow? Imagine the sorts of moral principles that would be prescribed by a perfectionist theory in which we are told to “perfect” our natures. Would everyone have to go out and perfect their genetic codes? This would ironically lead to direct support of genetic engineering since that would be the most efficient way of perfecting our genes and hence our natures! Genetic reductionism is simply not a plausible view of human nature. But suppose that we could be more sympathetic to some kind of genetic reductionist view of human nature such that an alteration in our genes could possibly amount to a change in our natures. What would this mean? But more importantly, would it matter morally?

²³ Ibid. 460.

3.2.4 What if We Became Gumans Instead of Humans?

If happiness, then, is activity expressing virtue, it is reasonable for it to express the supreme virtue, which will be the virtue of the best thing.

The best is understanding, or whatever else seems to be the natural ruler and leader, and to understand what is fine and divine, by being itself either divine or the most divine element in us.

Hence complete happiness will be its activity expressing its proper virtue; and we have said that this activity is the activity of study. This seems to agree with what has been said before, and also with the truth.

Aristotle²⁴

For Aristotle, the most god-like quality of our natures, and most worthwhile of development is understanding or contemplation, though there is debate on how exactly he is to be interpreted here. So suppose that we could explain to him that by GLGE we could increase the ability of people to contemplate to an even higher level than is presently possible, and that by GLGA we could allow those people to contemplate, that due to genetic illness would not otherwise be able to contemplate.²⁵ But imagine further that we could only accomplish these things at the cost of our human nature such that we no longer had a human nature but instead had a *guman* nature. How ought Aristotle to respond to such a suggestion? It is not at all clear that he would object to such an improvement. In fact it would be inconsistent of him to maintain his views on contemplation and to deny the value of genetically engineering future people to be even more divine-like. Therefore, it seems that Aristotle might even welcome such a change to human nature if it meant bringing us closer to the perfection of the gods. Even contemporary perfectionists, it seems, ought to welcome such a change.

²⁴ Aristotle, *Nicomachean Ethics*. Translated by T. Irwin. Massachusetts: Hackett Publishing Company, 1985: 284.

²⁵ Denis McKerlie brought this example to my attention.

But what about rights-based moralists or utilitarians? Again, there is no reason to suspect that they would be opposed to such a change. For rights-based theories, the new focus would be guman rights instead of human rights. For utilitarians, what would matter is what now constituted pleasure for gumans and the maximization of that good. It is a mistake to assume that any change in human nature would imply a complete destruction of moral theory and practice. Why couldn't we just modify our current moral theories or construct new ones based on the new and "improved" guman nature?

Of course this entire discussion has assumed that any alteration to our genes will result in not only an alteration in human nature but also the stronger claim that it will result in a new non-human nature. This is most likely an exaggerated view of what would actually happen. There is no foundation for believing that changes introduced at the level of genes would result in a change in the *kind* of thing that the individual is. Rather, the more plausible view is that GLGE would result in an increase *in degree* above average levels and GLGA would result in an increase *in degree* to the average level. It seems implausible to suggest that I would be any less human if I were less susceptible the common cold or to obesity. Furthermore, it seems absurd to accept that if parents, the mother of which was afflicted with hemophilia, underwent GLGA to have a child without hemophilia, that this child would be any less human than it's parents.²⁶ Rather, I ought to be viewed as a human with certain health advantages and the parents as praiseworthy for preventing a potentially fatal disease in their male *human* children. The point is that we are not *harming* our natures in any way by genetic engineering. We should view it rather

²⁶ Hemophilia is a genetic blood disorder that results from the deficiency of certain blood clotting enzymes. Afflicted persons are prone to excessive bleeding from minor wounds and under unsupervised conditions

as an enhancement overall to be appreciated. If I destroyed the Mona Lisa and used the canvas for an abstract painting of my foot, that would surely be grounds for moral blameworthiness (fanatical podiatrists aside). If this were the analogous example to genetic engineering, i.e., that we are somehow doing something to negatively destroy our natures, then it might work as an objection. But this is wrongheaded. The real analogy is like restoring the Mona Lisa such that its better features are enhanced and better appreciated. In the same way when we perform GLGA we are “restoring” genes to a state where future people may have more valuable lives than they otherwise would have had.

3.3 Concluding Remarks

So what are we to make of the human nature objection? I have argued in this chapter that two of the three interpretations of the human nature objections – namely the “objective value objection” and the “moral theory objection” – are not successful as objections to GLGA. They do not present anything either *in principle* or *in practice* that would be sufficient to call for the prohibition of GLGA. However, let me just conclude this chapter by saying that if there is such thing as human nature, and GLGA does in fact run the risk of altering it, the prevalence of this objection in the literature can only be summed up to a psychological habit – the tendency to fear the unknown, whether the consequences be good or bad. And habits, although comfortable, have never been sufficient reasons not to explore the unknown.

can bleed to death. It is a sex-linked disorder that is expressed only in males and inherited from their mothers.

CHAPTER 4

GOD AND MOTHER NATURE

Perhaps the most widespread objection to germ line genetic alteration in the literature is the “playing God” objection. After all is said and done about technical difficulties and safety, many critics still object to GLGA on the grounds that to manipulate the human germ line would amount to playing God. This objection presents itself in both a religious and secular context. Whereas the religious arguments point to our limitations as human, mortal beings and the interference with divine plan set out by God; the secular versions warn of our limited capacities to understand the overall forces of evolution and natural selection. These latter arguments are what I will collectively call the “Mother Nature” arguments. I will refer to the former, religious versions collectively as “Playing God” arguments. While not all of the arguments may be classified as objections *in principle* but rather may take the form of an objection *in practice*, it is important nonetheless to consider them in detail since they will most likely, if successful, represent permanent objections in practice.

4.1 Playing God

There are two separate versions of “playing God.” One is the popular, traditional objection which argues that by performing manipulations on the human germ line, we are interfering with God’s “work”. We are designating to human beings a power that is divine like and in doing so offending God. This argument is easily dealt with since it ignores fundamental similarities in the ways that GLGA would be interfering in the

divine plan and the way that current medicine interferes with it. This is what I will refer to as the “Naïve Playing God” objection.

David Heyd has articulated the second version of playing God in his 1992 book *Genethics*.¹ Heyd works with a direct translation of a biblical passage in Genesis and concludes that what these passages should be taken as saying is that we as human beings have an obligation to procreate in the image of God, that in this sense we legitimately play God. This is a non-conventional interpretation of “playing God” and as I will argue, construed in this way, one cannot formulate an objection to GLGA and in fact, we may through our divine-like right to play God, actually have an obligation to pursue GLGA.

4.1.1 Naïve Playing God

Traditional objections of this kind tend to refer to “playing God” in the pejorative critical sense of overstepping one’s designated role. If we were to go ahead with GLGA, this would constitute an illegitimate interference with an antecedently given natural or divine design – we are acting outside the limits of our rights and authority as human beings.

Harris notes that there are three assumptions upon which this objection rests:

1. God has a monopoly of the role of creation.
2. God is doing a good job and perhaps in consequence has a right to be left alone with it.
3. God’s will is expressed in nature and that consequently the natural order must not be disturbed.²

¹ Heyd, D., (1992), *Genethics: Moral Issues in The Creation of People*. California: University of California Press.

² Harris, (1998), p.177-8.

This formulation of the playing god objection is really a non-starter. The main reply is that the objection represents a serious inconsistency which must be explained if it is to hold water. The first assumption is problematic. It is not clear at all that God has not assigned the divine-like role of creation to human beings. I will discuss this in greater detail in the next section.

The second assumption is also problematic. That God is doing a good job will be completely false for those who see the traditional problem of evil as a real issue. Theists will generally hold that the evil and suffering we see is beyond our understanding but serves an important function in God's divine plan. As tempting as it is to embark on a discussion of the various responses to the problem of evil, this is not the place for such a discussion. Suffice it to say however, if evil is a result of our own God-given free will, would our freedom to repair an evil not also be part of that same free will? Of course, the idea that *we humans* created all of the genetic "evils" is not terribly plausible and since this is so, the argument from evil takes its strongest form, viz., as a concern about a so-called *loving* god who would nevertheless allow *innocent* children to suffer genetic disease induced pains and disabilities.

The implausibility of this objection is most apparent when examining the third assumption – that the natural or divine order must not be disturbed. If we accept this third assumption, it makes most of what we do in ordinary medicine wicked! As Harris notes

[P]eople naturally fall ill and naturally have reparable defects; if the practice of medicine has a coherent aim it must be seen, if anything, as the comprehensive attempt to frustrate the course of nature...Moreover, the idea that human beings should not disturb what God has so carefully

arranged presupposes that we and the disturbing things we do are not part of those arrangements.³

So, unless we wish to classify all doctors and their practices as demonic outbursts against God, critics cannot object to GLGA on these grounds. It would be inconsistent to allow antibiotics or vaccines, for example, yet prohibit GLGA. Morally, they are on equal footing where playing God in the disruption of nature is concerned. Hume, in arguing against the moral impermissibility of suicide, recognized a similar false dichotomy. If the reason we are not permitted to commit suicide is because it is for god to decide when we shall live and when we shall die, then we play god whenever we cure people thereby preventing their death, as well as when we kill others or ourselves. Hume wrote

Were the disposal of human life so much reserved as the peculiar providence of the Almighty that it were an encroachment on his right for men to dispose of their own lives, it would be equally criminal to act for the preservation of life as for its destruction. If I turn aside a stone which is falling upon my head, I disturb this course of nature, and I invade the peculiar providence of the Almighty by lengthening out my life beyond the period which by the general laws of matter and motion he has assigned.⁴

The fact that this response is so obviously successful makes it surprising that the playing god objection is still so prevalent in the literature.

Harris' second claim parallels my point earlier about free will and God's plan. To deny our role in the management of diseases would amount to denying that we are part of that very plan. This is a conclusion I do not think the critics would be willing to accept. Let me now turn to a more interesting version of "playing God."

³ Ibid. 178.

⁴ Hume, D., (1742), "Of Suicide," Reprinted in *Essays, Moral, Political and Literary*. London: Oxford University Press. p.590.

4.1.2 Heyd on Playing God

Heyd's version of playing God is not an objection to GLGA at all but is rather an unconventional interpretation of playing God that, if formulated carefully, might serve as a framework within which GLGA would present nothing contrary to God's design at all.⁵ In his book, *Genethics*, Heyd defends what he calls a "person-affecting" theory of value (which I will describe shortly) and it is under this model that Heyd examines the issue of playing God. He begins with a passage from Genesis in the bible.

And God said, Let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth. So God created man in his own image, in the image of God created he him; male and female created he them. And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth...And God saw ever thing that he had made, and, behold, it was very good.

Genesis I: 26-28, 31

Heyd draws a number of things out of this passage. The first and most important thing for Heyd is that when God examines what he has made and "behold, it was very good," we must be led to conclude that it was good *for* him. This is the foundation of the person-affecting view of value. In order for a thing to be of value, it must be of value *for* someone. Thus, the creation of Adam and Eve had to do with God's wishes, interests and good. The second point is that we are created *imago dei*. And what exactly is the image of God? For Heyd the important qualities are two-fold. He writes

⁵ Heyd, (1992). The following discussion will examine Heyd's theory as presented in Chapter 1 of *Genethics: Moral Issues in the Creation of People*.

[N]ote that the image that God wants to aggrandize in the world...is the very power of transforming valueless things and states of affairs into things of value through the creation of the necessary condition for the existence of value, namely valuers.

Now, if indeed the existence of valuers (for whom things might be good) is ... a necessary condition for anything being of value, then it is either God or human beings (or both) which are the reference points for any assignment of value. The world created stage by stage is said to be good for God (in his eyes), but, as most interpretations of Genesis point out, it is created so as to be good specifically for *man*. It must be “settled” and tilled by human beings, in order for it to become valuable. In that respect, human beings must perpetuate themselves so as to secure the ongoing value of the created world. This is the cosmic design (which is of value for God).⁶

And it is in this sense of begetting valuers that we have “dominion” over the world. Heyd continues

Although they [human beings] do not share the omnipotence of God, they have “dominion” over the world in the radical sense that the very continuation of the existence of any value in and of the world is dependent on their begetting valuers...without their existence as subjects for whom the earth can be of value, the earth will remain valueless. This is the nonstandard understanding “dominion,” and the way human beings “subdue” the non-human world.⁷

So, Heyd concludes we play God legitimately in two ways:

- Human beings have control over the existence and number of future people; and
- Human beings are the source of value of the rest of the natural world.

In God’s image, we can choose due to our qualities of rationality, consciousness and free will, whether and how to continue the original celestial design. This ability to choose to create in God’s image is what makes human beings subject to the religious obligation to “be fruitful and multiply” and to “subdue the earth.” It is a responsibility to God which is

⁶ Ibid. 6.

⁷ Ibid. 6.

to guide both family planning and ecological policies. This concludes the explication of Heyd's interpretation of "playing God." Now, how exactly can this understanding be used to lead to the conclusion that we may have an obligation to pursue GLGA? The argument might look something like this.

1. We have an obligation to propagate the image of God through procreation in order to maintain value in the world.
2. The only way to maintain value, according to the person-affecting view, is to create valuers.
3. Then, we are obligated to do what we can to make sure that future people are the sorts of people who can value.
4. Those people born with severe genetic disorders such as Tay-Sachs disease, Lesch Nyhan Syndrome, and anencephaly, are not capable of valuing.
5. We can ensure that people are not born with these diseases through the use of GLGA.
6. GLGA is a legitimate form of playing God since it involves genesis issues.
7. Therefore, we ought to pursue GLGA for the sake of propagating in the image of God.

The argument is by no means flawless, but it does draw out the main point here. If playing God is construed in a person-affecting way, then, although Heyd does not discuss this implication, there really is no reason to think that the promotion of valuers – in the image of God – by GLGA ought to be prohibited. Rather it might be that we are obligated to do so.

The suggestion that our god given right to "play god" may actually obligate us to pursue GLGA has limitations however. First, one must buy the person-affecting theory of

value. The biggest conceptual difficulty here is allowing for God to have desires and interests to be satisfied. The Judeo-Christian conception of God often denies this particular attribution to God. God is by his very nature perfect and desireless in his infinite existence. However, this ascription to God, then leads to another unfavorable consequence. The alternative would be to adopt an impersonal theory of value and reinterpret the passage from Genesis. What results is that if what God saw was not good *for* him, but was nonetheless good, then there is some value system independent of God which he is *serving* rather than *constituting*. Furthermore, that God does have interests intuitively fits better with his command for us to procreate in order to propagate his image in the world.

The second problem is that the argument formulated as such might allow for too much. Exactly how much are we to allow in the name of propagating the image of God? We are on dangerous ground in two places here; first in the description of God's image, and second in deciding the means we are permitted to pursue in order to achieve the goal of propagating god's image.

Both Heyd and I, in ascribing only the ability to procreate and thereby create value in the world, have been very conservative in describing the image of god. But, if the image of god was less conservatively spelled out, how far might it go? Is god obese or diabetic? Does she have buckteeth? Was Jesus black or white? One can see the potential here for all sorts of discrimination and although I have dismissed discrimination worries as objections *in practice* to GLGA, I find discrimination in the name of God particularly troublesome. Justifications for conclusions drawn and for practices based on God are dangerous. They can represent, in the eyes of many believers, overriding importance and

implicit divine consent for unacceptable means to achieve ends that are questionable in themselves. This is directly relevant to the second issue of what means, once we have established what the image of god is, we are permitted to pursue to ensure the propagation of that image. If god permits GLGA, are we then also allowed more severe and inhumane means such as coerced sterilization? Would a program of mass genocide also be acceptable?

These are really very serious issues. Belief that there is an obligation to god binding on humans, have often proved to be more strictly adhered to at any costs than obligations to ordinary humans. Furthermore, these obligations are often thought to override any legal sanctions that are in place. For these reasons, I am wary of appealing to any such arguments for the permissibility of GLGA. I would prefer arguments without reference to a deity of any sort. This will be the focus of Chapter 5.

4.2 Mother Nature

These objections generally come in two sub-versions. The first tend to point to the inadequacy of our knowledge of evolution, natural selection and the mechanisms of gene expression. Tampering with germ line genes could therefore lead to unexpected and disadvantageous results. These are most popular in the literature and present in the form of risk-benefit analyses thus rendering them *in practice* objections. The second sub-version of arguments are those that assign intrinsic value to the continued existence of the human species unchanged. Critics fear that GLGA will lead to the demise of the human species and the introduction of a new species, and since the human species is intrinsically valuable, we therefore ought not to pursue GLGA. This objection of course will be shown

to make the same logical error that the objective value of human nature objection made. I examine it in section 4.2.5 only for the sake of completeness.

4.2.1 The Value of Genetic Variation

This objection centers on the knowledge human beings have (or lack) of the intricate workings of evolution and natural selection. Critics argue that we simply do not know enough about the role of diseased genes in species survival. The infamous sickle cell trait is often appealed to at this point in the argument. Those who are heterozygous for the sickle cell gene tend to be asymptomatic for the sickle cell disease and have a natural immunity to the microbial parasite *Plasmodium falciparum* which is responsible for malaria. Suzuki and Knudston explain:

[P]aradoxically, people with sickle-cell trait have a better chance of surviving the battle with malaria than those who harbor either two copies of the mutant sickle-cell gene or two normal genes. The key to the success of these heterozygotes seems to lie in their genetically determined quota of defective red blood cells. When these cells are attacked by the parasite, they sickle, just as they would in low-oxygen conditions. But when the parasite attacks, the collapse proves beneficial. As the body's immune system is mobilized to track down and remove the accumulating debris of sickled red blood cells, it simultaneously sweeps up millions of the malarial parasites trapped inside them. As a result, the parasitic infection is often thwarted and the lives of many individuals with sickle-cell trait are spared.⁸

The moral of the story is that those allegedly diseased genes, which will be systematically eliminated from the human gene pool by GLGA, may be of potential benefit to the species – especially in different environments. Evolution and natural selection, so the objection goes, tend to pick out the most valuable traits for species survival and do a good job of eliminating those traits that are deleterious to species survival. Therefore, the

objection concludes that we ought not to interfere with this process by engaging in GLGA. These sorts of considerations have led Suzuki and Knudston to put forth two “genethical” principles related to this issue.

Genethic Principle 4: While genetic manipulation of human somatic cells may lie in the realm of personal choice, tinkering with human germ cells does not. Germ-cell therapy, without the consent of all members of society, ought to be explicitly forbidden.⁹

Genethic Principle 8: Genetic diversity, in both human and non-human species, is a precious planetary resource, and it is in our best interests to monitor and preserve that diversity.¹⁰

Let me just add here that if the plan is to actually *tinker* with the human germ line, then I too will be opposed to germ line genetic engineering. No one ought to *tinker* with genes as Suzuki and Knudston note. However, given the sophistication of current techniques and the good intentions of GLGA, the claim that “tinkering” will take place is implausible. Either Suzuki and Knudston chose the word innocently without the foresight of the negative connotation that would subsequently be linked to germ line genetic engineering, or they chose it deliberately for that purpose. Let me be generous in my reading and grant the first explanation.

There are at least three responses to the genetic variation objection. The first response is very similar to the response to the naïve playing God objection in that there is no reason to suspect that we don’t already interfere with natural selection in other ways,

⁸ Suzuki and Knudston, (1988), p.185.

⁹ Ibid. 335.

¹⁰ Ibid. 335.

and hence the mere fact of interference cannot be treated as a cogent objection. The second reply questions the claim that GLGA will actually reduce genetic variability. Finally one may deny the “beneficence” of natural selection and question its “efficiency”. Let me now discuss each of these replies in greater detail.

4.2.2 Reply 1

Objectors maintain that GLGA is impermissible simply because it interferes with naturally selected genetic variability. However, to acknowledge other medical, cultural and technological practices which likewise artificially affect genetic variability, but by contrast are permissible, presents a serious inconsistency.

To give credit where credit is due, in most intelligent debates on GLGA, those opposed to GLGA recognize this point and the main thrust of their objection then becomes not one of whether there is actually an interference with nature, but rather that GLGA is unique in that it involves the *intentional* interference with nature whereas the interference of other techniques is not intended but instead only foreseen. For example, the Royal Commission writes

It is nonetheless important to note that germ-line genetic alteration would be unique in that it involves intentional interference in human evolution. This imposes a greater responsibility to consider the impact of decisions regarding it on our species and on the interests of future generations.¹¹

Similarly, Capron writes

The major reasons for drawing the line between somatic cell and germ line interventions...are that germ line changes not only run the risk of perpetuating any errors made into future generations of nonconsenting “subjects” but also go beyond ordinary medicine and interfere with human evolution. Again, it must be admitted that all of medicine obstructs

¹¹ Royal Commission on New Reproductive Technologies, (1993), p.941.

evolution. But that is inadvertent whereas with human germ line genetic engineering, the interference is intentional.¹²

But the appeal to intentions versus foresight is barely more successful than the original objection that interference is wrong. It is simply not true that ordinary medicine interferes with natural selection unintentionally. Recall Harris' point. Since diseases occur naturally and our susceptibility to them is a result of the evolutionary process, the ultimate aim of medicine must be at least in part, the frustration of natural processes. Furthermore, we frustrate the course of nature intentionally. We are aiming precisely at the cure for the disease by means of eliminating the susceptibility.

One possible reply is to deny that the interference of the natural course of events is in fact the aim of medicine. Rather the aim of medicine is to alleviate suffering and promote the well-being of individuals. This reply is really a non-starter. But even if we are charitable and agree that this is the case, does the same not apply to GLGA as well? By definition, GLGA involves the aim of preventing disease and thereby preventing suffering. Ultimately, according to either choice of the aim of medicine, if the interference objection is successful in prohibiting GLGA, then it must also prohibit other medical techniques. Alternatively, we must allow both techniques. The pattern here is similar to the analogy between SCGE and cosmetic surgery that we saw in Chapter 2.¹³

There is one final possibility. Perhaps what lies at the heart of the objection is a matter of questionable means rather than ends. That is, maybe critics would not deny that the ultimate aims of conventional medicine and GLGA are the same, but rather would

¹² Capron, A., (1990), "Which Ills to Bear: Reevaluating the 'Threat' of Modern Genetics," *Emory Law Journal* 29: 665-96.

¹³ See § 2.4

object to the means by which GLGA realizes the aim. Whereas in ordinary medicine the means do not involve a direct intentional manipulation of the genes, the fact that in GLGA manipulation of the genes is precisely the intended means is what is objectionable about GLGA. But really this objection would then be a *petitio principii*. If we ask exactly why it is that direct manipulation of genes is objectionable, it seems that the response might be something along the lines that our genomes are intrinsically valuable in their natural states. But of course, this will be unsuccessful as a reason since it is the same kind of logical error that was made in the conservative claim about the objective value of human nature.¹⁴ Intrinsic value, like objective value, does not entail overriding value. This is especially apparent in this case where it has already been established that an inadvertent alteration of the genome for the sake of health, as in ordinary medicine, is permissible.

4.2.3 Reply 2

The second response to the genetic variability objection concerns itself with the assumption that GLGA will in fact reduce genetic variability. This assumption is dubious for a number of reasons. Berger and Gert argue that it is an error to claim that GLGA will result in a loss of variability and that the chances are that GLGA will actually *increase* genetic variability.¹⁵ They write

The second and more important reason that the evolutionary argument [the argument that GLGA will reduce genetic variability] is false is that unlike the situation with selective breeding in crops where genetic variation is lost by inbreeding, gene therapy in its current form does not result in a loss of any allele variation. In fact, just the opposite occurs...Essentially, the present technology which would be applied to human gene therapy only

¹⁴ See § 3.1

¹⁵ Berger, E.M., and B.M. Gert, (1991), "Genetic Disorders and The Ethical Status of Germ-Line Gene Therapy," *The Journal of Philosophy and Medicine* 16: 667-683.

allows us to add genes. All of the resident genes present in the cell prior to therapy remain in the cell.¹⁶

So, in terms of the quantity of genes in the gene pool, and given the type of therapy currently available is limited to gene addition, GLGA will lead to an increase in genetic variability. In other words, the reasoning here, far from arguing that GLGA is *impermissible*, suggests that at least in its current applications, GLGA is perfectly permissible. The downside is that the technique of gene addition only enables us to treat recessive genetic diseases. Recall that the insertion of a gene is not enough to mask the effects of a dominant genetic disease. These diseases could only be cured by *gene replacement* – i.e., the excision of the faulty gene and replacement with a healthy gene. Therefore, while the objection fails to provide a good reason for the impermissibility of GLGA by gene addition, it still leave open the possibility that limits could be set to what permissibly could be done to cure dominant genetic diseases.

Harris offers a more interesting response to the genetic variation objection.¹⁷ He suggests that there is an equivocation on the word “diversity” at play here and depending upon which interpretation is actually being referred to, the objection will be based on a false premise. There are three separate ways in which “diversity” may be understood.

1. **Genetic Diversity** – the variability of genotypes.
2. **Human Diversity** – the variability of phenotypes. i.e., those genotypes as expressed within a particular environment.

¹⁶ *Ibid.* 90.

¹⁷ Harris, (1998).

3. **Personal Diversity** – the variability resulting from what people are like and what they can do.

While maintaining diversity in the first sense – genetic diversity – is important, it will also be important to maintain diversity in the other two senses, human diversity and personal diversity. It should also be noted that diversity is not only important quantitatively, but also equally qualitatively important. Presumably, the genes that would be eliminated are qualitatively poor genes. Therefore, with respect to genetic diversity then, reducing the number of different alleles by gene replacement will be qualitatively beneficial. While the sickle cell trait example is important, disease genes that confer some kind of advantage are extraordinarily rare. Most diseased genes offer no benefit to the affected individual or the species as a whole. At most, with respect to genetic diversity, the only thing the objection shows is that we must exercise caution in the selection of alleles that we choose to eliminate.

With respect to human diversity, the phenotypes that would be targeted for elimination by GLGA are undesirable to say the least. The physical manifestations of certain genetic diseases such as the uncontrollable jerking of Huntington's Chorea, the excruciating full-body muscle spasms of cerebral palsy, and the painful deterioration of muscles of multiple sclerosis, while severe and painful are minor compared to the mental and emotional anguish of those afflicted. The magnitude of the loss of dignity, loss of independence and humiliation of those who suffer from such diseases can never be fully appreciated by those of us fortunate enough never to have experienced it. I can't see any reason to regret this kind of loss in diversity of phenotypes if these are the sorts of phenotypes we would thereby be sacrificing. Therefore, the objection with respect to a

reduction in human diversity is unsuccessful. We might even think that a reduction in the diversity of the *phene* pool in this way is a good thing.

Finally, personal diversity, like genetic diversity, should be expected to increase with the application of GLGA. What people are like and what they are capable of doing will often be directly limited by their degree of health. The goal of GLGA is to eliminate genetic diseases that debilitate their victims and greatly decrease their life expectancy. If the alterations are successful, what we can legitimately expect to see are persons living longer, healthier lives who otherwise would have been affected by a genetic disease. This will open up new possibilities to what they can achieve and consequently personal diversity will increase.

4.2.4 Reply 3

Finally, I question the validity of the claim that evolution and natural selection are as efficient and beneficent as the objection requires them to be. First of all, no sense can be made of evolution or natural selection, which are both *processes*, as efficient or beneficent. However, even on a charitable reading, it is not clear that, in the words of Boone, the “uncontrolled reign of nature produces the most humane world that we can imagine.”¹⁸ For example, if a gene were deleterious to survival of the species, one would expect the gene to be selected against through the process of evolution in much the same way as those fetuses that are severely genetically damaged often spontaneously abort. But there are many examples where this is not the case. Huntington’s Chorea in fact may appear to have been selected for in that the symptoms of the disease are late in onset –

¹⁸ Boone, K.C., (1988), “Bad Axioms in Genetic Engineering,” *Hastings Center Report* August/September.

usually after the individual has had children. Therefore, the gene is more likely to be transmitted through generations.

There is another consideration to be taken into account. The objection assumes that all of our traits have been selected for their adaptive advantages. But, as many evolutionary biologists have noted, this need not be the case. There are at least two other ways in which a trait may come to be prevalent in a species. Elliot Sober writes:

Consider the human chin. Apparently, there never was selection for having a chin. Rather, selection for certain other features of jaw structure yielded a chin as an inevitable architectural consequence. If the genes that produce chins are the same as the genes that produce jaws, selection for jaws will bring chins along as a free rider. If jaws and chins were independent characteristics, each could be independently manipulated by natural selection. But if architectural constraints tie traits together in packages, the power of natural selection to produce novelty will be reduced... So chins may become prevalent because of selection without there being selection for having a chin. Biologists now call this sort of process *pleiotropy*.¹⁹

The phenomenon of pleiotropy suggests that a particular trait may have no particular adaptive advantage, but rather is a consequence of genetic architecture and the selection of a different beneficial trait. What this means is that, *in theory*, if a gene modifier could be inserted so as to control the traits separately, the “free rider” gene could easily cease to be expressed without deleterious effects.

The second way in which a trait could become prevalent without having been selected for is through chance. At the molecular level at least, evolution may to a

¹⁹ Sober, E., (1987), *The Nature of Selection: Evolutionary Theory in Philosophical Focus* Massachusetts: MIT Press. p.24. Others have referred to it as the “spandrel” effect. See S. J. Gould and R. Lewontin, “The Spandrels of San Marco and the Pandossian Paradigm: A Critique of the Adaptationist Programme,” *Proceedings of the Royal Society* B205: 581-598.

considerable extent be the result of what Sober calls a “random walk.”²⁰ A mutation in a dominant gene of just a few persons would be enough to introduce the change into the population at frequencies resembling those of many genetic diseases. So, really there would be no justification for the claim that somehow these diseased genes represent some kind of adaptive function. It could really be just the result of a couple of mutations propagated through the population by reproduction. If either the possibility of free-rider genes or random mutations is likely to be the cause of genetic disease, then there is no reason to prohibit our interference with nature. The issue is really not whether we interfere, but whether or not our incursions enhance or diminish the human prospect. If we, through GLGA can be more efficient in the quest for survival than evolution, then there are strong grounds for allowing such a technique.

As for the suggestion that certain traits that are disadvantageous in one environment and advantageous in another, e.g., sickle cell trait, I have a very difficult time trying to imagine any sort of environment in which self-mutilation in the form of gnawing my flesh off as in episodes of Lesch Nyhan’s syndrome, could be advantageous. So, while this objection can serve a purpose as a warning to be cautious and thorough before proceeding with GLGA, it does little to provide support for the view that we ought to prohibit it all together.

4.2.5 The Value of Species Preservation

Some of those opposed to GLGA have argued that there is intrinsic value in remaining the species that we are. They argue that since GLGA might introduce changes so as to effectively mark a speciation event, we ought not to pursue it. Like its human nature

²⁰ Ibid. 25.

analog in the previous chapter, this objection, if successful, would prove to be an objection *in principle* to GLGA.

Right off the bat, we should note that it is unreasonable to think that the possession of disease genes is essential to being human qua *Homo sapiens* – just as unreasonable as it was to think that the presence of disease is part of *human nature*. Suzuki and Knudston’s claim that genetic imperfection is “part of what makes us human” does no work in convincing us of the value of disease in being a member of *Homo sapiens*.²¹ For, genetic imperfection marks not only being a human being, but also being an animal, plant, microbe, yeast or prion. Mutation is not something unique to human beings. Furthermore, mutations have always occurred without rendering us non-human. There is no reason to suspect that artificially induced mutations in the form of GLGA would, by contrast, render us non-human. However, for argument’s sake, let me assume that our species could change with the advent of GLGA.

Leon Kass suggests this line of argument.²² He presents what he calls the “Homo superior” objection to GLGA. The reader is asked to imagine that through GLGA, we were to introduce a new, qualitatively superior species called *Homo superior*. He argues that we as human beings have a vested interest in remaining human beings. The objection may be summarized as follows.

1. GLGA may mark the introduction of a new superior species *Homo superior*.
2. As human beings, we have an interest in the survival of our species *Homo sapiens*.
3. *Homo superior*, through competition may threaten our existence as *Homo sapiens*.

²¹ Suzuki and Knudston, (1990), p.188.

²² Kass, L., (1972), “New Beginnings in Life,” in M. Hamilton (ed.), *The New Genetics*. Grand Rapids: ME Eerdmans.

4. Therefore, we ought not to pursue GLGA.

The first thing needed for this argument to work is an additional premise articulating just what it is about being human that he thinks gives us an overriding interest in survival as such. Perhaps because the characteristics associated with being human beings are useful and advantageous to us? But given most of those characteristics are not at their optimal levels, e.g., intelligence, resistance to disease etc., if we could optimize them by GLGA or even bring certain diseased individuals up to a normal level of function, wouldn't that be even more advantageous? It's not clear that the increased advantages would not be preferred over the present advantages even if it meant that we would be members of *Homo superior* instead of *Homo sapiens*. As it stands, it seems likely that any such premise articulating our preference for humanity that could be offered would be reducible to some form of specism or anthropocentrism, neither of which are particularly persuasive views.

To reject such a view however need not entail the rejection of the claim that preserving our species has intrinsic value. It is only to recognize the familiar logical mistake that we saw with the human nature argument – *intrinsic or objective values do not entail overriding value*. It may very well be the case that preservation of not only our species, but of all species has intrinsic value. However, what is not clear is that we should preserve our species at all costs.

4.3 Wisdom and Hubris

There is one final "Playing God/Mother Nature" objection which draws on an interpretation of *wisdom* that is different from our understandings of *knowledge* or *expertise*. The objection goes deeper than the lack of knowledge objection. Somehow, as

human beings, we are limited by virtue of being the sorts of beings that we are (recall the broader non-essentialist notion of human nature in chapter 3), in gaining sufficient *wisdom* to embark on certain procedures such as GLGA. Reference to such a lack of wisdom can be found both in religious and secular contexts. Ramsey writes, “Man [is not] wise enough to make himself a successful self-modifying system or wise enough to begin doctoring the species.”²³ Likewise, French Anderson presents an analogy of a little boy taking apart a watch. He writes:

I fear that we might be like the young boy who loves to take things apart. He is bright enough to be able to disassemble a watch, and maybe even bright enough to get it back together so that it works. But what if he tries to “improve” it? Maybe put on bigger hands so that the watch is “better” for viewing. But if the hands are too heavy for the mechanism, the watch will run slowly, erratically, or not at all. The boy can understand what he sees, but he cannot comprehend the precise engineering calculation that determined exactly how strong each spring should be, why the gears interact in the ways that they do, etc. Attempts on his part to improve the watch will probably only harm it. We will soon be able to provide a new gene so that a given property involved in human life would be changed...If we do so simply because we could, I feel that we would be like that young boy who changed the watch hands. We, like him, do not really understand what makes the object we are tinkering with tick. Since we do not understand, we should avoid meddling.²⁴

Suzuki and Knudston, in introducing another genethical principle, also refer to our lack of wisdom and the danger it could lead to.

Genethic Principle 9: The accumulation of genetic knowledge alone – however precious in its own right – does not guarantee wisdom in our decision regarding

²³ Ramsey, P., (1970). *Fabricated Man*. New Haven: Yale University Press.

²⁴ Anderson, F., (1985), “Human Gene Therapy: Scientific and Ethical Considerations,” *Journal of Philosophy* 10: 275-91.

human heredity; if such knowledge breeds a false sense of mastery over our genes, it can even lead to folly.²⁵

This principle may lead us closer to understanding what exactly is meant by this lack of *wisdom*. It seems plausible to suggest, that like the idea of *hubris*, what Suzuki and the others are driving at is a problem concerning human conceit about our ability to predict or control the outcomes of our actions. Given that God or Mother Nature are the only ones that could have such an ability completely and accurately, it is in this way that we objectionably “play God or Mother Nature.” We, as human beings, may be able to understand some of the separate parts of the workings of nature and gene expression, but we cannot understand, like the young boy, the workings of the whole picture and to think that we could would be presumptuous and arrogant.

In a religious context, interpreting playing god as a form of hubris would then characteristically associate playing god with pride and arrogance, the aping of divine power, or the attempt to gain salvation without the use of the divinity. An appreciation of this however, I suggest, makes clear that it is not the use of power or creativity that offends, but rather attributing power to one’s own resources, denying it’s origin in God’s continuing creation. In this usage, playing God is not therefore an act against morality, but rather one against God. So as Boone notes, “it would not seem that individual genetic pursuits would be forbidden in any necessary sense, unless the motive were an attempt to stand in God’s place. Therapeutic interventions are, in fact, consonant with the benevolent, other regarding impulses of Judaism and Christianity.”²⁶

²⁵ Suzuki and Knudston, (1990), p.335.

²⁶ Boone, (1988), p.10.

As for the secular version, the appropriate response to the charge of hubris is not that we should not play Mother Nature since we have previously acknowledged all the ways in which we acceptably do it already, but rather that we ought to do so intelligently and carefully, for again as Boone points out, “that is the essence of making choices and it undeniably is our destiny, whether we choose to accept genetic options or not.”²⁷

There is an element of uncertainty in almost everything that we attempt to do. Boone is correct in that “the essence of making choices” involves recognizing the uncertainties, informing ourselves of alternatives and consequences, and then proceeding to make the decision intelligently. It would be foolish to prohibit something as potentially beneficial as GLGA based on the fact that we have uncertainties as to some of its effects. These same uncertainties were present when we started using antibiotics, organ transplants and *in vitro* fertilization. Yet, rational decision making processes were able to guide us through the difficulties and allow us to finally reap the benefits. We can reasonably expect the same to be true of GLGA.

4.4 Concluding Remarks

I believe it would entirely accurate to say that the playing god and mother nature objections have been the most popular in the literature on GLGA. I suspect they will continue to be. However, as I have argued in this chapter, none of the formulations, both religious and secular, represent objections *in principle* to GLGA. Of the religious arguments, the naïve playing god objection was simply that – too naïve to be taken seriously. Ironically, the more sophisticated version presented by Heyd can actually be

²⁷ Ibid.

used to support GLGA. The perils of divine voluntarism however, led me to reject that argument as an adequate defense of GLGA.

Of the secular arguments, only the value of species preservation argument might have served to be successful as an objection *in principle* to GLGA. However, as is quickly becoming a trend in this thesis, this objection also commits the logical error of assuming that intrinsic value entails overriding value.

CHAPTER 5

GERM LINE GENETIC ALTERATION AND THE MORAL STATUS OF FUTURE GENERATIONS

Thus far in this thesis, I have argued against some of the most popular objections to germ line genetic alteration. While it seemed that these objections might be *prima facie* objections *in principle*, it turned out to be the case that they either collapsed into objections *in practice*, or were not cogent arguments at all. As is often the case in philosophy, responding to an objection will often prove less challenging than developing positive arguments for a position. The purpose of this chapter is to explore various positive arguments for the permissibility of GLGA. That I have shown that there are no good reasons to *prohibit* GLGA does not logically entail that there will be sufficiently strong reasons to *permit* it. For the rest of this chapter I will assume, contrary to fact, that there are no longer any technical difficulties with GLGA and that the elimination of dominant and polygenic diseases is safely possible.

There are two separate approaches which may be taken in order to positively defend GLGA. The first approach will be to argue that future generations have rights and that these rights impose, on presently existing generations, a correlative obligation to act in accordance with their interests. This has been the view defended by Joel Feinberg¹. However, as I will argue, Feinberg's argument is susceptible to the *potential person* – *potential rights* objection and is thus unsuccessful. This objection states that since future

¹ Feinberg, H., (1974), "The Rights of Animals and Unborn Generations," in T.L. Beauchamp and N.E. Bowie (eds.), *Ethical Theory and Business*. New Jersey: Prentice-Hall Inc.

generations are potential in the sense that they do not, by definition, exist, any rights that they can be shown to have will only be potential rights. David Heyd² presents a non-conventional *volitional* potential/actual distinction in which future generations may be seen as actual and therefore possessing actual rights. However, as I will argue, this view while circumventing the potential person – potential rights objection, yields other implausible results. I will conclude that the rights approach is too problematic and that we in fact do not need to establish the rights of future generations in order to establish the permissibility of GLGA.

The second approach will be to establish an obligation on our part to pursue GLGA without the correlative claim that future generations have rights. There are three distinct forms which this argument may take. The first argument is presented by Munson and Davis³ and is based on what they refer to as the “therapeutic imperative of medicine” as a discipline. According to Munson and Davis, the therapeutic imperative, which includes the duty to prevent disease, can be used to ground an obligation to pursue GLGA. The second argument is based on the “duty of easy rescue.” It can be argued with plausibility that in certain cases, all of the conditions stated in the duty of easy rescue (the so-called “need”, “proximity”, “capability”, and “last resort” conditions – see below) can be satisfied, and hence, in such cases, GLGA would be at least *prima facie* obligatory. Finally, we may appeal to Derek Parfit’s⁴ *Same Number Quality Claim* which claims that if in either of two possible outcomes, the same number of people would ever live, it would be worse if those who live are worse off, or have a lower quality of life than those

² Heyd, (1992).

³ Munson, R. and L.H. Davis, (1992), “Germ Line Gene Therapy and the Medical Imperative,” *Kennedy Institute of Ethics Journal* 2(2): 137-158.

who would otherwise have lived. This claim combined with mid-level moral principles such as the *duty of beneficence* and the *duty of nonmaleficence* can also establish an obligation to pursue GLGA. I will conclude that this will in fact be the preferable approach to establishing the obligatoriness of GLGA.

5.1 A Note on Methodology

As I discussed in the introductory chapter of this thesis, I have been working with a wide reflective equilibrium in this thesis. At this point, I just want to take a moment to review my approach, and in particular with reference to this chapter. In this chapter much of what I will be doing, in particular in the section on obligations, is working specifically with mid-level moral principles which have been fairly well-established in the literature, e.g., the principle of beneficence and the principle of nonmaleficence, and attempting to bring them into a reflective equilibrium with our considered moral judgments against a body of relevant background theories. So, basically what the reader can expect to see is first the presentation of a case scenario which is meant to draw out various intuitions. These considered judgments will then be tested against and supplemented by various mid-level principles.

What I will *not* be doing, is constructing the actual moral theories which might be the result of such a reflective equilibrium. The reason for this is that the majority of the mid-level principles are, as I mentioned above, fairly well established in the literature. Furthermore, the principles themselves can be found to be directly supported by most of the leading moral theories including, Kantianism, Utilitarianism, and Right-Based Theories. Therefore, I feel that to establish them once more in this thesis would be

⁴ Pafit, D., (1986), *Reasons and Persons*. Oxford, England: Oxford University Press.

unnecessarily repetitive and tedious. The obligations that I attempt to establish will require only an understanding of the principles I will present.

5.2 The Rights of Future Generations

5.2.1 Feinberg

Feinberg presents an argument for the rights of future generations that is based on their future interests. Feinberg's approach is basically one of setting up the argument first in terms of the rights of animals and then applying it to future unborn persons. However, as I shall argue below, this is an illegitimate move since there is a crucial difference between the two cases – namely, when we speak of animal rights, we are considering entities that in fact exist, whereas future generations are by definition non-existent. But before examining the implications of this difference for Feinberg's argument, let me first present the argument.

In deciding whether a particular entity has rights, Feinberg argues that we need to first answer three questions:

1. Is the entity in question the sort of thing that can have rights?
2. Do we feel that we ought to treat the entity with consideration?⁵
3. For whose sake ought we to treat the entity with consideration?

Answering affirmatively to the first question will only tell us that the thing in question is the sort of thing that *can* have rights – it will not tell us that the thing *in fact* has rights. It is only after answering the last question that we can establish the rights of the thing in question. In Feinberg's words, "...if we hold not only that we ought to treat [the entity in question] humanely but also that we should do so for the [entity's] own sake, that such

treatment is something we owe [the entity] as their due, something that can be claimed for them, something the withholding of which would be an injustice and a wrong, and not merely a harm, then it follows that we do ascribe rights to [the entity in question].”⁶

In order to decide whether an entity is the sort of thing that can have rights, Feinberg formulates the *interest principle*.

Interest Principle: The sorts of being that can have rights are the sorts of beings who have (or can have) interests.⁷

His interests based approach is given a two-fold justification:

1. A right holder must be capable of being represented and it is impossible to represent a being that has no interests.
2. A right holder must be capable of being a beneficiary in his own person, and a being without interests is a being that is incapable of being harmed or benefited.⁸

Insofar as future generations have many proxies to represent them, the first requirement of the interest principle is satisfied. This much is fairly straightforward. The second condition requires that it be the case that we, through our actions now, can cause harm or benefit members of future generations. It seems to me that this is a fairly plausible stance to take. If I now place a bomb underground that is scheduled to explode in fifty years, when the bomb goes off in fifty years and injures hundreds of people, I can legitimately be said to have harmed them. Alternatively, if I leave a will now stating that my great-great- great-granddaughter is to receive \$100,000 upon her 21st birthday, when she is 21 I

⁵ This clause is nearly enough a quote from Feinberg, (1974), p.572. It is interesting to compare this clause with the claim that an entity can be morally considerable without having rights.

⁶ Feinberg, (1974), p.572.

⁷ Ibid.

⁸ Ibid.

can rightly be said to have benefited her. So I think that the second condition of the interest principle is also satisfied. Although the interests of future generations are not actual at the present time, it is nearly certain that they will have interests, and as I have shown above, these interests can be represented and can be harmed or benefited by the actions of already existing generations. So Feinberg concludes that future generations are indeed the sorts of beings that are eligible for rights.

Next we need to ask if we ought to be considerate towards the interests of future generations. It might be argued that since we do not know the identity of the members of future generations that we can not now be expected to show concern for their future interests. I agree with Feinberg that this is not a valid response. The vagueness of the identity of future persons should not weaken the claim that they might have on us in light of the nearly certain fact that they will exist. And equally certain is the fact that when they do exist, they will have interests that can be harmed or benefited by the actions of presently existing generations. So, in response to the second question, I think it plausible to suggest that we in fact ought to be considerate towards the interests of future generations.

Finally, Feinberg asks for whose sake it is that we ought to be considerate towards the interests of future generations? Like Feinberg, I also agree that it is for their sake that we ought to show consideration. There may be other reasons as well that do not stem from future generations for their own sakes. For example, parents may feel that through procreation, they can validate their place within a genetically continuous family line, the conception of their children as a source of immortality, being surrounded by replicas of themselves. From this perspective, a parent may be motivated to take into special

consideration the future interests of her future children, but as a means to ensure the satisfaction of her own interests. This however, need not imply that she does not act in the interests of her future child *as well*. It is perfectly consistent to maintain that she could act both out of concern for her own interests *and* out of concern for her own interests. For Feinberg to establish his point about what sorts of things can have rights, all we need, according to him, is to show that we take into account the interests of the entity in question *at least* for its own sake.

At this point, Feinberg concludes that future generations do in fact have rights. However, I believe this last move is a logical error. Conceding to the fact that future people will have future interests that we must now consider does not entail that they *now* have rights. They are morally considerable, and their interests should be taken into account when we make decisions, but I fail to see how Feinberg's argument escapes the potential person – potential rights argument. Insofar as they are *future* people with *future* interests, the status of rights must also be *future*. Thus Feinberg is correct when he writes "...the rights that future generations have against us are contingent rights..."⁹, they are contingent upon their existence, but he is incorrect in claiming that they are rights that can with plausibility be claimed against existing persons.

There is a modification that can be made to Feinberg's view that may help to escape the potential rights objection. Heyd suggests that a different, volitional rather than metaphysical distinction between potential and actual persons will allow us to categorize future generations as actual persons. I will now examine this view in greater detail.

⁹ Feinberg, (1974), p.575.

5.2.2 Heyd's Volitional Conception of Potentiality

There are at least two ways in which we might interpret the potentiality of a thing.

Traditional references to potentiality are based on views regarding the properties that a being will eventually have and which will make "it" a person. Such a metaphysical or biological conception of potentiality assumes that a being presently exists. This is often the sense of potentiality appealed to in abortion debates. A common argument is that a fetus is the sort of being that will eventually have the properties associated with a person and is thus a *potential* person. Given it is only *actual* persons that can have rights, a fetus therefore only has potential rights that will be realized when it becomes an *actual* person.

This is most likely the sense of potential being appealed to in the potential person-potential rights objection raised against Feinberg's rights argument. However, the objection is even more severe in this context since not only are the properties associated with right holders in need of actualization, but their existence as beings is also in need of actualization. Thus their rights are potential in the sense of being contingent first on their coming into existence and then on their becoming persons.

Heyd offers the second conception of potentiality. This differs from the traditional conception in that it does not make use of any metaphysical properties of the being itself but rather is understood through the dependence of the being's existence on human choice. So in contrast to the metaphysical/biological conception of potentiality, Heyd's concept is a *volitional* conception of potentiality. The following definitions can now be constructed.

Potential People: People whose existence is dependent on human choice.

Actual People: People who do not owe their existence to human choice. Note that this may include people who do not actually exist now and we need not know their exact identity.

I want to note quickly here that Heyd's terminology is rather misleading since "actual" implies existence in most of the literature. But, according to Heyd's definition actual people need not be existent. I will maintain his terminology in this section only for the sake of consistency and convenience.

So, according to the definitions above, the 120 million Mexicans that will exist in the United States in the 21st century but do not yet exist are actual since their existence is independent of human choice. By contrast, the child that a couple deliberates conceiving is potential since whether or not it exists will depend upon the decision made by its parents.

Although the sorts of individuals that will be included in each category will be different according to which sense of potentiality one is using, many of the implications of the classifications remain the same. According to Heyd's volitional interpretation of potentiality, potential people, as in the metaphysical/biological account of potentiality, have no moral standing. Potential people are, as Heyd refers to them, conceptual "noncounts."¹⁰ Consequently, potential persons will have no rights against us and we will have no obligations towards them. By contrast, actual people will have actual rights, interests, duties etc. - an implication also held in common with the metaphysical/biological interpretation. Any decisions that are made must therefore take

¹⁰ Heyd, (1992), p.99. In more recent literature, the idea of conceptual "noncount" is usually referred to as the entity in question not having *moral considerability*. For a more detailed discussion of the idea of moral

into account actual people. By definition, this distinction allows for future generations to be included in the class of actual people even though they do not yet exist. The only condition for inclusion is that their existence is not dependent on human choice. So, since I know for near certain that future generations will exist, regardless of whether or not I choose to procreate, I may now consider them actual people.

It would be interesting to unfold exactly why Heyd thinks that human choice plays such a crucial role in the determination of the moral status of unborn persons, which to me seems to be a rather unconvincing suggestion. However, for the purposes of this chapter, I do not feel a full examination is necessary. I present Heyd's distinction only for the purposes of attempting to salvage Feinberg's rights argument from the potential person-potential rights objection. That I reject Heyd's view (see below) will be due to the bizarre implications of his distinction and will therefore be independent of his reasons for developing the actual/potential people distinction the way he does.

On this interpretation, the pursuit of GLGA is to be decided according to the interests, welfare, rights and duties of actual people (as defined by Heyd), including the very people it is to affect – namely future generations. Now we can proceed with Feinberg's argument, filling it in as we go along. Not only are members of future generations the sorts of beings that can have rights, but they *do* have rights. Although we cannot predict their exact identity, we can extrapolate fairly accurately from *our* own interests to *their* interests (although note that on Heyd's interpretation this will hold equally well for potential people even though they are conceptual noncounts). For

considerability, see Bernstein, M.H., (1998), *On Moral Considerability: An Essay on Who Morally Matters*. New York: Oxford University Press.

example, we can safely assume that they will have an aversion towards pain and diseases, and that they will prefer a higher quality of life than certain genetic diseases can afford. So, it seems that if GLGA is available and it will be in their best interests to pursue it, then they will have a right against us and a correlative duty will be imposed upon us to engage in GLGA to ensure their interests.

While this approach does solve the potential person – potential rights objection on a broad level, it yields some other rather bizarre consequences. Consider a couple that is deliberating whether or not to conceive a child. Their genetic profiles reveal that if they conceive a child, it will be afflicted with a terrible disease such that its life will not be worth living. However, they are also aware of the option of GLGA. If they pursue this option, the child will be born without the disease. In this situation, according to Heyd's view, since the existence of the child they are considering conceiving is directly dependent upon human choice – namely the choice of the parents – the child is thus potential and has no moral standing. Therefore, the parent's decision to forego GLGA and have a diseased child cannot be said to have been contrary to any obligations to their child, nor can it be said to be a wrong act. At most, all we could do is pass moral judgment on their characters. Our intuitions however, are stronger than this. Surely it is morally preferable to procreate a child without the disease than a child who will *ex hypothesi* be suffering from a disease which will make her life not worth living¹¹; for to procreate the child with the disease will in effect count as being directly responsible for the existence of much misery.

¹¹ I borrow the phrase "a life not worth living" from Derek Parfit to describe a life that is so significantly deficient in one or more of the major respects that make human lives valuable and worth living that we could make sense of the claim that death would be preferable to living in such a state.

There is a further implication of Heyd's position which aggravates this counterintuitive response even further. While these parents have no obligation towards their own potential child, they do have obligations towards far-removed future generations that are, by Heyd's standards actual and therefore holders of rights. This is contrary to any societal and moral views we have of familial bonds and role-based obligations. I therefore, prefer to reject Heyd's view even though it circumvents the potential person – potential rights objection and as I mentioned previously, my rejection of Heyd's distinction is the reason that I do not discuss his reasoning behind the distinction in greater detail. It seems then that the attempt to ground the permissibility of GLGA in rights of future generations will not be successful. I do not however think this will be detrimental to the case for GLGA. In fact, I do not think that we have to establish such rights at all in order to show that GLGA is permissible and perhaps even obligatory, as I will argue in the following sections.

5.3 Obligations

5.3.1 Medicine and the Therapeutic Imperative

Ronald Munson and Lawrence Davis argue that the enterprise of medicine as a whole has a *prima facie* duty to pursue and employ GLGA which finds its basis in the nature of medicine.¹² Before the argument even begins they must deal with the following objection. The discipline of medicine is often thought to be a science and insofar as science is often thought to be value-neutral, it can therefore not have any obligations. The attempt to show that medicine has an obligation to pursue GLGA will therefore be unsuccessful. Munson and Davis respond by denying that medicine is a science. By contrast to science,

in which they claim the pursuit of knowledge is for the sake of knowledge itself, knowledge serves a purely instrumental role in medicine. Whereas the goal of the sciences is to gain knowledge in order to provide persuasive reasons for accepting empirical theories about the nature and character of the world, medicine does not have a comparable epistemic goal. The standard of evaluation in medicine is practical or instrumental success with respect to its specific aim which is to achieve health by the effective control of disease.¹³

A quick point needs to be made here. While I agree that knowledge does, in the way Munson and Davis describe, play an instrumental role; I do not agree that this is the only role knowledge plays. There would be no damage done to their argument to concede that knowledge in medicine is pursued both as an inherent or self-justifying good *and* as a means to cure disease. It is more accurate to distinguish medicine into *clinical medicine*, which involves scientific knowledge in the service of clinical ends; and *medical science*, which is straightforwardly science. Likewise, I believe it would naïve to suggest that the knowledge in the sciences is only pursued as a self-justifying good and that science is therefore value-neutral. For instance, the value of the knowledge gained by the research of astrophysicists is surely used as a means by NASA in space travel. In fact, I would say that there is certainly an obligation on the part of engineers employed by NASA to gain as much knowledge as they can about space travel in order to ensure the highest

¹² Munson and Davis, (1992).

¹³ This is of course much too narrow a description of the aim of medicine. One might argue (correctly) that preventing disease could only be *one* of the aims of medicine. It seems that if this were in fact the *only* aim of medicine we would be omitting a whole series of practices which don't fit into the category of "achieving health by the effective control of disease" – practices such as repair of injury, saving lives from accidents, cosmetic surgery, and palliative care, all of which are part of clinical medicine but none of which work primarily or exclusively by the *control of disease*.

standards of safety for astronauts. Furthermore, it is perfectly consistent to say this *and* maintain that engineers and astrophysicists are doing science. However, as I mentioned above, this conjunctive purpose of knowledge in medicine will not harm Munson and Lawrence's argument in the least since in order to show that the obligation to use GLGA holds, we needn't show that it follows from all of the aims of medicine.

So, let me restate one of the aims of medicine:

Therapeutic Imperative: To achieve human health by the effective control of disease.

This is a rather uncontroversial aim and I think would be accepted by most. As Munson and Davis write

A consequence of medicine's aim of meeting health needs is that medicine possesses a therapeutic obligation imposed by its own character. That is, basic to medicine as an enterprise is the *prima facie* duty to treat those who are ill in ways that will help them achieve the degree of health of which they are capable.¹⁴

Now the rest of the argument is rather simple. Insofar as elimination is the most effective means of control over a disease, and insofar as certain inheritable diseases could only be eliminated by GLGA, then, medicine has a *prima facie* obligation to pursue and employ GLGA.

I believe this to be a valid and sound argument that requires only a few qualifiers. First of all, Munson and Davis' use of the phrase "duties of medicine" needs cashing out in terms of the duties of individual physicians and of various institutions, which in turn are realized in the duties and correlative actions of individuals who are acting as part of

¹⁴ Ibid. 132.

the institutions. What the determination of individual obligations will require is an examination of the structure, membership and existing practices of the medical (and perhaps legal) enterprise.

Second, while GLGA will be obligatory, it will not override the other obligations that constrain the activity of medical professionals. Respect for patient autonomy and the usual consent requirement would still override any therapeutic imperative. Finally, in the case that GLGA would prove to be sufficiently harmful to the individual, the physician's obligation to ensure the health of the individual undergoing treatment will override the obligation to pursue GLGA since that is primarily a benefit that future generations will enjoy.

5.3.2 The Kew Gardens Principle

The tragic stabbing of Kitty Genovese in the Kew Gardens section of New York City while thirty-eight bystanders watched and did nothing to help prompted Simon *et al* to formulate the *Kew Gardens Principle* – a version of the “duty of easy rescue.”¹⁵ While this principle is generally applied to cases in which there is an existing person in a dangerous or life-threatening situation to establish an obligation of a bystander to provide aid, I will argue that it can also be applied to show an obligation to pursue GLGA on the part of the parents of, and physicians treating, potential children that will be born genetically diseased. But first let me present the principle in greater detail.

There are four conditions that must be met before the Kew Gardens Principle can be said to hold.

¹⁵ Simon, J.S., C.W. Powers and J.P. Gunneman, (1964), “The Responsibilities of Corporations and Their Owners,” in T.L. Beauchamp and N.E. Bowie (eds.), *Ethical Theory and Business*. New Jersey: Prentice-Hall, Inc.

1. **Need:** There is a person in need who requires aid.
2. **Proximity:** All other things being equal, if a person knows of the need of another, a responsibility is binding on that person to provide aid. Proximity is thus largely a function of *notice* which is often, but not always, enabled by spatial nearness to the person in need. For example, a deaf person who cannot hear the cries of a woman being raped in the alley while his window is open cannot be expected to provide aid. Alternatively, a woman in Korea who knows of a gang in Canada that regularly engages in the torture of babies can be expected to provide aid by, for example, notifying the authorities. When a person know of imperilment and does not do what she can in order to remedy the situation, we tend to hold her blameworthy.
3. **Capability:** If someone can, without significant harm or inconvenience to herself, meet the need of a person in danger, then she ought to provide aid.
4. **Last Resort:** If the person does not provide aid then no one will.

We should also note that if the person to be aided is capable of giving consent to the aid offered, then attaining consent will also be one of the conditions that need to be satisfied. Therefore, I add it as a fifth condition.

5. **Consent:** Under the circumstances that a person in danger is capable of providing consent, the person offering aid has attained consent before proceeding to provide aid.¹⁶

So, the duty of easy rescue will be binding on a person, regardless of their relationship to the individual in danger, if conditions (1) – (5) outlined above are true of

¹⁶ This of course is an oversimplified view of the notion of consent. The idea of attaining consent presents many problems including the issues of proxy consent, whether the person has elsewhere given prior

the situation. We might want to say something about the stringency of the duty. I cannot here, within the limited space of this thesis, embark on a full discussion about the stringency of the duty although a few quick points might serve as a useful starting point. It seems plausible to suggest that with respect to the first condition – need – the greater the need of the person who is to receive aid, the greater the responsibility to provide the aid. The last resort principle may be more controversial in terms of the Kitty Genovese case and cases like it where there are a number of people who could provide aid. The question of exactly who the duty would be binding on could be problematic. I suggest that we might rephrase the condition therefore, in terms of the *likelihood* of anyone providing aid, such that the principle would read “It is unlikely that anyone else will provide aid.”

We can now ask if this is the sort of principle that could be applied to GLGA? As I will argue below, I think it is. What we need to show is that each of the four criteria are satisfied by the situation of the prospective child and his/her parents and/or physician. But before I examine whether or not the duty of easy rescue could in fact be binding on the parents and physicians, let me briefly note a preliminary concern that some might have in applying the Kew Gardens principle in the case of GLGA. In comparing the Kitty Genovese case to GLGA, one might suggest that it would be odd to attempt to apply the principle to GLGA since whereas in the Kitty Genovese case there was an actual person in need of aid, i.e., Kitty Genovese, in the case of GLGA we have no existent being. I will discuss the issue of obligations towards non-existent persons in the sections below.

directions as to what should be done if she is ever unable to consent in an emergency situation, etc. For a full discussion of these issues, see the vast body of literature concerning advanced directives.

But for now I ask the reader to cling less tightly to any such intuitions they might have.

While the principle is thought by most to make up a crucial part of *any* morality, the principle has been oddly ignored in several interesting contexts. Consider for example black slaves in the United States. The principle was not even thought to apply since blacks were not considered persons at all. However, in retrospect, we can see the atrocity of the judgment and injustice of not applying the principle. It might turn out to be the case that the issue of future persons ends up being the same sort of misguided error. Let me now move on to examine the Kew Gardens principle within the context of GLGA.

Consider again a couple who has decided to conceive a child. Their genetic profiles reveal to them that if they proceed to conceive a child without medical intervention, then it will have a severe genetic disease such that its life will not be worth living. GLGA, which is easily available to them at a cost they can easily afford, will prevent the disease thereby allowing the couple to conceive a child who can be expected to have a life that will be *at least* worth living (though more probably a happy life that will be quite above a minimum standard of life). Could this couple be bound by the Kew Gardens Principle to use GLGA?

The need of an unborn person who is bound to be genetically diseased is unquestionable. Like a fetus, it cannot help itself and is completely reliant upon existing persons to meet its needs. If the parents have undergone screening before conception, as they have in the scenario I have presented, and they have decided to conceive one way or the other, then the proximity requirement will also be satisfied since they have full knowledge that if they do not pursue GLGA, their child will have a genetic disease. This will hold true for embryos and early stage fetuses as well. In addition, there is also a

social expectation at play in the GLGA situation. Furthermore, it seems that, provided the parents are in a position to afford GLGA for their child, the parents can, with the aid of physicians, easily be expected to meet the need of their prospective child. Thus, the capability requirement is also satisfied. Finally, since it is very unlikely that anyone can aid the unborn person aside from the parents and physician, the last resort criterion is also satisfied. It can therefore be concluded that the parents and physicians are bound by the Kew Gardens Principle and have a duty to pursue GLGA towards the prospective child.

5.3.3 Role-Based Duties

While the duty of easy rescue is meant to be, in the words of Hume, a “natural duty” which does not derive from anything like family, role, profession, citizenship, or what have you, I think it is crucial to recognize that the case of GLGA is unique in that in most cases we are dealing specifically with duties binding on parents and physicians.

Therefore, it is important to acknowledge that although an obligation to pursue GLGA can adequately be established by independently applying the duty of easy rescue, it can also be established by an appeal to the role-based duties of parents and physicians.

Munson and Davis’ argument presented in the previous section regarding the therapeutic imperative, is a preliminary step to establishing the obligations of individual physicians to use GLGA. As I noted in that section, moving from the obligation of medicine as an enterprise to the obligations of individual physicians will be a matter of examining the particular details of the medical enterprise.

A parent’s obligation to her child, like the physician, is due to her standing in the relevant particular relationship to the child, within a particular social institution. Presumably, the parents of a child are directly responsible for its existence and insofar as

an infant, toddler and young child cannot by themselves meet their basic needs, we expect the parents to provide the necessities for their child as a matter of obligation. They are obligated to ensure a minimally acceptable standard of living for their child. This role-based obligation, like the role-based obligation of physicians, it should be noted, by contrast to the duty of easy rescue, is an “artificial duty” and will therefore only make sense within an institutional setting.

Now, going back to our scenario of the parents confronted with the option of GLGA, assuming at least a minimal level of health is required to ensure a minimally acceptable standard of life (a fairly plausible assumption), and given the conventions of a social institution are such that one of the obligations of parents is to provide a minimally acceptable standard of life for their children, then the parents of the unborn child in my example will in fact have an obligation to undergo GLGA to ensure a minimally acceptable standard of life for the child they have decided to conceive. So we may conclude that parents and physicians have the duty to help the child by undergoing and providing GLGA, respectively, *both* from their roles within an institutional setting, *and* from the duty of easy rescue, with the latter reinforcing the former perhaps, but being different from it.

5.3.4 Parfit’s Same Number Quality Principle

There is one final way that we might try to ground an obligation to pursue GLGA. I will work through first a less intuitively challenging example and then show how this reasoning will also apply to GLGA. Consider the following example. A woman has chosen to undergo *in vitro* fertilization. Of the embryos to be implanted, two have genetic diseases which will sentence the resulting children to a life of such low quality that will

make their lives not worth living.¹⁷ The remaining two embryos are normal and can be expected to lead healthy, happy lives. Given the woman will go through with the rest of the IVF procedure and have an embryo implanted¹⁸, which should the woman and physicians choose to implant? Surely there would be something morally objectionable about choosing to implant the genetically defective embryos. In fact, we might think that there is an obligation binding on the woman and physicians to implant the healthy embryos. There are two main issues in this example that might help establish this obligation.

The first point is that there are alternatives from which to choose and each of the alternatives would lead to the same number of people but with differing qualities of life. The fact that we are dealing in this example with the same number of persons is absolutely crucial for my argument and for the application of Parfit's principle (see below). Same number issues allow us to concentrate on other issues – namely harm and quality of life in this context. But when we are considering alternatives that involve different numbers of individuals, the issues become much more complicated requiring an examination of not only the principles we are applying but also the background theories that support various principles. The second point that leads to our intuition about the example above is that one alternative would lead to a life that is diseased and in which much suffering is involved. The other choice would offer the individual a happier and

¹⁷ Under real life conditions, a minimum of three and usually a maximum of six embryos are usually inserted into the woman's uterus to increase the chances of implantation. My example is simplified, though still plausible, only for the sake of making the issues clearer.

¹⁸ I explicitly include this condition to avoid the absurd implication that she might be obliged to implant an embryo *sans phrase*. The fact that the woman has made the decision to implant an embryo is crucial to the situation I am presenting since it is only *after* this decision has been made that we can even begin to plausibly speak of obligations. She could have just as well decided not to go through with the rest of the

healthier existence. Parfit's *Same Number Quality Principle* may be used to express the intuitions here seen.¹⁹

Same Number Quality Principle: If in either of two possible outcomes, the same number of people would ever live, it would be worse if those who live are worse off, or have a lower quality of life than those that would otherwise have lived.

While this principle is enough to show that it would be *good* to implant the healthy embryos, it is not enough to show that it would be *obligatory*, which is the stronger claim that I want to make here. As Beauchamp and Childress correctly note:

Principles do not function as precise action guides that inform in each circumstance how to act in the way more detailed rules do. *Principles* are general guides that leave considerable room for judgement in specific cases and that provide substantive guidance for the development of more detailed rules and policies. This limitation is no defect in principles; rather, it is a part of the moral life in which we are expected to take responsibility for the way we bring principles to bear in our judgements about particular cases.²⁰

Some other principles and structuring will be required before we can be said to have established an obligation in a case like this. Furthermore, we must be careful to spell out the principle more fully so as not to allow too much. For example, questions such as how much worse off will be enough to justify choosing the alternative must be answered.

Another principle which will help support the idea that the woman and physicians are obligated to implant the healthy embryos, is the *principle of beneficence*. This

IVF procedure, and chosen instead to adopt a child in which case *any* talk of implanting *any* kind of embryos would be absurd.

¹⁹ Parfit, (1986).

²⁰ Beauchamp, T.L. and J.F. Childress, (1989), *Principles of Biomedical Ethics*. London: Oxford University Press. p.38.

principle simply states that the active bringing about of happiness is a good. The principle may also be stated as a duty.

Duty of Beneficence: We ought to act so as to promote the well being and interests of others.

More specific to this case, the duty of beneficence will entail, with respect to the mother, a duty to promote the well being of her children, and a duty to promote the health of their patients with respect to the physicians. The endorsement of beneficence is quite uncontroversial and brings us one step closer to establishing the obligation to implant the healthy embryos.

However, the duty must be made more explicit such that we can distinguish the obligatory acts from supererogatory acts. This exercise will serve to also limit the same number quality claim. Exactly how much we are to promote the well being of others will be decided by what I will call the *moral minimum*. According to the moral minimum, we, as parents, are obligated to ensure a minimum standard of living for our children and as physicians, provide the most adequate health care we can in the given situation. To go beyond this level will be considered supererogatory. Now, the same number quality claim can also be spelled out in greater detail. Whatever falls below this minimum standard of life will be considered worse enough to choose the alternative if the alternative is *at least* the moral minimum.

Finally, one last principle may be appealed to in order to support our initial intuitions which I cashed out as Parfit's same number quality claim. The *principle of*

nonmaleficence states that the active bringing about of harm is an evil.²¹ This principle, like the principle of beneficence, can be restated as a duty.

Duty of Nonmaleficence: We ought to avoid harming others.

I admit that it might not be entirely clear exactly *how* this principle is to be applied in this scenario given that there is no person to harm. What I am here suggesting is this. Although an embryo cannot *now* be said to have interests which are necessary in order to be harmed, if the mother and physicians decide to implant the genetically diseased embryo, the debilitating and painful life it is sure to have as a person will surely constitute a harm for the *person the embryo will become*. Therefore, in this sense, the mother and physicians are in effect directly responsible for the existence of severe misery.

Note however that what I have suggested is not the more complicated and contested claim that a person can be harmed by being brought into existence. My claim is different in that I am suggesting that it is the future person the embryo will become to which the harm is done. Therefore, it is a *deferred* harm. This claim should not be counterintuitive. The idea is similar to the examples I discussed in section 5.1.1 above. In planting a bomb that will explode in fifty years, I can legitimately be said to have harmed those individuals that will be injured by the explosion. Similarly, I can be said to have benefited my great- great- great- granddaughter when she receives her inheritance. In

²¹ We need to distinguish here between what Shelly Kagan calls *local* harm and *global* harm. This distinction is one of interpretive scope. On a *global* interpretation of harm, when I go to the dentist for a root canal, although the procedure is painful and causes me much discomfort, the dentist has not harmed me since *on balance*, I am better off with the root canal than I would have been without it. By contrast, on a *local* interpretation of harm, we're not actually concerned with where I end up *on balance*, but rather each individual element that affects my interests is looked at. So the dentist, in performing the root canal, has

each of these circumstances, it makes sense to speak of a deferred harm and a deferred benefit, respectively. Likewise, the mother and physicians are not harming the embryo by implanting it, but rather are harming the person the embryo will become.

Let me now formulate what I think is a plausible argument for the obligation to implant the genetically healthy embryo.

1. Assuming we accept that the same number quality claim is a valid claim and that it is circumscribed by the moral minimum; AND
2. Assuming we accept that the principles/duties of beneficence and nonmaleficence are valid principles/duties and that they are also circumscribed by the moral minimum; AND
3. Given that in the example above, there are two possible outcomes, one in which the standard of life will be below the moral minimum, and the other in the other, the standard of life will be *at least* the moral minimum; AND
4. The duties of beneficence and nonmaleficence are binding on the mother and the physicians by virtue of their roles; THEN
5. The mother and the physicians have an obligation to choose the healthy embryos to implant.

The last step in this argument will be to apply this method of reasoning to the case of GLGA. Recall once more the example from the previous section. In one outcome, if the couple chooses to conceive without GLGA, their child will be born with a severe genetic disease that will make its life not worth living. In the alternate outcome, the couple

actually harmed me. I am, in the formulation of the duty of nonmaleficence, working with a global interpretation of harm which I feel is more plausible than the local interpretation.

chooses to undergo GLGA and the child will then be born healthy and can reasonably be expected to live a happy life well above the moral minimum. I believe the exact same reasoning now applies to this case as the case of *in vitro* fertilization. Again we have two possible outcomes – one preferable to the other. The same duties of beneficence and nonmaleficence will apply to both the parents and the physicians. We can therefore conclude that GLGA will be obligatory in this case.

There are two possible objections to the establishment of this obligation. One will charge that the argument formulated as such demands too much from the parents and physician and will open up the way for germ line genetic enhancement. The second objection will complain that the obligation to implant the healthy embryos cannot be binding since the existence of an obligation logically requires the existence of an obligation-recipient and in the case of GLGA there is no existing obligation recipient.

5.3.5 The Road to Germ Line Genetic Enhancement

This objection attacks both the same number quality claim and the duty of beneficence. Insofar as the parents are obliged to pursue GLGA to ensure the preferable outcome, the parents will also be obliged, so the objection goes, to ensure maximum quality of life that could be ensured by GLGE.

This objection is a non-starter for I have already implicitly dealt with this issue in setting up the obligation. The moral minimum ensures that while parents may be blameworthy for bringing a severely genetically diseased child into existence when they could have prevented it by GLGA, they cannot be blameworthy for failing to ensure their child a future as the second Mozart or a brilliant scientist. They are obligated to ensure only a minimum quality of life; the rest is supererogatory.

5.3.6 The Lack of Obligation-Recipient

That obligations logically require the existence of obligation-recipients is a line of argument suggested by De George in his discussion of future generations.²² Of course this argument can be applied to the GLGA case above since the preconceived child is non-existent. De George presents a four-step argument.

1. By definition, non-existent beings do not exist.
2. What does not exist cannot be the subject or bearer of anything.
3. Therefore, what does not exist cannot be subject or bearer of rights, or the recipient of obligations.
4. Therefore, we can have no obligations towards non-existent beings.

It is not clear that this objection is sound. The best way to examine what in fact is wrong with the objection is to examine the familiar example of the dead man's will.

Most of us agree that we have an obligation towards a deceased person to honor the requests in his will. Yet, this person is no longer existent. This response to the objection will not however, be totally satisfactory for some. As Nagel has maintained, there is a difference between *preconceptive non-existence* and *posthumous non-existence*.²³ He writes

It is true that both the time before a man's birth and the time after his death are times when he does not exist. But the time after his death is time of which his death deprives him. It is time in which, had he not died then, he would be alive. Therefore any death entails the loss of *some* life that its victim would have led had he not died at that or any earlier point. We know perfectly well what it would be for him to have had it instead of losing it, and there is not difficulty in identifying the loser.

²² De George, R.T., (1978), "Do We Owe the Future Anything?" in E. Dais (ed.), *Law and the Ecological Challenge*. New York: Hein.

²³ Nagel, T., (1979), *Mortal Questions*. New York,: Cambridge University Press.

But we cannot say that the time prior to a man's birth is time in which he would have lived had he been born not then but earlier. For aside from the brief margin permitted by premature labor, he *could* not have been born earlier: anyone born substantially earlier than he was would have been someone else. Therefore the time prior to his birth is not time in which his subsequent birth prevents him from living. His birth, when it occurs, does not entail to him the loss of any life whatever... Given an identifiable individual [the deceased man], countless possibilities for his continued existence are imaginable, and we can clearly conceive of what it would be for him to go on existing indefinitely.²⁴

It seems that Nagel's comments here are directed at the issue of identity. Since we know of the man's identity, we can easily imagine what his life would have been like had he continued to live instead of dying. According to Nagel, we cannot say the same of a preconceptively non-existent person. There is no such identity to speak of.

This approach, while intuitively plausible, is the wrongheaded approach to explaining the obligation we have in the dead man's will example. What we are actually appealing to are the specific *interests* the dead man had while he was alive. He had *preferences* for who should receive his estate, his stocks, his car, etc. Because it still makes sense to speak of the satisfaction and frustration of his preferences, and because we are capable of satisfying those desires quite easily, we feel it obligatory to execute the requests in his will. But note that we need not know his exact identity, i.e., exactly what he is like, to reasonably assume that one of his interests was to have his belongings distributed as he saw fit – the fact that he wrote a will in this case makes the assumption even more reasonable.

Now reconsider the as-of-yet non-existent child. As I mentioned earlier in this chapter with respect to Feinberg's interest principle, like the dead man, we need not know

²⁴ Ibid. 7-8.

the child's exact identity in order to know that she will have certain interests. Insofar as we can reasonably assume that at least one of her preferences will be to have a life that is *at least* a minimally acceptable standard of life, and because the parents and physicians can satisfy that desire, this situation will not be different from the dead man's case. It is as perfectly coherent to speak of an obligation towards the preconceived child as it is to speak of an obligation towards the dead man. It seems then that the claim that obligations logically require the existence of obligation-recipients is false.

I need here to mention here that while I have examined *some* of the approaches to dealing with the moral status of future people in the previous sections, I have by no means exhausted the rather extensive scope of approaches. Given the complexity of the issues involved in future generation discussions, I could not, at least not with any kind of respectable adequacy, discuss them in this thesis. That would indeed require an entire thesis.

5.4 Conclusion

In this chapter I have attempted to develop some positive arguments for the permissibility of GLGA. I explored several approaches. The rights-based approach proved to be complicated without much promise of success. Next, I examined three different obligation-based approaches – the therapeutic imperative, the Kew Gardens Principle and finally the Same Number Quality Claim. While all are sufficient to establish an obligation to pursue GLGA, I conclude that the third approach is most satisfactory since most accurately captures the morally significant features of GLGA and future unborn persons. These features are:

- The unborn person is morally significant with interests that allow it to be harmed and benefited.
- Knowledge of a genetic disease that will be transmitted to a child and subsequent conception of that child without medical intervention in the form of GLGA would constitute a harm done to the child.
- In cases where a couple has decided to conceive a child, and they are aware of the fact that their child will have a genetic disease that will make their life not worth living, GLGA is obligatory for the sake of the child.

CHAPTER 6

CONCLUSION

6.1 Review

The main goal of this thesis was to examine two of the common objections to GLGA in the literature that would, if successful, represent objections *in principle* to GLGA. These objections were the “Human Nature” objections in chapter 3 and the “Playing God and Mother Nature” objections in chapter 4.

There were two different interpretations of the human nature objections. One version argued that human nature has objective value and that since GLGA runs the risk of altering human nature, we therefore ought not to use GLGA. Working under the assumption that, for the sake of argument, there is in fact such a thing as *human nature*, I argued that in effect, proponents of this objections were in fact making a logical error – namely, they were assuming, incorrectly, that objective value entails overriding value. This error had the consequence of making the objection simply too implausible to be credible.

The second version of the human nature objection appealed to the role of a conception of human nature in moral theory. The first thing I needed to do was to unveil exactly what kind of conception of human nature would make the objection *at least* consistent. After concluding that only an essentialist conception of human nature would maintain consistency in the objection, I picked out what I thought was one of the most plausible theories that appeals to an essentialist human nature – namely Perfectionism. However, the implication of such a view made it clear that human nature is not the sort of

thing that can plausibly be essentialist in its formulation. So, in effect, what we saw towards the end of chapter 3 is that any theory which appeals to an essentialist human nature is not terribly plausible, and because of this, the original objection to GLGA based on the role of human nature fell apart.

In chapter 4, both the religious and secular versions of the “Playing God” objection were examined for their success as *in principle* objections. Ironically, it turned out to be the case that Heyd’s more plausible version of playing god, i.e., that we as humans legitimately play god as the source of value in the world, could actually be used as an argument in *favor of* GLGA. However, I dismissed this argument as much too dangerous an avenue to pursue for the permissibility of GLGA.

The “Mother Nature” objections, i.e., the value of genetic variation and the value of species preservation, were barely more successful as objections *in principle* to GLGA. While the genetic variation objection was found to be based on a mistaken premise, i.e., that GLGA would result in a loss of genetic diversity, the species preservation argument was shown to be guilty of the same logical mistake as the objective value of human nature objection in chapter 3, i.e., that objective value entails overriding value. While these arguments may point to some important risks that must be taken into account when considering GLGA, I feel that I can safely conclude that they are not successful as objections *in principle* to GLGA.

Finally, in chapter 5, I presented a variety of arguments in support of GLGA. Feinberg’s rights-based approach was susceptible to the “potential person-potential rights” argument and I therefore concluded that it would fail in its attempt to ground rights to unborn persons. Consequently, I chose to take an obligation-based approach to

grounding the permissibility of GLGA. There were three basic arguments, the first based on the therapeutic imperative of medicine, the second on the Kew Gardens Principle (duty of easy rescue), and finally the third which was based on Parfit's same number quality principle. Each of the arguments were fairly plausible but the last was what I thought to be the most persuasive. It appealed to well-established and plausible principles, i.e., Parfit's same number quality claim, the duty of beneficence and the duty of nonmaleficence, and in doing so, presented the strongest case for grounding obligations to future persons to perform GLGA.

6.2 Final Remarks

I want here to say something about the applicability of my conclusions in chapter 5 – primarily that we as parents and physicians have an obligation to the future child who will be genetically diseased, to use GLGA. Caution should be taken here *not* to assume that my approach can be equally applied in broader issues concerning future generations, such as population or conservation policies. I warn against this because in these latter situations, we are dealing with *different number* issues – as opposed to the more straightforward *same number* issues that I presented in chapter 5. Much more complex theorizing will be required in order to reach any conclusions about the broader category of future generations.

I'd like to close this thesis by reiterating a point I made in the Introduction. In presenting the distinction between *in principle* objections and *in practice* objections, I emphasized the importance of not assuming that a lack of *in principle* objections to GLGA would immediately entail its permissibility. Instead, I noted that it might still be the case that even though there are no successful *in principle* objections to GLGA, it

could still be impermissible if there were any binding *in practice* objections. My reason for focusing on the *in principle* objections was to provide a starting point for discussion, for, it is only after legitimately concluding that there are no objections *in principle* that an examination of *in practice* objections would be useful. This is *not* to trivialize the *in practice* objections at all for GLGA, for all its potential benefits, also has the potential to have catastrophic practical consequences. So, my concluding suggestion for this thesis is that now that we *have* concluded that those arguments that might have been objections *in principle* are in fact unsuccessful, we ought to focus our research on the medical risks of GLGA, including risks of safety, effectiveness and the regulation of gene expression. It is only *after* such risks are considered to be acceptably low, that GLGA may receive its final moral stamp of approval.

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