Traditional and New Enhancing Human Cybernetic and Nanotechnological Body Modification Technologies: A Comparative Study of Roman Catholic and Transhumanist Ethical Approaches

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in memoriam matris carissimae
Ninetta Gaetana Caligiuri
manus cui cunabula curae mundum regit

For Theodore and Calum
Model teachers and men

For my Surrogate Family in Ottawa
This work happened because of you

For the Crowned One
Always loved and remembered

For my Professors in Religious Studies at the University of Ottawa
Professional of course but also caring

gratias vobis ago

Abstract

Advances in cybernetic and nanotechnological body modifications currently allow for enhancements to human physical and mental function which exceed human species-based norms. This thesis examines body modification and human enhancement from two perspectives—Roman Catholicism and Transhumanism— in order to contribute to bioethical deliberations regarding enhancement technologies. Roman Catholicism has a longstanding tradition of bioethical discourse, informing the healthcare directives of Roman Catholic institutions. Transhumanism is more recent movement that endorses body modifications and human enhancements as a means of individual betterment and social evolution. The thesis first considers definitions of human enhancement and levels of normalcy in connection to cybernetic and nanotechnological bionic implants, and outlines a series of criteria to assess a technology's potential bioethical acceptability: implantability, permanency, power, and public interaction. The thesis then describes Roman Catholicism's response to non-enhancing decorative body modifications (cosmetic surgeries, common decorative modifications such as tattoos and piercings, and uncommon modifications such as scarifications and brandings) in order to establish a basis for possible Roman Catholic responses to enhancing cybernetic and nanotechnological modifications. This is followed by an analysis from a Roman Catholic perspective of the major social issues brought forward by enhancement technologies: commodification, eugenics, vulnerability, and distributive justice. Turning to Transhumanism, the thesis describes the origins and philosophy of the movement, and then discusses the bioethical principles it advances with regard to human enhancement. The thesis concludes by locating points of convergence between Transhumanism and Roman Catholicism that could be the basis of more widely accepted ethical guidelines regarding modification technologies.

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Chapter 1—Introduction

A. Our changeable bodies

Given the funds, time, and inclination, altering one's body has become a simple set of purchases. One can decide upon body size, shapes, features, colours, and maintenance regimes. Particularly in westernized societies, one may choose to tuck, enlarge, reduce, colour, tattoo, implant, lift, smooth, electrolyze, replace, remove, and even heighten. Our bodies are creeping towards a future where cosmetic changes are common and body modifications include increasingly innovative technological integrations. The introduction of advanced technologies body modifications are beyond simple cosmetic changes. Current applications of nanotechnological and cybernetic implants give rise to a series of new options for individuals seeking to change their natural, or original, body forms. With these new options come challenges to existing definitions, justifications, and moral estimates of body modifications. Both traditional cosmetic and new technological body modifications have thus far garnered little attention in religious bioethical reflection, yet they bring out a number of important issues beyond the physical alterations of the body: aesthetic choice, compassionate restorations, equality and fairness, the worth of function, and consumerism, to name but a few. Is a body modification ethically justifiable simply because technologies and personal whim make it possible? Given the right to personal opinion, pluralities, and autonomy, are there any guidelines to traditional and advanced body modifications that go beyond mere safety standards?

A cursory examination of human body modification reveals differing levels of actual physical alterations. These include simple tattooing or decorative productions, cosmetic surgeries to repair or augment physical features, and technological

modifications such as prostheses, medical apparatuses, or implantable devices which restore functionality or even augment body abilities. There are gradations to the complexity and levels of physical change that each of these types of body modifications allow: tattooing may be minimal to full bodied; one may choose simple cosmetic surgery such as a rhinoplasty or one may elect radical reconstructive surgery that would alter nearly all parts of one's self; a technological medical implant may be as innocuous as a hearing aid or as remarkable as a set of bionic legs. Each type of body modification can vary across cultural lines, restricted only by trends in social acceptability, economic availability and technical legality.

Examining these procedures in a primarily North American context, we find decorative body modifications, cosmetic alterations, and technological augmentations growing in popularity and in technological prowess. For example, cosmetic surgery is no longer limited to restorative surgery in cases of disfigurement or dysfunction. According to a 2007 Medicard Finance survey within Canada, 20% of the respondents surveyed have had some type of cosmetic surgery, 33.3% have had a non-surgical procedure, and only 7.5% were not familiar with cosmetic enhancement procedures at all (CNW Group, ¶8).[1] Similarly, across North America there has been exponential growth in artistic body modification over the last decade. Analyzing trends in decorative body modification, Nancy Wong reports that *Life* magazine estimated in 1936 that 10 million Americans, or approximately 6% of the population, had at least one tattoo. A 2003 Harris Poll nearly triples those numbers and estimates that 16% of Americans now have one or more tattoos

[1] References in the text and in the notes to this thesis follow the (2001) *Publication Manual of the American Psychological Association.* Fifth Edition. Washington, DC: American Psychological Association. Additionally, per APA format, all in-text citations include page or paragraph locators for directly quoted materials, whereas supplementary information given in footnotes for the purposes of general interest or as indicators for further reading contain only names and publication dates.

(Wong, 2006, ¶2). Similarly, in 2006 the Pew Research Center reported that 36% of Americans aged 18 to 25, and 40% of those aged 26 to 40, had at least one tattoo (Pew, 2007, ¶10).

But there is much more to the modification industry than the field of cosmetic surgery or decorative body arts. We have come as far as implanting microchips and sensors, wireless receivers and broadcasters, optical devices capable of broadcasting real-time images of our activities and surroundings, and a variety of artificial limbs and organs to meet or exceed our bodily expectations. This is a move beyond restorative medical technologies that provide varying levels of function to those individuals who were born lacking, or have lost, specific limbs or organs. By applying advanced nanotechnologies and computerization to the manufacturing of body implants we have reached a new level of body modification allowing for the enhancement of human abilities previously limited by the constraints of our natural biology. Alterations can be characterized by adjectives like 'amazing', 'interesting', 'quirky', 'repulsive' or simply 'dangerous', depending upon how one perceives the nature of the human body.

Reactions to emerging body enhancement technologies will, of course, vary. Some believe that the idea of a microscopic computer and video-camera implanted in place of biological eye, linked to the internet in order to allow twenty-four-hour live streaming of your actions, is unreasonable. J.H. Moor writes, "Who would want to have computer parts implanted? To become part computer? The idea of having a computer implanted may seem unnatural, possibly even grotesque, or at least something that undermines human dignity. But such a negative reaction is not defensible on close examination" (Moor, 2005, 122). But what exactly should be examined? New body enhancement technologies lead to renewed reflection on the limitations of body functions, added

artificial sensory input, experimental methods of interpersonal communications via the nervous system, as well as medical risk and privacy. These issues need to be considered not only from the point of view of engineering, economics, or even health, but also ethics, including religiously based ethics.

Advances in prosthetics, the branch of medicine that deals with the production and use of artificial limbs, illustrate the types of issues that new technologies can raise. Traditionally prostheses have been used to replace body parts lost by injury or disease or missing from birth.[2] They are amongst the most common of body modification devices and have sparked little ethical debate. But today, thanks to advances in materials, design, nanotechnology, and computerization, limbs replaced by artificial constructs allow for as much, if not more, flexibility and advantage.

A prime example of this is the case of South African Paralympics running champion Oscar Pistorius, who uses carbon-fiber Cheetah® (Flex-Sprint III) leg attachments.[3] Developed by the Össur Company, the Cheetah leg is just one of a variety of customizable advanced prosthetics.[4] Other recent body attachments include the Proprio Foot® and Power Knee™: bionic devices that utilize multiple micro-sensors and computerized artificial intelligence in order to anticipate movements and produce power.

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[2] Notable pioneers in medical prosthetics include: French surgeon, Ambroise Pare who, in 1529, introduced amputation as a lifesaving measure in medicine and developed prosthetic limbs with scientific precision (Pare, 616-621); Dubois L Parmelee of New York City who, in 1863, made an improvement to the attachment of artificial limbs by fastening a body socket to the limb with atmospheric pressure (Bellis, ¶2); or Dr. G. Vanghetti who, in 1898, invented an artificial limb that could move through muscle contraction (Vanghetti, 385). These notables are but a few. The list of contributors is long and their achievements great, not only in the sense that they advanced the ability to restore function and appearance to the injured but by the simple fact that they used their natural faculties to further compassionate efforts and aid humanity. See also Ott et al., (2002); Serlin (2002); Kurzman (2003).

[3] See Gibbs (2008).

[4] According to company releases: Össur was founded in 1971, and has amassed wide-ranging expertise in the development, manufacture and sale of non-invasive orthopaedics. Today the company is a leading global player in the industry. An assertive acquisition strategy complements ambitious organic growth as Össur continues to conceive and harness the very best in design and technological advances in its award-winning pursuit of 'life without limitations' (Össur Inc., 2008, ¶1).

It has been argued that a human body provided with Cheetah leg attachments can out-pace and out-distance equivalent competitors, utilizing the reflexive properties of the devices to increase energy output at lower, more efficient levels than a non-augmented body.

Although challenged by the Össur Corporation and Pistorius himself, the scientific tests conducted by the International Association of Athletics Federations (IAAF) in 2008 show that utilizing the Cheetah leg gives competitors a biomechanical advantage.[5] The IAAF reported the following results in their study:

- Pistorius was able to run with his prosthetic blades at the same speed as the able-bodied sprinters with about 25% less energy expenditure. As soon as a given speed is reached, running with the prosthetics needs less additional energy than running with natural limbs.
- Once the physiological potential of Oscar Pistorius and the able-bodied control athletes had been estimated, using three different methods, Pistorius' potential was not higher than that of the controls, even though their performance results were similar.
- The biomechanical analysis demonstrated major differences in the sprint mechanics of a below-knee amputee using prosthetics compared to athletes with natural legs. The maximum vertical ground reaction forces and the vertical impulses are significantly different. The amount of energy return of

[5] On January 11, 2008, Össur issued, in-part, the following regarding bilateral amputee Oscar Pistorius' bid to participate in IAAF-sanctioned events, and ultimately the Olympics: "Össur has reviewed the test results and expects the IAAF to allow Oscar Pistorius to compete because we are confident that the prostheses he is using, which we make, do not give him a technical advantage over able-bodied runners. Any other ruling on the part of the IAAF would only raise the question, 'are we not ready to have amputees on the Olympic stage?'" (Össur Statement, 2008, ¶1).

the prosthetic blade has never been reported for a human muscle-driven ankle joint in sprint running.

- The positive work, or returned energy, from the prosthetic blade is close to three times higher than with the human ankle joint in maximum sprinting.
- The energy loss in the prosthetic blade was measured at 9.3% during the stance phase, while the average energy loss in the ankle joint of the able bodied control athletes was measured at 41.4%. This means that the mechanical advantage of the blade in relation to the healthy ankle joint of an able bodied athlete is higher than 30%. (IAAF, 2008, ¶3)[6]

Unfortunately for Pistorius, the results led to an initial ban on his participation in the 2008 Beijing Olympics. Yet the information gathered from the testing shows the increased capacity of a technologically advanced prosthesis to enhance a human body to levels which exceed current definitions of the human norm. Pistorius' experience also illustrates the ethical controversy raised for competitive sport by devices which exceed current human conventions. After multiple legal challenges, the Court of Arbitration of Sport finally ruled that Pistorius could compete.[7] The arbitrators deemed that the initial testing only considered biomechanics at full-speed when Pistorius was running in a straight line (unlike a competitive 400-metre race) (#60), that the energy loss or gain by

[6] IAAF test procedures and parameters were outlined in separate documents available for referees and judges: "Analysis was carried out by a team of more than 10 scientists, including staff from the physiology laboratory of professor J. Mester (Institute of Training Science and Sport Informatics); 12 high speed cameras (250 frames per second) were used to record 3D kinematics, with another 4 high-speed cameras to observe sagittal plane motion; Force platforms were used to record ground reaction forces and point of force application; Athletes ran the 400m test with a K4 mask to record max VO2. VO2 testing was also carried out in the laboratory (Wingate and Ramp Test) on static bicycles; Blood lactate records were taken regularly; A 3D scanner was used to record body mass and anthropometric measures of all the control athletes; The prosthetics were also subjected to material testing" (IAAF, 2008, ¶5).

[7] At the subsequent London 2012 Olympics, Pistorius ran twice. He competed in the 400m opening heat and semifinal relay event and, as Hendricks (2012) reports, "though he failed to get any medals, he inspired competitors and fans."

the *Cheetah* limbs could not be properly interpreted at this time (#96), that the new rule prohibiting prosthetics by the IAAF was introduced with Pistorius in mind (#57), and that multiple communicative and procedural errors by the IAAF render the initial ban null and void.[8]

The Össur products provide dramatic examples of body integration technology, items that are still relatively rare in today's society and thus garner attention. In fact, however, today there is a large variety of integrated computerized body devices, including many that are less dramatic and so common that they are practically ignored by all but the end-user. This thesis will explore ways in which new levels of body modification technologies meet or exceed definitions of normalcy, the subsequent bioethical issues stemming from their application, and how two current religious and philosophical models interpret the validity of the various types of body modifications. The two models that are selected for examination and comparison are Roman Catholicism and Transhumanism. In the remainder of the introduction we shall explain why it is timely to consider the bioethical implication of body enhancement technologies, why it is worthwhile to consider both a religious and a secular response to body enhancement technologies, and why Roman Catholicism and Transhumanism were selected as the two interlocutors for the purpose of this thesis.[9] But before proceeding to that discussion, it may be helpful to outline the development of the thesis.

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[8] See Court of Arbitration for Sport (16 May 2008), *CAS 2008/A/1480 Pistorius v/ IAAF*.

[9] Recognizing the sociological complexity of the definition and phenomena referred to as "secularism" and "religion" this thesis assumes a basic understanding of religion as having characteristics of practice such as a belief in supernatural agents, specific rituals of reversibility, repetition and pageantry, and symbols and narratives of spirituality to impart morality; whereas secular systems oppose a majority (if not all) of the above, denying a belief in the supernatural and instead developing practices and worldviews which affirm moral actions through non-theistic means including human reason and law, and affirming that religious beliefs should be separate from social and political matters. For discussion, see Durkheim (1968); Geertz (1973); Lawson & McCauley (1990); Rappaport (1999); Asad (2003); Taylor (2007).

Before considering the bioethical issues posed by body enhancement technologies and possible responses to those issues, we must first clarify the terminology used to describe different types of body enhancement technologies and develop a taxonomy of current and future applications. In Chapter 2 we discuss terminology used in relation to body modification technologies and their bioethical implications. We consider labels such as 'cybernetic', 'bionic', and 'nanotechnological', as well as concepts such as health, functionality, normalcy, and enhancement. In Chapter 3 we develop criteria by which to assess the effects of body enhancement technologies: implantability, permanency, power, and public interaction. We then apply these criteria to current and developing models of cybernetic and nanotechnological body enhancements in order to illustrate the bioethical concerns that may arise from such enhancements. In Chapter 4 we turn to the first of our two interlocutors, the Roman Catholic bioethical tradition. In order to be able to extrapolate from past and current Roman Catholic bioethical deliberations, we first outline the sources of Roman Catholic bioethics and then describe Roman Catholic responses to non-enhancing common and uncommon body modifications, particularly cosmetic surgeries and decorative body arts. This provides the basis for Chapter 5, which explores possible Roman Catholic responses to cybernetic and nanotechnological enhancements and the bioethical issues of commodification, eugenics, vulnerability, and social justice. In Chapter 6 we turn to consider Transhumanist perspectives on cybernetic and nanotechnological enhancements. We first outline the philosophy itself, identifying origins, structures, published value-systems, goals and current applications. Then we identify groups, ideas and principles within Transhumanism which contribute to its overarching approach to bioethical questions and to various forms of non-enhancing and enhancing body modifications. Lastly, in Chapter

7, we discuss a possible confluence between the Roman Catholic and Transhumanist approaches to body enhancement technologies.

Given the novelty of cybernetic and nanotechnological enhancements and the relatively limited bioethical discussions to date, a systematic examination of the relevant research presents certain challenges. Several bodies of literature were explored in order to build a complete picture of the technologies and the bioethical responses under consideration: 1) the technical, historic, and current applications of body modification technologies; 2) bioethical reflection on other (i.e. non-cybernetic and non-nanotechnological) enhancement issues; 3) the contribution of a religious perspective to the field of modern bioethics; 4) Roman Catholic bioethical reflection on non-enhancing and enhancing body technologies; and 4) Transhumanist philosophy and views of enhancing body technologies. In addition to this literature review, current opinion from specialists in the above fields was taken into consideration.

The literature considered in Chapters 2 and 3 of the thesis was obtained from scholarly databases and online-sources dedicated to human enhancement technologies. The search for literature focused on technical data, developed definitions, standards, experimental and current applications, and reflection on corresponding issues. The search included scholarly publications keyword and subject searches such as: cybernetics, cyborg, robotics, nanotechnology, microtechnology, human enhancement, augmentation, cosmetic/plastic surgery, bionics, prosthetics, experimental medicine, bioethics, healthcare ethics, genetic manipulation, normalcy, computerization, reproductive technology, philosophy of technology and science, fairness, conceptions of the body. Keyword and subject searches were done through the following selected library and e-databases, as well as online search engines: Biotechnology Research

Abstracts; Biomed Central; Canadian Health Research Collection; Computing Reviews; eMedicine; EBSCOhost Research Databases; Gale Virtual Reference Library; IEEE Xplore; Oxford English Dictionary Online; PubMed (Medline); Scholars Portal; Google; Bing; AltaVista; Webcrawler.

The same keyword/subject searches were used to locate literature bearing on Chapters 4 and 5, Roman Catholic bioethical responses to non-enhancing and enhancing body modifications. The following library, e-databases, and institutions were searched for relevant literature: ATLA Religion Database & ATLAS; Brepolis; Catholic Periodical and Literature Index; Papal Letters; Project MUSE; The Pontifical Academy of Science; Hastings Center Report; JSTOR; EthxWeb; International Bioethics Organizations Database; National Reference Center for Bioethics Literature; Kennedy Institute of Ethics; Springer Databases of Philosophy and Religion; ProQuest; The National Catholic Bioethics Center; The Canadian Catholic Bioethics Institute.

Information regarding current organizations and philosphical positions dedicated to human enhancement technologies, which formed the basis for Chapter 6, was found through online keyword searches. Scholarship on such philosophies is relatively new; most of the literature is found in online sources, specific forums, and electronic mailing lists such as: Institute for Ethics and Emerging Technologies; Humanity+; Journal of Evolution and Technology; World Transhumanist Association. While the keyword and subject searches used for Chapters 2 to 5 overlapped with those used to find literature in this last area of investigation, the searches also required the addition of new terms: Transhuman(ism), Extropian(ism), posthuman(ism); singularity; artificial intelligence; body morphing; automorphism; neural implants; body web; techno libertarian(ism); biohacking.

B. The need for bioethical reflection on cybernetic and nanotechnological body enhancements

Faced with the prevalence of body modification technologies and given that the augmenting and enhancing processes appear to solely affect the individual, are bioethical and/or religious concerns relevant or necessary? Likewise, should we apply any kind of ethical reflection upon bourgeoning technological processes, particularly in a modern, pluralistic, society? Ted Peters (bioethicist, theologian, and editor of *Dialog*, a quarterly scholarly magazine of modern and post-modern theology) asks, "So why would anyone worry about a new cosmetic surgery technique that promised to make us thinner? Why worry about a new psychopharmacological agent that promised to enhance concentration and performance in school?" (Parens, 1).[10] One could continue in this vein and ask why worry about cybernetic or nanotechnological enhancements, given their parallel sophistication, availability, and ability to modify human nature. Within current scholarship the prospects of technological body modifications which challenge standard human capabilities have escaped widespread debate. One of the goals of this thesis is to demonstrate the need for religious and secular bioethical reflection on the topic of technological enhancement. In order to do this, the thesis focuses on the technologies of enhancement which do not include the typically addressed genetic or pharmaceutical varieties.

Current religious and secular bioethical concerns regarding types of human body enhancements overwhelmingly center on genetic modification therapies and human reproductive issues. While there is an abundance of scholarship on these biologically-

[10] This indifference has been dubbed the problem of conformity (President's Council on Bioethics, 320).

based therapeutic and enhancive possibilities, there is little exploration (on the part of religious or secular bioethical responses) of technological body modification through innovations such as cybernetics or nanotechnologies.[11] Since no direct genetic alteration or embryonic material is used in a technological body modification, its application to human physical and mental augmentation through technological implants bypasses much of the current ethical debate. One may reason that since cybernetic and nanotechnological body modifications involve no stem-cell or embryonic research, biological eugenics, nor the manipulation of genes (all of which may be forbidden by many deontological-based bioethical approaches), similar judgments may not apply to technological body enhancing. Technological body modification seemingly gathers little concern compared to classic bioethical issues such as the purposeful destruction of embryos for research purposes or genetic screening techniques that may raise the specter of selective abortions.[12] Yet, because the outcome of a modification technology aimed at increasing human function, senses or memory is ultimately the same as a genetic modification, study into its moral validity cannot be overlooked. While cybernetic and nanotechnological enhancement technologies do not express themselves upon the body at the level of 'natural' (i.e., of biological origin) manipulation, they certainly do affect the quiddity of the body. Additionally, just as the ways in which humans use tools point to

[11] See for example Shannon (1987); Suzuki & Knudtson (1989); Rifkin (1998); Kass & Wilson (1998); Ho (2000); Peters (2003); Panicola (2007).

[12] Historically, ethicists (particular those using deontological-based approaches) often focus on the issue of medical normalization and pre-natal screening when considering the classic bioethical debates on abortion. Specific debates on abortion are issues that we shall leave in the womb, for not only is there a mountain of readily available information on the topic but our concern is with the enhancement of an individual capable of self-choice and thus makes the assumption that we have an individual pondering enhancement options to begin with. This does not exclude examination into the cases of parents who could seek the option of nanotechnological enhancement for their unborn children. However, such scenarios most often fall within the preview of genetic modification enhancement theory and not our specific look into cybernetic implants. While it is theoretically possible that nanotechnology could one day be a part of implemental genetic enhancements at the embryonic stage of human development, our focus shall be the realities of the state of our current technologies.

the whole spectrum of human behaviours from creating art to waging war, similarly, the very use of technology forces us to reflect upon humanity (Klugman, ¶1). Burgeoning body enhancement technologies have inherent ethical challenges paralleling the aforementioned biological issues. As cybernetic researcher Kevin Warwick explains, "Genetic changes offer short term, slight modifications. However the step to Cyborgs offers humans a natural, technological upgrade in the technological world we have instigated" (Warwick, 2005c, ¶22).

Erik Parens has observed that concerns about new enhancement technologies are perceived by the public as "a familiar but unfortunate form of anxiety that does not deserve to be taken seriously" (Parens, 1998, 11). But since the development of cybernetic and nanotechnological body enhancements can result in increases in human functionality and performance, this thesis argues that their development and implementation should be subject to bioethical reflection. In other words, one of the main reasons for bioethical reflection about the development and use of enhancement technologies is the potential for individuals and groups in society to achieve abilities and functions beyond what is currently dubbed as normal. We shall discuss this aspect of enhancement technologies in Chapters 2 and 3. While the primary ethical concern of cybernetic and nanotechnological body modifications is their ability to exceed our biologically-set levels of mental and physical function, other ramifications include: economic commodification or exploitation of body parts or functions; the value attributed to, on the one hand, human frailty and, on the other, to human perfection; ambivalence among physicians toward body enhancing technologies in the face of increasing demand; concern about over-reliance on technology; and the potential for illegal medicine and provision of enhancements. The first three concerns are considered

central to this thesis and addressed throughout subsequent chapters. However, since current scholarship discusses the other concerns as well, we shall briefly review all considerations that have been raised.

In 2011 T.D. Hotze et al., conducted a survey among physicians in the United States about body enhancements. Almost half of the respondents were unconcerned about body enhancements (Hotze et al., 8).[13] The majority agreed, however, that enhancements should be allowed but not encouraged (i.e., not covered by insurance) (Hotze et al., 7). While a majority of physicians may not support the use of enhancement technologies (such as pharmaceuticals) beyond therapeutic needs, the general public shows a higher desire (Hotze et al., 4):[14] 62% of physicians in the United States reported receiving requests to prescribe interventions for what they view as enhancement purposes at least monthly, and 12% report patients asking for enhancement interventions daily or more often (2011, 6). Merkel offers similar sentiments when considering the public's request for low-risk extensions of human memory capacity with artificial neural-implants (143).

While the study conducted by Hotze did not ask explicitly about the religious affiliation or philosophical orientation of respondents, it did acknowledge that enhancement technologies raise bioethical concerns. Moreover, it did so by using religious language. The survey included the statements: "I am concerned about physicians 'playing God' with new medical technologies" and "Using medicine for enhancement poses a threat to the essence of what it means to be human" (Hotze et al., 6). The inclusion of these statements, as well as their phraseology, indicate that beliefs

[13] 30% of physicians reported as being neutral and a further 21% agreed with the statement "Concerns about the social effects of using medicine for enhancement are overblown" (Hotze et al., 6).
[14] See also Bergstrom & Lynoe (2008).

regarding the ethical ramifications of enhancement technologies contribute to ongoing debate regarding their uses.

The economics of body modification is also a consideration. Leon Kass (bioethicist and former chairman of the U.S. President's Council on Bioethics) registers concern about the trend to treat human body parts as trade goods, particularly in the Asian market for viable organ sales to Westerners unwilling to wait on conventional transplant-lists.[15] Advanced cybernetic implants that allow for beyond-normal abilities are likely to be prohibitively expensive, since they can be valued at beyond-normal rates. It is also likely that they will create markets such as the current market for human body parts. It is possible that the two markets will interact, with scarcity of biological organs increasing the value of non-biological enhancements. For some ethicists, such as Richard McCormick, this economization of the body is a consequence of links between technology and consumerism. This is further reflected in the concerns of bioethicists and theologians who oppose the patenting of human and animal life forms, as seen in the 1995 "Joint Appeal Against Human and Animal Patenting".[16] If body enhancement technologies are prohibitively expensive because of patents and other factors, and yet also still available to those who can afford them, one can anticipate, as the 2003 U.S. President's Council on Bioethics calls it, "the emergence of a biotech aristocracy" (317). This is a further reason for ethical reflection on the use and availability of body enhancement technologies, and will be specifically addressed in Chapters 5 and 6.

This is not to say that technology in service of public health, coupled with consumerism, has not made incredible advancements and benefited thousands medically.

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[15] See Caplan & Coelho (1998); Cherry (2000) (2005); Goodwin (2006).
[16] See Peters (n.d.) (2003).

An historical example of this is the artificial heart which has, according to *The Working Group on Mechanical Support,* reached a positive level of reliability and benefit as a viable medical tool in the minds of the general public (Levine, 1987, 290). Yet, even with positive impact, bioethical concerns remain. As the working group members note, possible social risks arise as a technology becomes more reliable and available: "It is far easier to increase than to decrease the use of a technology after it is in place…experience with medical procedures indicates that dissemination proceeds in the manner of a ratchet; once a medical technology has reached a certain level of use, the public may come to expect and even demand it as a right" (Levine, 290). Thus it seems worthwhile to reflect on the ethical implications of potential future body enhancements technologies before they become widely used or before there is a wide demand for their use.

Advanced cybernetic and bionic implants hold out the prospect of longer lives, stronger bodies, and replaceable parts—a general reliance on a technology to relieve the problems of biological breakdowns. As we shall see in Chapters 6 and 7, one can view this as a modern incarnation of the classical utopian dream of immortality coupled with an apparent fear of suffering and death. However, the levels of enhanced health and abilities that these technologies offer may fall into what Paul Tillich terms 'unhealthy health'.[17] As will be noted in our definition of what constitutes 'normal', there are often concerns that segments of society who fall below given set-points are viewed as less desirable, productive, and even autonomous. This leads us to an important element within the exploration of enhancement technologies, that of human authenticity and the quest for perfection.

[17] By this term, Tillich means a specific focusing on the particular parts and perceived problems of an individual or patient without taking the whole into consideration. There is after all, more to a person than a body, see Tillich (1990).

Religious bioethics (principally, but not exclusively, Christian-oriented bioethics) are particularly concerned with this aspect of the debate, as the human body and its teleology has deep connections with leading an authentic life in harmony with a religious ethos. The theoretical promises of abilities and function that modification technologies offer may be seen as contraindicating virtues and failings that make one truly human. Because religious bioethicists recognize a type of power which comes from our own flaws and differences, they are cautious or critical of a view of normalization that would seek to associate a deviation from a standard human norm (usually falling below the standard) as abnormal. To be authentically human, then, is to embrace and learn from our frailties (in body, mind, and spirit), for only in this manner can one hope to gain a sense of wisdom.

This is not necessarily a religious position. As Erik Parens points out, there are many researchers and ethicists who hold similar perceptions:

> Whereas Elliott was concerned that certain "enhancements" might promote a turning away from a form of anxiety or feeling bad that is constitutive of a life lived courageously and authentically, project participants like Gerald McKenny and Mary Winkler were concerned that some "enhancements" might promote a turning away from the vulnerability, imperfection, and finitude that is constitutive of life altogether. As Gerald McKenny puts it, "To the extent that enhancements overcome, or lead us to deny, the vulnerability of the body, they also foreclose the kinds of self-formation that our awareness of vulnerability makes possible." Along similar lines, Mary Winkler argues that our advertising practices reveal the depth of our desire to gain control over what, ultimately, is beyond our control: the fact of our own finitude. (Parens, 24)

This thesis shall explore these concepts of human vulnerability and authenticity in ethical judgments on body modifications further in Chapters 5 and 6.

Few would argue against the legitimacy of curative medical devices, nor is there virtue in indiscriminate acceptance of human frailties and vulnerability. In fact, the application of such technologies to restore a quality of life to patients is often viewed by religious and secular bioethics not only as an act of compassion and charity but as a societal obligation. So while there are reasons to be reflective about body enhancement technologies, one should not assume that the only responsible reaction is prohibition. Public fears of Frankenstein-like creations—be they genetically altered food-products or enhanced people—are great fodder for the publishing and television industries.[18] This opposition can come from a variety of ethical foundations. One example is the sacralization of nature that Jeremy Rifkin espouses in his critique of genetic modification issues.[19] Rifkin's political activism against certain forms of genetic modification stems from his view that nature is sacred, that the original biological unit is normal and correct, and that the artificial or modified are intrusions into natural genetic products and thus immoral. He goes as far as labeling the process of genetic modification as *algeny*—that is, "the upgrading of existing organisms and the design of wholly new ones with the intent of 'perfecting' their performance" (Rifkin, 1984, 17). With such a definition, algeny appears to fit well as a description of cybernetic and nanotechnological body enhancements, yet the 'perfecting' that the term denotes is more a warning than an appreciation. Rifkin's Foundation on Economic Trends led a passionate battle against patenting genetic information—on the broadest level, a battle between science and

[18] See Wolfenbarger & Phifer (2000); Ruse & Castle (2002); Smith (2003); Engdahl (2007); Brookes & Barfoot (2008).
[19] See Stone (1995).

nature—and warned "that government drains life of its intrinsic nature and sacred value" (Peters, 118).[20]

Yet, as ethicists and theologians have pointed out, such a view is not based in traditional Christian or Jewish theology, for at a fundamental level nature itself is not considered sacred.[21] Peters reminds us of this theological distinction by pointing out that within a Christian ethos natural life, important as it is, is not ultimate; God is ultimate (Peters, 15). This is not to say that Rifkin is without support from ethicists and activists who hold a more traditional religious ethical ethos.[22] Supporting Rifkin's stance on anti-modification, Richard Land, Executive Director of the Christian Life Commission of the Southern Baptist Convention, expressed the common warning against playing God in the laboratory: "We see altering life forms, creating new life forms, as a revolt against the sovereignty of God and an attempt to be God" (Peters, n.d., ¶3).

Others approach ethical issues concerning body modification technology with different foundations (yet often with similar conclusions). For example, lamenting the propensity of technological intrusions upon body functions and ever-changing social trends to embrace views of the body which were once held as inviolable, Kass recalls:

> In the twenty-five years since I began thinking about these matters, our society has overcome longstanding taboos and repugnances to accept test-tube

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[20] Peters himself later refutes such a claim noting that a Christian response holds that the creator is sacred, not the creation (2003, 119); furthermore, it may be noted that patenting is not the same as creating.

[21] See Bouma et al., (1989). Gustafson makes the theological point that whatever we value and ought to value about life is at least relative to the respect owed to the creator, sustainer, and orderer of life (1992, 196).

[22] This was demonstrated on May 18, 1995, at the Washington Press Conference: "Joint Appeal Against Human and Animal Patenting" orchestrated by Rifkin's Foundation where it was announced that religious leaders representing more than 80 different groups had signed a statement opposing genetic patenting. Numerous Roman Catholic bishops, along with Jewish, Protestant, Muslim, Hindu, and Buddhist leaders, signed the following statement: We, the undersigned religious leaders, oppose the patenting of human and animal life forms. We are disturbed by the U.S. Patent Office's recent decision to patent human body parts and several genetically engineered animals. We believe that humans and animals are creations of God, not humans, and as such should not be patented as human inventions. (Peters, n.d., ¶1-2)

> fertilization, commercial spermbanking, surrogate motherhood, abortion on demand, exploitation of fetal tissue, patenting of living human tissue, gender-change surgery, liposuction and body shops, the widespread shuttling of human parts, assisted-suicide practiced by doctors, and the deliberate generation of human beings to serve as transplant donors—not to speak about massive changes in the culture regarding shame, privacy, and exposure. Perhaps more worrisome than the changes themselves is the coarsening of sensibilities and attitudes, and the irreversible effects on our imaginations and the way we come to conceive of ourselves. (Kass, 1993, 485)

Here, the concerns do not have a foundation in a theological basis, but appeal to the rationale of caution before the point of no return. Theologian Richard McCormick echoes this sentiment and criticizes current definitions of normality in his explanation of *homo technologicus*—the term which he applies to a society which creates, solves, and re-creates dilemmas utilizing technology in a comic and tragic circle. He states early on in *How Brave a New World?* that "we are, corporately, *homo technologicus*. The best solution to the dilemmas created by technology is more technology. We tend to eliminate the maladapted condition (defectives, retardates, and so on) rather than adjust the environment to it" (McCormick, 1981a, 7). Like McCormick, yet with less specific criticism, Paul Ramsey observes a relationship between technology and society: "A third tenet of our age I call the Baconian project—that is, the pervasive notion that, for every problem produced by technology used for the relief of the human condition, there will be an as-yet-distant technical solution. That, too, is among our certainties" (Ramsey, 1980, 139). This sentiment is echoed in bioethicist and theologian Ronald Cole-Turner's observations on the "narrative of purpose" which he also traces to the ideas of Bacon,

who emphasized human reason and technology as a means for restoring order and achieving Eden (2001, 156).

A complete prohibition of enhancing body modifications is unlikely and impractical. Since, however, physicians serve a social role as 'gatekeepers' to many services and products interventions often hinge on physician certification regarding medical necessity (Hotze et al., 4), restrictions on the availability of enhancing body modifications could result in illegal or unprofessional provision of enhancements. This is already the case in the provision of cosmetic procedures, and has been the subject of numerous warnings and reports made public by review boards, members' associations and judicial record. [23] In 2002, for example, the American Society for Aesthetic Plastic Surgery (ASAPS) issued a public statement in response to increasing arrests by fraudulent practitioners and illegitimate procedures:

> News reports about phony doctors arrested in New York after their cosmetic procedures caused disfigurement may represent only the tip of the iceberg, according to the ASAPS, the leading national society of American Board of Plastic Surgery certified surgeons who specialize in cosmetic surgery. "This is not the first tragic story, nor is it likely to be the last," says Franklin DiSpaltro, MD, president of the 1900-member organization. "Most cosmetic procedures have excellent safety records, so people may be easily persuaded that they are simple to perform and are without risk. But in the hands of untrained physicians or possibly criminals posing as doctors – in this case using an illegal substance –

[23] Examples of unethical, immoral and illegal medical practices are well documented and contributed to the 1949 Nuremburg Code against such crimes and the subsequent 1964 World Medical Association Code of Research Ethics and the *Declaration of Helsinki*. For recent cases, see Stein & Martin (2010); Weber (2005); Jacobsen & Jacobsen (1994).

> the results can be disastrous." Authorities say that individuals posing as doctors injected unsuspecting patients, for cosmetic purposes, with substances not approved for use in the U.S. Some of these injections resulted in dangerous infections and disfiguring scars. (ASAPS, 2002, ¶1-3)

Indeed, Parens argues that unscrupulous doctors peddle their skills to the desperate and wealthy alike despite risks or ethical boundaries (11). Such persons are likely to embrace the addition of cybernetic and nanotechnological enhancement technologies, be it inside conventional insurance reimbursement or illegally, in order to make further gains without regard to medical risk or ethical deliberation. Of course the problem of illegal markets or underground medicine is tied to consumerism and marketplace as avenues that can be used to exploit a potential good. For Richard McCormick, it is this type of technology coupled with consumerism that plays a major role in the creation of 'sinful structures' that lead society to processes of enslavement rather than true health (McCormick, 1981, 35).

By examining the role of cybernetic and nanotechnological enhancement technologies, this thesis hopes, in keeping with Haraway's observations, to avoid a technical discourse setting limits around what is morally and politically possible, and instead, encourage a moral and political discourse serving as a paradigm for rational discourse (1991, 193-94).

C. The need to consider both religious and secular responses to cybernetic and nanotechnological enhancements

Ethical reflection on human enhancement technologies has dealt with genetic modification (somatic and germ line), cloning, and stem-cell research—to name but a

few technologies.[24] The issues have included conceptions of the human body, community and social standards, stewardship, natural limits, and equality. As these issues are often approached on religious as well as secular terms, this thesis examines cybernetic and nanotechnological technologies from a religious and a secular perspective in order to gain a broader understanding of their specific bioethical methodologies and opinions regarding technological-human enhancement interactions.

There is a long history of religious opinion regarding personal and public policy relating to areas of scientific research and technologies which encompass the composition and health of persons. Many religious traditions address bioethical technologies in terms of their moral acceptability with respect to their doctrines and beliefs. This judging is not necessarily restricted to life-threatening or permanently-altering cases; indeed, even cosmetic or artistic changes to the human body are often subject to religious guidelines. These religious guidelines, methodologies, and opinions allow us to categorize and predict religious responses to the cybernetic and nanotechnological body modification processes which loom on the horizon. The remainder of this chapter will briefly situate the role of religious bioethics within the broader field of bioethics and explain the reasons for selecting two particular bioethical approaches—Roman Catholic and Transhumanist—as useful ways of thinking about cybernetic and nanotechnological body modifications.[25]

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[24] See Buchanan et al., (2000); Scully & Rehman-Sutter (2001); President's Council (2003); Goodman et al., (2003); Rothman & Rothman (2003).

[25] For the purposes of this thesis it may be noted that the difference between 'moral' and 'ethical' is often a matter of application. That is, ethics commonly refers to rules of conduct defined externally, for example, by society or religious principles, whereas morals are defined internally and deal with personal conduct and our own beliefs in what is right and wrong. While both are effected by such factors as gender, religion, culture, tradition, age, media, and family, the study of one will invariably lead to the other. Within a Roman Catholic approach, God is the ultimate source and reference to each of the above, good ethics is an application of good morals, and yet it is important to note that as per the Catholic reliance on

There are a number of reasons to consider religious approaches to body enhancement technologies. Firstly, contemporary bioethics has developed out of earlier and continuing religious moral philosophy. Secondly, both secular and religious experts within the field of bioethics argue for the importance of religious perspectives to health and body-related issues. Thirdly, religious guidelines are still used to shape healthcare policy and influence public regulations. Fourthly, while diverse in scope and judgments, religious perspectives do not, de facto, exclude or deny secular or differing religious opinions on similar issues. Finally, plural opinions are valuable not only to study the specific issue but as a reflexive tool for the field of bioethics itself. We shall elaborate on each of these reasons in turn.

i. Origins

Bioethics has arisen from the combination of philosophical and religious sources or, as Warren Reich labels them, the two legs of the humanities (2003, 185). Similarly Robert Veatch notes that the ethical foundations of medicine first come from meta-ethical foundations (2003, 69), as does Eran Klein and J.K. Walter in *The Story of Bioethics* (2003, ix). Bioethics today generally analyzes issues from the series of principles outlined in the *Belmont Report* (respect for autonomy, non-maleficence, beneficence, and justice), arguably derived from religious foundations and continually debated within the field.[26] A more detailed review of differing secular approaches to bioethics would include a number of additions and interpretations to the principles of bioethics such as: Veatch's use of social contracts or covenants as a basis for defining

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natural law, good morals and ethics can be found in all persons, regardless of creed or culture. For a more detailed examination of the distinction between morals and ethics within a Roman Catholic purview see G. Grisez and deontology, R. McCormick and revisionism, and J.F. Keenan's virtue ethics.

[26] See Beauchamp (2003); Childress (2003).

norms and rights (2003, 69); Childress's ideas of common morality and an order of exception for the prima facie principles (2003, 53); Pellegrino's principles of patient-doctor relationships, duties, and virtue (2003, 5); William May's image of the healer as teacher, parent, and fighter (2003, 16). But specific critiques of the success of the Belmont principles and the continued debates concerning the primacy of selected principles are beyond the scope of this review. Suffice to say, the principles of the *Belmont Report* arose from the years when secular bioethics approached problems with a variety of decision-making processes and drew upon "a standard account of universal, principled theories, namely, teleological or consequentialist approaches such as utilitarianism, Kantian deontology, egalitarianism, social contractarianism, and libertarianism [as well as] theories of the right, the good, and the virtuous" (Daniels-Sykes, 2007, 16).[27] These approaches no longer necessarily assume religious foundations. Nevertheless, they have developed—some more directly than others—out of religious moral philosophy, and continue to figure in the thinking of bioethicists that espouse a religious point of view.

ii. Importance

In his sociological study of body modification, Michael Atkinson notes that the rise in body sculpting in Western societies is very much an obsession. He points out, "We are, in a sense, a culture of body modificationists, with our hunger for altering the corporeal only frustrated by the limits imposed by our imaginations, financial resources, products at our disposal, and scientific-medical technologies" (Atkinson, 2003, 3). Yet, the list of limits to which Atkinson refers is lacking. Atkinson's limitations include the

[27] For the contribution of selected approaches see Rawls (1971); Mill (1987); Rabbi (1995); Jonsen (1998); Beauchamp & Childress (2001); Engelhardt (2003); Heubel & Biller-Andorno (2005).

financial, technological, and imaginative, yet overlook others such as the moral or religious limitations which may influence an individual more than any of the above. Specialists in the field, religious and secular alike, recognize the importance of considering religious responses to issues and often warn of trends which limit or ignore religious participation. This fear is reflected in the work of ethicists such as Hugo Tristram Engelhardt, Warren Reich, Edmund Pellegrino, Leroy Walters, and others working with, and without, specific religious traditions.[28] For example, in *Theological Bioethics: Participation, Justice, Change*, Lisa Sowell Cahill counters the marginalization of religious input to bioethics in the public square. She argues that public policy makers who exclude religious input limit their own positions by assuming religious views bias bioethics (Cahill, 2005a, 1).[29] Despite differing responses to specific ethical dilemmas, there is common consensus amongst many working within bioethics regarding the religious foundations of their field and the dangers associated with a purely non-theistic approach to all issues.[30] As Jean Elshtain and others have pointed out, religious contributions to bioethical problems have not died out, nor has an ethical framework based solely on scientism become the dominant form of social reflection.[31] The reality is, concerns over the limits of technology may be dubbed hubris, 'playing God', or Promethean, and are shared by people of all theological beliefs and none (President's Council on Bioethics, 323).

Some have argued that without a justifiable ethical foundation, medical precepts and moral opinions can easily be denied, compromised, or challenged (Pellegrino, 2003,

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[28] See Reich (1978); Walters (1997); Engelhardt (2003); Pellegrino (2003); Beauchamp et al., (2007).
[29] See too Bowman (2004), and Dumler (2003) and the critique of secular bioethics as presenting a predominantly white-male-oriented view to global issues, contributing to marginalization of minority population by the use of utilitarian theories.
[30] See Curran (1985); Engelhardt (2003); Shelp (2003); May (2003).
[31] See Al-Hibri, Elshtain & Haynes (2001).

4). On this view, bioethics must take into account the religious sources of moral authority (Pellegrino, 2003, 10). But even if one does not accept or is leery of religious claims concerning the sources of moral authority, the practice of medicine necessarily entails a consideration of people's religiously informed values and morality, as Alfred I. Tauber explains:

> Moral concerns have always been implicit in medicine. Indeed, the division between science and values—the objectivity sought in the study of nature and the values governing human behavior—disappears at the bedside. The medical choices made by physicians and their patients must, by their very nature, reflect a complex array of values that determine how the findings of clinical science and the applications of their associated technologies are to be deployed in the care of the ill. Thus medicine necessarily obscures the line separating science and human values because of the intimate connection between clinical science and its object of study and intervention: the person—the nexus of politico-judicial action, moral agency, scientific scrutiny, and religious sanctification. (2003, 548)

iii. Influence

Beyond any argument regarding the validity of religious input to bioethical debates, there is the simple fact that religious influence on social, political, and individual policies remains a very real part of today's world. Much of what is critical in bioethics involves not only individual, familiar, or professional decisions, but also the development of public policy (Childress, 2003, 63). The study of religious judgments regarding a biotechnology is of great importance not only because it serves to add to policy debates, but because in practice religiously-administered institutions offering

health services often tailor their programs through specific spiritual guidelines.[32] We see examples of this today in religiously affiliated teaching hospitals and ethical questions regarding reproductive technologies. Since this thesis will focus on Roman Catholic responses, it may be useful to cite instances from Roman Catholic tradition to demonstrate how specific religious precepts are integral to privately run institutions and affect millions of people. For example, "at Creighton University's School of Medicine medical centers, doctors and researchers abide by the *Ethical and Religious Directives for Catholic Health Care Services*, issued by the National Conference of Catholic Bishops. The directives forbid all forms of high-tech IVF outside a woman's body, a position that stems from the Catholic Church's position that it is immoral to separate conception from sexual intercourse" (Santana, 2006, ¶22).[33] Similarly, as stated in the *Health Care Ethics Guide* published by the Catholic Health Association of Canada (CHAC), Canadian Catholic health care facilities—whether hospital, nursing home, personal-care home, or long-term care in general—integrate a specific religious "balance of the biological, psychological, social and spiritual forces that interact within the person, the society and the ecosystem" (CHAC, 1991, 10). To this end, the CHAC *Health Care Ethics Guide* gives a list of fundamental Catholic moral principles (which this thesis will explore in Chapters 4 and 5) that underlie ethical decision-making including: the dignity of the person, the social nature of the person, the right to life, well-informed conscience, the principles of the double effect, legitimate cooperation, totality and integrity of the human person, the common good, growth through suffering, and stewardship and creativity (13-17). Indeed, the Catholic Health Association of the United States of America

[32] See Numbers & Amundsen (1986); Curran (2008).
[33] See *Donum Vitae* (1987); *Dignitas personae* (2008); *CCC* #2377; Hass (n.d.).

states that there are 630 Catholic community hospitals in the United States representing 12.6% of all hospitals and 15.8% of all patient admissions (CHAUS, 2013a, ¶1). With 19 million emergency room visits and nearly 101 million outpatient visits in Catholic hospitals, during a one-year period the 56 Catholic health care systems across the United States employ 533,152 full-time employees and 232,591 part-time workers (CHAUS, 2013b, 2). In Canada, the Catholic Health Alliance of Canada reports that in 2012 there were 108 Catholic affiliated health care organizations offering 17,646 beds for patient care and employing 60,928 people across the county (CHAC, 2012, 5). General Roman Catholic medical guidelines for teaching hospitals and surgical procedures provide a course of action on the use of technologies to repair an injury or address an affliction, but to use such technologies for human enhancement may be contrary to current accepted norms and create new sets of problems.[34]

iv. Diversity

Because religious approaches to bioethics happen to hold particular viewpoints, it cannot be implied that the same viewpoints are not shared, or valid, when considered by others. As theologian and bioethicist Tadeusz Pacholczyk explains, there are important social subjects that can be understood as true by all peoples, religious and non-religious, and proposals which are just, right, and good for all, which should not be dismissed or assumed as being imposed by religious authority (2005, ¶3). Indeed, there is a disservice to the community when religious input is "short-circuited [by] stressing religious zealotry and imposition without ever confronting the substantive ethical or bioethical

[34] While acknowledging divergence amongst specific hospital boards, teaching colleges, and medical institutes, general Roman Catholic surgical and medical education guidelines follow recommendations as set down by encyclicals, publications of Conferences of Catholic Bishops and boards dedicated to such guidelines: Catholic Medical Missions Board Inc., Catholic Physicians Guild, National Association of Catholic Chaplains, the Pontifical Council on Health Affairs, etc.

argument itself" (Pacholczyk, ¶6). A simple examination of religious contributions to medical ethics in our pluralistic society is found in *Contemporary Catholic Health Care Ethics,* wherein Gerald Kelly outlines the history of the relationship between religion and medicine and makes strong claims about how theology can be applied in health care ethics. He suggests how a Roman Catholic perspective on health care can utilize certain secular moral-philosophical positions, even as they apply to the issues of birth control, and end-of life concerns (Georgetown, 2003, ¶6). Further, it is possible to have selected Roman Catholic perspectives applied to non-Catholic positions.

Within this sharing of philosophies one finds that the positions regarding body modification or enhancement practices are not confined solely to those organizations which developed them. There is no exclusivity regarding an organizations' ability to find common ground in the application or rejection of body modification or enhancement guidelines. Indeed, the relationship between Roman Catholic guidelines or ecclesiastic opinion on medical procedures and secular or non-Catholic institutions is a subject that hospital ethics committees and moral theorists have written on at great length.[35] This is not to say that Roman Catholic applications of religious principles such as totality, mutilation, or body integrity are, nor even necessarily can be, given weight in the creation of bioethical regulations by non-Catholic organizations. Yet, there is a strong relationship between Roman Catholic concepts of social justice, common good, and human dignity, and the foundations of bioethics that hospitals and clinics look to for guidance when moral dilemmas arise in everyday practice.[36]

v. Reflexivity

[35] See Grodin (1993); Dugan (2001).
[36] See Numbers & Amundsen (1986); Lammers & Verhey (1998).

Human cybernetic and nanotechnological enhancement is an example of how technological advances bring new ethical puzzles to society, requiring people to ponder and pronounce upon something that was once purely fiction. This new puzzle offers the fields of religious and secular bioethics more than the chance to examine traditional guidelines regarding the limits of the body. Through an examination of body modifications in light of ethical systems we are able to reflect upon the problem by using the methodologies within the field, analyze new ethical questions which relate to current and projected body issues, and finally re-analyze the methodologies and bioethical foundations which contributed to the judgments in lieu of new technologies. Yet the reflexivity of a bioethical examination into body modification technologies goes beyond an analysis of methodologies; it is an opportunity to understand our own ideas of what our body limitations contribute to being human.[37] This process is seen in the bioethical examination of a similar advanced technology, the creation of artificial intelligence (AI). In *God in the Machine: What Robots Teach us About Humanity and God*, Anne Foerst contends that AI can be used for more than what normal machines are currently used for, it can be used to understand ourselves (2004, 87).

D) The responses selected for consideration: Roman Catholicism and Transhumanism

Roman Catholicism and Transhumanism were selected as illustrative of a religious and a secular response to cybernetic and nanotechnological enhancements for several reasons. First, I have a personal interest in Roman Catholic bioethics and the tradition's approach to advanced scientific theories in the fields of bionics, nanotechnology,

[37] As Stephen Garner notes, "there is almost an enthrallment with the question of how much technology compromises the essentially human" (2005, 3).

artificial intelligence, and bio-mimetic computer applications. Secondly, Roman Catholicism and Transhumanism (on the surface) represent differing areas of a spectrum of views towards traditional and new body modification processes. The Roman Catholic approach is relatively conservative, traditional, and consistent in assessing technologies which affect the body, whereas Transhumanism, a more recent approach, is somewhat radical, independent, and nonconformist in its evaluation of those technologies. Roman Catholicism has a major influence on healthcare directives and is active on social and political levels in promoting a well-defined set of ethical parameters. Transhumanism as a cultural movement claims only a few thousand members, something Cole-Turner notes as "hardly the critical mass needed to launch the next stage of human evolution." But, as Cole-Turner continues, "ignoring Transhumanism comes at the risk of failing to see the more basic and pervasive dynamic upon which it depends" (2011, 14). Hence its selection as an interlocutor with Roman Catholicism.

A third reason for the selection lies in the tradition of dialogue. Distinctive Roman Catholic bioethical positions on emerging topics (particularly contraception, abortion, organ donation, and euthanasia) have been articulated in dialogue with other religious perspectives, often contrasted and compared to various Protestant and Jewish theologies.[38] Yet there has (to date) been a lack of dialogue between a Roman Catholic position and a one based on a secular technologically-oriented philosophy. Yet there is a discourse within Transhumanism that is evocative of Christianity. As we shall see in Chapter 6, Transhumanist philosophical principles appeal to many of the very same categories that we shall examine within Roman Catholicism, such as human stewardship, the value of vulnerability, the purpose of life, and risk to both the self and the common

[38] See Curran (1985).

good. Indeed the language between the two groups is often identical, although, as this thesis will show in Chapters 6 and 7, the interpretations of the underlying principles can be radically different. The differences in interpretation should not exclude both groups from discourse; as Nicolas Rose explains, differing moralities can become part of discursive process provided groups understand each other's interpretations of words and symbols, translating the values of others into their own terms (1996, 184).

A further reason for choosing these two groups is their accessibility and continual exposure to critiques, both internally and externally. Catholicism over the centuries, and more recently Transhumanism, has been assessed on sociological, technological, religious, and economic levels with strong pro and con judgments. Criticisms of both groups are varied. In the case of Roman Catholicism, some declare its approach as outdated and discriminatory in matters of human reproduction and sexuality, paternalistic, and philosophically committed to a false and corrupting dialectic between reason and faith.[39] In the case of Transhumanism, some declare that it lacks persuasiveness because of its futurological designs, lack of clarity regarding implementation, sensationalism, disregard for faith-based concerns, technoutopianism, or lack of cohesion and official members.[40] As we shall discuss in Chapters 6 and 7, even within Transhumanism, members debate each of the above and constantly present arguments regarding determinism, over-emphasis on human reason, and the conclusion that technological possibility ensures implementation.[41] Such negative evaluations do not undermine Transhumanism's contribution to a philosophy of technology; they are to be expected, given the scope of the subject matter and the history of criticisms against

[39] See Curran (1987); Engelhardt (1995); Lammers & Verhey (1998).
[40] See Miah (2003); Hughes (2010a) (2010b) (2010c) (2010d).
[41] See Smith & Marx (1994); Miah (2003); Hughes (2010c).

Enlightenment sources upon which Transhumanism predicates itself.[42] Moreover, in Transhumanism (as in Roman Catholicism) we find a spectrum of opinion: members wholly against theism, restriction, and policies labeled as bioconversative and other members who maintain traditional religious affiliations and seek to temper enhancements by way of a blending of bioethical approaches.[43]

Finally, to address growing bioethical issues based upon cybernetic and nanotechnological technologies, Roman Catholicism must confront those systems which have established themselves as proponents and experts of these advances—systems such as Transhumanism, borne of technology and philosophy and eager to contribute to modern applications and social discourse. Jeanninemariedymphna (an internet alias), self-described 'liberal-Catholic' and author of "Dues Ex Machina: Can Transhumanism be reconciled with traditional Abrahamic religions?", notes how the religious study of Transhumanism and technological utopianism does more than compare narratives; it shows how "technological developments compel us to alter our worldviews—whether we want to or not" (2011, ¶6). Given this, apart from contributing to common guidelines regulating body modifications (as applied to government health policies or social trends), an analysis of Roman Catholic bioethical approaches to enhancement technologies in conjunction with Transhumanism displays how novel body technologies can lead one to reflect upon past assumptions and expand to meet new demands.

[42] See Marcuse (1964); Foucault (1970); Gray (1995); MacIntyre (1996); Glendon (1999).
[43] See Hughes (2010b).

Chapter 2—Literature review of human enhancement

As a beginning, our literature review will situate the current technical applications of body modifications technologies and scholarship on human enhancement. This includes definitions in the field and bioethical reflection on similar, yet not identical, enhancement issues. Before we can examine the array of present and future body enhancement technologies, we must first address the confusion and lack of consensus in defining and describing of the phenomenon's many labels and scenarios. Is 'enhancement' thought of in the same manner by a cosmetic surgeon and an electronic engineer? How restrictive should we be when defining a device or procedure that has the potential to go above and beyond normal states of human health and function? The ambiguity becomes grave when we consider just what it is to be 'normal' and what constitutes good health or function. The following review of the discourse around cybernetics, nanotechnology, enhancement, and normality will allow for improved understanding of the definitions and ethical challenges that come along with changing the abilities and characteristics of the human body. The parameters of the included literature and sources have been selected by necessity and value—as human enhancement has only recently reached viable levels of experimentation and use, a majority of the included literature and reflections do not exceed twenty years. Similarly, scholarship aimed at specific cybernetic and nanotechnological enhancement issues and philosophies dedicated to the same is overwhelmingly recent in origin, limiting the scope of searches to within the last decade. This does not include those sources and literature used in compiling the historic applications of technologies nor the foundations of bioethical and religious input regarding issues of the body. Sources and literature for such foundational areas span the last century, but primarily focus on the last fifty years of

scholarship within the field of bioethics and the selected religious tradition. The most recent developments within each of the areas of study have been used and the contributions of respective expert or authoritative opinion documented within each chapter.

Popular perceptions of terms such as 'cybernetics' are often misguided: individuals can be swayed by the semi-accurate and easily glamorized portrayals of new terms and procedures that the media produces for entertainment purposes or sensationalism.[44] Box-office hits such as the *Terminator* movies, *Robocop*, *I-Robot*, and even *Star Wars* give the public views of a future where human-machine combinations can out-perform regular (obsolete) people. As technoculture author and lecturer Lelia Green explains, today we are captivated with depictions and inquiries into how much technology integrates with people, on biological and social levels (2002, 167). In these entertainment scenarios, the cyborg or augmented human is predominately emotionless, robotic, and excessively draconian.[45] In reality, present-day technological body integration is hardly so sinister, as illustrated in publications such as *TIME Magazine*.[46]

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[44] See Hook (2002); Miah (2003); Merkel (2007).

[45] Interestingly, the majority of 'cyborg' characters in this small list of movies are justice-oriented protagonists seeking out more human rather than artificial qualities.

[46] Sound journalism on the topics of non-biologically-based body augmentations, nanotechnology and cybernetics counter media glitz or lax reporting. Examining a publication's use of the term 'cyborg', we find *TIME Magazine* issuing articles such as "Meet the Chipsons" which introduces us to the Jacobs family, "the first volunteer test subjects for a new, implantable computer device called VeriChip…. pending Food and Drug Administration approval, doctors will load a wide-bore needle with a microchip containing a few kilobytes of silicon memory and a tiny radio transmitter and inject it under the skin of their left arms, where it will serve as a medical identification device. It sounds like science fiction. (Remember the Borg on Star Trek? Resistance is futile!) But VeriChip is quite real. The Jacobs family could be the first in a new generation of computer-enhanced human beings" (Grossman & Klarreich, 2002, ¶2). Other *TIME* publications outlining artificial body modification technology include: Mark Halper's, "To Your Health" (Dec. 15, 2003), describing Optobionic's artificial retina, showcased at the World Economic Forum; Dan Cray, Carolina A. Miranda & Wilson Rothman, "Rise of the Machines" (Jun. 14, 2004), reporting on neural-controlled driving and 'swarm-computers' planned for use in the exploration of Mars; and Francine Russo, "Who Should Read Your Mind?" (Jan. 19, 2007), on the exploding new field of neuro-ethics and the debate on who should be given authority to scan and interpret your brain-activity. Such articles show the true state of the technologies: noting their limitations as well as their advantages.

When we seek to be more precise, however, we soon find that the key terms used by differing disciplines and organizations are still in a state of flux. These terms are descriptive of body modification procedures and the technologies that make up the physical components and connections between artificial implants and natural body parts. In what follows, we discuss and define the major terms and themes that are currently used in conjunction with body modification technologies and connected ethical issues. They include labels such as 'cybernetic', 'bionic', 'nanotechnological', as well as concepts such as health, functionality, and enhancement. However, definitions of the constitutive elements of an individual's good health, levels of functionality, and conceptions of well-being rely on determinations of what is normal. Thus the clarification of 'normal' also becomes imperative. Definitions of 'normality' and states of health play an important part in understanding how technology is used to enhance rather than restore. Likewise, the definition of enhancement versus restorative medical treatment is also a necessary part of this discussion—indeed, is not all medical treatment an enhancement? And the definition of technology by itself is worthy of inspection, particularly when examining the policies and judgments of differing groups.

A. Cybernetics/cyborg

Although cybernetics has been described as the study of control and communication, or as a method of viewing the human being as essentially a collection of biological and mechanical information (Herzfeld, 2005, 2111), it is its application towards physical and mental improvement that occasions bioethical reflection. Initially the term was used in the philosophical study of interactions, as Paul Pangaro explains:

> The term itself began its rise to popularity in 1947 when Norbert Wiener used it to name a discipline apart from, but touching upon, such established disciplines as electrical engineering, mathematics, biology, neurophysiology, anthropology, and psychology. Wiener, Arturo Rosenblueth, and Julian Bigelow needed a name for their new discipline, and they adapted a Greek word meaning "the art of steering"[47] to evoke the rich interaction of goals, predictions, actions, feedback, and response in systems of all kinds (the term "governor" derives from the same root) [Wiener 1948]. (Pangaro, 2008, ¶4)

Thus the term took root in systems engineering and in the inquisitively eccentric field of mathematical philosophy. One of the early pioneers of philosophical cybernetics was Austrian-American scientist Heinz von Foerster who founded the Biological Computer Lab at the University of Illinois. He noted: "Should one name one central concept, a first principle, of cybernetics, it would be circularity" (University of Reading, 2008, ¶1). This is not quite as esoteric a definition as the one given by Peter Fellgett, who described cybernetics as anything that interested him (University of Reading, ¶1).

Subsequent adoption and adaptation of the term has grown in use and meanings, spawning such popular terms as 'cyber' and 'cyborg'. Much of the credit for this is given to science fiction writer William Gibson, who coined the term 'cyberspace' in 1982,[48] as well as Manfred E. Clynes and Nathan S. Kline, who used the term 'cyborg' to describe a theoretical being, part human and part machine, which could be developed

[47] Christopher Hook echoes this same Greek foundation explaining that the word 'steersman' derives from *kybernetes*. See Hook (2004a).
[48] As quoted in the *New York Times Sunday Magazine*, 19 August 2007.

for work in extra-terrestrial environments.[49] Thus the term morphed from a philosophical expression of guidance and control to the integration of the biological with the artificial: mechanics and computers contributing to a human body.

One of the most notable introductions for the cyborg comes from Donna Haraway's "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century" in *Simians, Cyborgs and Women: The Reinvention of Nature*. Haraway's analysis delves into the nature of political feminist theory, images of the body, and the minimizations between artificial and natural constructs. While this is an exploration of the cyborg myth and image, primarily focused on the development of fractured identities and the parallelisms of power and relationships found within women's studies, we find several important aspects of the cyborg in her work. Perhaps the most important is the conception that what we deem natural (biological, not fabricated by human production) and the artificial (synthetic, manufactured by humans) are not opposites but are, in fact, equal extensions. This integration of the natural and artificial is thus a fundamental aspect of a cyborg. Another facet of the cyborg appears in her analysis of the diversity of milieux in which they exist: "A cyborg is a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction…. Modern medicine is also full of cyborgs, of couplings between organism and machine, each conceived as coded devices, in an intimacy and with a power that was not generated in the history of sexuality" (Haraway, 149-150). This is the use of the cyborg as a metaphor in order to challenge all people (not only feminists) to re-explore their views on global political, social, and economic systems. This

[49] As Clynes and Kline first used in the September 1960 issue of *Astronautics*, "For the exogenously extended organizational complex functioning as an integrated homeostatic system unconsciously, we propose the term 'Cyborg'" (26-27).

emphasis of the cyborg as a cultural icon and its relational aspects is further echoed by Hayles (1999), wherein the cyborg is an artifact which displays new relationships between bodies, information, technology, and prosthetic extensions (Hogle, 703)

For our purposes, Clynes, Kline, and Haraway bring the term to its proper application: the coupling of human and machine, organic and artificial, to adapt, repair, or enhance the human body. This fits the simple definition of 'cyborg' as given by *The Oxford English Dictionary*: "[Blend of CYB(ERNETIC *a.* and ORG(ANISM.] A person whose physical tolerances or capabilities are extended beyond normal human limitations by a machine or other external agency that modifies the body's functioning; an integrated man-machine system" ("Cyborg", 1989, ¶1). Such a definition encompasses the key elements of a cyborg as it includes the blending of the biological and artificial components of the term and appropriately incorporates the idea that such an entity goes beyond human limitations.

The cyborg should not be confused with, nor used as a synonym for, two other artificially constructed organisms, the android and the robot. An android is a constructed, human-shaped, self-aware machine with few, if any, organic components. Current models of self-aware machines are theoretically impressive but have yet to cross into realistic feasibility. A robot, the term which derives from Slavic meaning 'worker', is also a constructed being, but usually does not have a human form and is more likely to perform repetitive dangerous tasks than operate as a sentient entity. Such devices perform tasks as directed by another machine or human being (Klugman, 1999, ¶44).

Foreseeing the development in cybernetic organisms, G.Q. Maguire and Ellen McGee noted that the rapid miniaturizations of electronics and precedents in body enhancements may be traced to the 1960s, with the "Quiet Revolution" in

biotechnologies. This "Quiet Revolution" refers to the rapid acceptance of biotechnologies in conjunction with the boom in miniaturization and computer processing speeds by many of the largest and most influential segments of society such as business and government institutions. Rarely were 'upgrades' to the latest and faster models of technology questioned and rarely were they discouraged. Following the steps already taken in cyborg development, Maguire and McGee review technological developments, particularly those that facilitate interfaces between neural tissues and microprobes. The first steps have already been taken in research with cochlear and visual cortex implants. Today cochlear implants enable even the congenitally deaf to hear by direct stimulation of the auditory nerve (Maguire & McGee, 8). This type of implant is an example of a typical technological intervention—direct stimulation, overriding a damaged or missing nerve function with mechanical aid. As applied to human vision, work on ocular prosthetics started in the 1960s, when Giles Brindley attached eighty electrodes to miniature radio receivers and implanted them into a sightless volunteer's brain, hoping to remotely stimulate the visual cortex (Maguire & McGee, 8). Development continued in varying forms and today visual cortex implants allow the end-user (legally blind) to recognize letters as well as patterns of light as darkness. Yet the technological interfaces do not stop at sensory augmentation; neural devices to aid in contracting paralyzed muscles and in bladder control have also been implemented. Thus the two researchers correctly note:

> If this trend is taken to its limit, computer chips and other electronic equipment implanted with human bodies might replace, augment, and enhance those most human of faculties, our memory and our ability to reason. We could see the

> coming to be of science fiction's cyborg, a person who has an intimate, perhaps necessary relationship with a machine. (Maguire & McGee, 1999, 7)

In addition to human-machine hybrids, Maguire and McGee predict body networks as the first step towards the development of a new kind of mind—a collective mind. Such a development allows for the experiencing of the same reality between two individuals and brings about the ability to share information, skills, and perceptions in unprecedented forms. The benefits could be quite impressive, as Maguire and McGee note: "(1) the spreading of organizational expertise among workers, (2) providing fast access to procedural process, and schematic information for problem solving, (3) supporting process reengineering, (4) improving organizational memory, etc." (8). Beyond the sharing of faculties, we can see a development of a collective consciousness—the hive mind. This type of consciousness is ascribed to the development of implantable brain chips, internalizing wearable computing trends, and making bioengineered bodies common place, and, as we shall outline, has become a reality.

Maguire and McGee rightly point out that trends in applying cybernetics will occur in stages dependent upon the user. The first and easiest stage is made up of adopters, those with disabilities who seek a more powerful prosthetic device. The second stage encompasses a move from therapy to enhancement as non-disabled individuals seek devices to augment faculties or senses. Maguire and McGee further speculate that military influences will come into effect at this stage with interfaces coupled to positioning and weapons. Finally, in the third stage groups of individuals will be seeking to expand information transfer and capacity (workers for example) —all within roughly twenty to thirty years. Such a time-line and ordering is not unreasonable as we have

already reached several stages with prototypes and research. This thesis will outline current examples of such prototypes in Chapter 3.

However, given the increased or altered body functions offered by cybernetics, there appears to be a looming question of social justice in the discussion of body modification, as characterized by Annals: "'devices would not only permit us to locate all the implanted [persons] at any time, but could be programmed in the future to monitor the sound around them and to play subliminal messages directly to their brains.' Governments could control and monitor citizens" (Maguire & McGee, 11). There are of course other possible dangers that technologies such as brain implants could spur. Some of the more important ones include: the urge to alter the body to provide competitive abilities, the social impact of implementing a technology that widens the divisions between genders as well as rich and poor, and the unforeseen consequences to the image of self, dubbed cyber-psychosis (Maguire & McGee, 11). Predicting the moral dilemma brought on by cybernetic enhancement, Maguire and McGee note, "Many people accept invasion of the organic by the mechanical for curative purposes but feel that using technology for enhancement is wrong. For them, respect for humans requires the physical integrity of the body…. [O]n a religious sense improving on the design of creation insults the Creator" (10).

B. Bionics

As with 'cyborg', we find that 'bionic' has evolved from its initial usage and has varying interpretations depending upon its application. In many respects the term 'cyborg' is akin to the term 'bionic', as they may both be used as a description for a life-

form that shares synthetic and biological elements. The term also shared a history of misuse by popular media soon after its first appearance.

Introduced in 1958 and 1960 as the title of working papers and a symposium by Jack E. Steele, the term 'bionic' has the connotations of being life-like as well as combining the biological and the electronic. Modern bionics has little to do with 'super-strength' or the cartoonish representations of the pop-media (McCarty, 2009, ¶10). As with related terms, such as biomimetics or biomimicry, it is simply the engineering principle of applying evolutionary characteristics to synthetic products.[50] This is done by analyzing a natural biological process, adaptation, or ability, and then transferring the desired quality through imitation to achieve an artificial counterpart. Engineers and manufacturers attempt to borrow design concepts from nature, thus creating innovative products which minimize costs and maximize effect. A classic example is the development of Velcro® by electrical engineer George de Mestral. He realized that the sticking-power of burdock burrs which so often plagued his clothing and his dog could be replicated in a synthetic version—nylon—thereby introducing a new apparatus for all challenged by buttons or laces (Mueller, 2008, 3).

When applied to the medical field, the mimicry which bionics seeks to employ comes from the human body; replacement organs and limbs, constructed from various synthetics, attempt to restore or enhance their damaged natural counterparts. Cochlear

[50] Via the study of the natural design structures and the composite materials of plants, animals and even inorganic substances, biomimetics and biomimicry allow for the application to the manufacturing sciences of sophisticated natural patterns made from simple materials like keratin, calcium carbonate, and silica, which nature manipulates into complex yet amazingly strong and versatile building blocks for thousands of global life-forms. As Mueller explains, "The abalone, for example, makes its shell out of calcium carbonate, the same stuff as soft chalk. Yet by coaxing this material into walls of staggered, nanoscale bricks through a subtle play of proteins, it creates an armor as tough as Kevlar" (Mueller, 3). By identifying such naturally formed structures and mimicking the design with artificial processes we are able to produce greatly improved material traits and efficient rates of production to a myriad of substances.

implants and artificial hearts are examples of artificial devices modeled on biological organs, making the end-users both partly bionic and partly cyborg. Another example would be current bionic research into tissue engineering and novel biomaterials such as elastomeric scaffolds, silicon nanowire devices, and transdermal injectors, which seek to drastically reduce the problems associated with a lack of viable organ donation.[51]

Since the structural design paradigms of biological organisms range in scale from miniscule to gross, biomimetics has naturally turned to the nano, micro and macro level from which to draw insight.

C. Nanotechnology

Allowing for the use of the smallest of objects in the grandest of ways, nanotechnology (or nanotech) is the engineering of functional systems at the molecular level, a scale which operates at roughly 100 nanometers or less. Nanotech is the continued miniaturization beyond the micro level. To put this measure into perspective, an ant would be about 500,000 nanometers in length; a red blood-cell, roughly 7000-8000 nanometers; and the strings of DNA inside it, roughly 2-3 nanometers. The term's first public definition was given by Norio Taniguchi at the University of Tokyo in 1974, although the concept of atomic-sized machines or sub-atomic manipulation pre-dates formal publication.[52] K. Eric Drexler subsequently promoted and refined nanotech phenomena and models through such works as *Engines of Creation: The Coming Era of*

[51] On average, 25% of transplant patients will die due to lack of compatible donor tissues. See Center for Integration of Medicine & Innovative Technology (CIMIT, 2010).
[52] See Taniguchi (1974).

Nanotechnology (1986) and *Nanosystems: Molecular Machinery, Manufacturing, and Computation* (2006).[53]

At the nanometer level, physical, chemical, and electrostatic properties of materials may differentiate from their standard-sized levels, allowing manufacturers novel and unique applications such as the creation of increasingly effective, better targeted drugs; stronger, more flexible materials; and more nutritional, longer-lasting foods (Fletcher, 2008, 7). However, due to a number of scientific principles becoming dominant at the nanoscale, nanomaterials can have very different properties than bulk materials. Materials can become stronger, lighter, more electrically conductive, superparamagnetic, optically tunable, more porous, better thermal insulating, and less corrosive (Gordon & Sagman, 2003, 4). Atoms thus become one's building-blocks for devices and mechanisms able to work within the confines of a biological cell, grouped together to form small gears, engines, ports, links, and so on.

As outlined by N. Gordon and U. Sagman, nanotechnology provides a new generation of biocompatible nanomaterials for repairing and replacing human tissues (10). In medical applications, nanomaterials (including nanoparticles, nanowires, and nanocrystallines) are practical non-bulky replacements for use as biocompatible materials or coatings in drug encapsulation, bone replacements, prostheses, and implants (5). These nanomaterials include the groups 'nanotubes' and 'fullerenes'[54], described by Gordon and Sagman as the first "wonder materials" of nanotechnology (5). These are new forms of carbon molecules that produce materials which are 100 times stronger than steel and one-sixth of its weight, more conductive than copper, and safely used in

[53] Drexler's pioneering efforts in the field have earned him the unofficial title, Father of Nanotechnology.
[54] The carbon-family allotrope, spherically also known as buckyballs.

medical applications. While still in the development stage, the range of nanotube and fullerene applications includes artificial muscles, injection needles for individual cells, and drug delivery systems (5). Nanotubes allow for the sensations of touch and temperature for artificial skin, and because carbon nanotubes, 1/10,000 as thick as a human hair, are the most efficient thermal and electrical conductors known, they may be formed into water-resistant skin composites shaped by lasers (Fischman, 2010, 51). Nano-skin, combined with bionic prostheses, thus produces an artificial construct which is indistinguishable in terms of sensory information provided from their biological counterparts. Indeed, as L. Hogle, ethicist and anthropologist of science, technology, and medicine at the University of Wisconsin Medical History and Bioethics Department, notes, many of the current researchers developing artificial tissues felt that it was an inherent part of their responsibility to create something stronger, more resilient, and more functional in terms of cell signaling and protein interaction than naturally occurring biological tissues (Hogle, 712).

Gordon and Sagman further identify two families of medical nanomaterials that are important for our purposes:

> 1. Nano devices: device technologies that are dimensioned in the nanoscale. While nano devices are increasingly becoming possible to make in the lab, they are not yet viable in medical applications. Larger scale micro devices are effective solutions in most cases and avoid many difficulties associated with production and packaging of nano devices. As a result, nano devices are more likely to be in future applications.
> 2. Micro devices: micro-electromechanical systems (MEMS), microfluidics, and microarrays, to name a few. These microtechnologies have diverse medical

> applications. Examples include biosensors and detectors to detect trace quantities of bacteria, airborne pathogens, biological hazards, and disease signatures; microfluidic "Labon-a-chip" applications for DNA testing and implantable fluid injection systems; and MEMS devices which contain miniature moving parts for heart pacemakers and surgical devices. (Gordon & Sagman, 5)

Thus, even though we have two categories of miniscule objects, we have a large distinction between theoretical nanodevices and the practical applications of current micro devices (the aforementioned MEMS). The one group is in current use and, as we shall see, often poses little or no bioethical challenge. The other is not yet ready for market use, although the horizon appears to be relatively close. For example, the elegantly simple, yet deceivingly strong, nanotube (100 times stronger than steel and one-sixth the weight) may be applied to artificial muscle and bone causing a direct challenge to current species-based norms, and moves us from a paradigm of repair and restoration into enhancement and betterment.

While terms such as nanotechnology are often used for market-appeal or as a catch-all for technological developments on an atomic scale, it is important to realize what the scope of initiatives, disciplines, and institutions this concept embraces. Presenting at the 2003 Institute of Electrical and Electronics Engineers (IEEE) conference on nanotechnologies, Vivian Weil notes that nanotechnologies have implications for advances in medicine, biology, computing, energy conversion and storage, optics, and material fabrication, spanning academic disciplines and affecting government institutions, businesses, and organizations (Weil, 1977). Rosalyn W. Berne echoes nanotech's expanding role in the world today in "Tiny Ethics for Big Challenges: Calling for an Ethics of Nanoscale Science and Technology." Berne points out the

increasing interactions between nanotech and the human body while directing attention to the problems of power. This power is for increased control and manipulation of matter, resulting in an "exponential decrease in the size of matter we can touch, move, and otherwise influence, conversely increasing our capacity to change our world, our bodies, our resources, our ecosystems, our political systems, and so on" (Berne, 2004, 11). But at the same time the non-profit Center for Responsible Nanotechnology warns against generalizing any micro-scale technology or product as nanotech:

> Unfortunately, conflicting definitions of nanotechnology and blurry distinctions between significantly different fields have complicated the effort to understand the differences and develop sensible, effective policy. The risks of today's nanoscale technologies (nanoparticle toxicity, etc.) cannot be treated the same as the risks of longer-term molecular manufacturing (economic disruption, unstable arms race, etc.). It is a mistake to put them together in one basket for policy consideration—each is important to address, but they offer different problems and will require different solutions. As used today, the term nanotechnology usually refers to a broad collection of mostly disconnected fields. Essentially, anything sufficiently small and interesting can be called nanotechnology. Much of it is harmless. For the rest, much of the harm is of familiar and limited quality. But as we will see, molecular manufacturing will bring unfamiliar risks and new classes of problems. (CRN, 2008, ¶8)

While many of the currently used and theoretical designs for artificial body augmentation devices employ miniaturized components and interface with residual natural body parts on a microscopic level (MEMS), the large-scale implementation of atomic-scale machinery for use in body augmentation or enhancement is not yet practical

or a reality. The present-day application of nanotech to body modification comes in the appositeness of new fibers, plastics, and other structural materials that can be manufactured with characteristics which out-perform previous designs through the use of nanotech processes and substances. This potentially increased performance is, as we shall see, the cause of many negative perceptions of nanotech even though no current working nanoscale devices aimed at enhancing living cellular capabilities have been introduced into a biological system.[55]

D. Enhancement, treatment, and augmentation.

Since we find such terms as 'cybernetic', 'bionic', and 'nanotech' are applied and understood in differing fields in dissimilar ways, it is no great surprise that 'enhancement' is as well—particularly when we connect the word with changes to the body's natural biological limits of function. While few examinations of enhancement technologies have been framed from religious approaches, several secular and moral philosophical ethicists have delved into the hypothetical and real uses of enhancements today.[56] In medical and scientific communities, the term 'enhancement' is less important or esteemed than 'treatment'. It is often equated with an extra, or bonus, quality and is identified with seeking to achieve more-than-normal, or beyond original, levels of human

[55] "Nanotechnology and its capacity to alter the fundamentals of nature, it seems, are failing the moral litmus test of religion. In a report published in the journal *Nature Nanotechnology*, survey results from the United States and Europe reveal a sharp contrast in the perception that nanotechnology is morally acceptable. Those views, according to the report, correlate directly with aggregate levels of religious views in each country surveyed. In the United States and a few European countries where religion plays a larger role in everyday life, notably Italy, Austria and Ireland, nanotechnology and its potential to alter living organisms or even inspire synthetic life is perceived as less morally acceptable" (Scheufele et al, 2009, 91).

[56] See Kramer (1993); Walters & Palmer (1997); Juengst (1998); Sade (1998); Parens (1998); Miller, Brody & Chung (2000); Stock & Campell (2000); Rothman (2003); President's Council (2003); Kamm (2005); Henry, Fishman & Youngner (2007). In addition, several policy-making bodies have addressed certain enhancement technologies (particularly drug-related athletic enhancers) including the AMA (1998), American College of Sports Medicine (1996), and the World Anti-Doping Agency (2003).

health and form. Since medicine is based upon finding pathology or a deficiency in current conditions, it focuses on variances from the norm and treatments that will bring patients to functional states; enhancements, however, may or may not have a starting point in deficiency and thus may focus on redesign and upgrading capabilities (Hogle, 697). Prior to cybernetic and nanotechnological options, enhancement often applied to altering mood, memory and attention spans by the use of drugs or similar brain modifying behaviours (Merkel et al., 147). However, these neuro/pharmacological enhancements do not entail permanent improvements in human performance, senses, or gains to human function so much as altered brain activity and abnormal sensations.

Eric T. Juengst gives a well-founded description of the uses for enhancement in Erik Parens' *Enhancing Human Traits: Ethical and Social Implications.* He points out that the term is important within a bioethical discourse on two levels: the proper limits of biomedicine and the ethics of self-improvement (Juengst, 29). Juengst asserts that differing ethicists have attempted to clarify the term as it is applied to their respective fields of ethical analysis—using the term in such issues as genetic modification, germ-line intervention, cloning—and in medical practice and theory (44). These interpretations are not necessarily equivalent. Juengst defines the term as used in biomedicine as "interventions designed to improve human form or functioning beyond what is necessary to sustain or restore good health" (Juengst, 29), a definition used by the 2003 U.S. Presidential Council on Bioethics.[57]

Others, such as Norman Daniels, propose that enhancement is bounded by a definition of that which goes beyond species-typical normal functioning or organization. Daniels notes, "According to the normal function model, the central purpose of health

[57] See President's Council (2003).

care is to maintain, restore, or compensate for the restricted opportunity and loss of function caused by disease and disability. Successful health care restores people to the range of opportunities they would have had without the pathological condition or prevents further deterioration" (Sabin & Daniels, 1994, 124). Sabin and Daniels endorse a view of enhancement based upon definitions of normal human function and a healthcare system that would allow individuals to have a normal opportunity range. In this way, any intervention that expands upon one's functionality beyond a species-based norm would be classified as an enhancement and therefore medically unnecessary. Under this model, ethicists such as Daniels and Brock set out guidelines for medical treatments with a specific focus on costs and benefits. They propose granting permission only when medically necessary, when there is a need to eliminate conditions which cause disadvantages, or when treating to *eliminate* a characteristic.[58] A key feature in this definition is 'elimination'. A treatment may be classified as non-enhancing if its purpose is a reduction rather than an addition. Similarly, some consider a repair as having the effect of normalizing a subject's health, or perhaps returning them to their health level prior to the need for repair, whereas an enhancement would make an individual more capable than they were prior to the need for repair.[59] By contrast, LeRoy Walters and Julie Palmer regard enhancement as something that takes 'improvement' into account, distinguishing between health-related and non-health-related states.[60] For Walters and Palmer, an enhancement can be clearly distinguished from a treatment; treatments apply to health-related issues, enhancements do not. Administering a vaccine would be treatment, whereas permanently implanting a global positioning system in one's arm

[58] See Brock (1998); Daniels (2000); Merkel (2007).
[59] See Miah (2003).
[60] See Parens (1998).

clearly is not. This is an important distinction from the species-based normal function model. It also avoids the use of 'norms', thus eluding definitions of 'normality' and states of health. According to Maxwell J. Mehlman, a biomedical enhancement "raises a person up by improving performance, appearance, or capability" and yet only the modified person may determine what is or is not an improvement (2009, 6). As Mehlmen writes, "an enhancement is an improvement if the enhanced person thinks it is one" (2009, 6). However, while accurate in emphasising the deep personal level to which a body modification may be considered an enhancement, such a definition is quite relative, giving way to the possibility of multiple interpretations.

In the end, the distinctions in terms will depend upon how the technology is applied. A neural implant aimed at curing visual impairment as a function of ageing could be labeled as a 'treatment', as are corrective glasses paid for by health insurance (Merkel et al., 154). Yet a technology aimed to increase muscle strength can be dubbed a medical treatment when applied to a person with a degenerative muscle disease, but can also be labeled an 'enhancement' if used by an athlete to compete at weight lifting (Parens, 2). It can be argued that there is a need for the increased muscle mass in both of these cases, but a decision about who *deserves* the technology is less clear. This thesis will address this gap by demonstrating that despite philosophical or social differences there is often common ground in judging whether an augmentation or enhancement crosses ethical boundaries into the realm of the abnormal. As D. DeGrazia summarizes, "enhancements are interventions to improve human form or function that *do not respond to genuine medical needs,* where the latter are defined: 1. In terms of disease, impairment, illness, or the like, 2. As departures from normal (perhaps species-typical) functioning, or, 3. By reference to prevailing medical ideology" (DeGrazia, 2005, 263).

Taking DeGrazia's summary as a working definition for enhancement, we are able to further delineate between enhancement and augmentation and to define augmentation as the more limited form of body modification. While enhancement indicates an impetus to go beyond the normal in terms of function, an augmentation is a body modification which may change body form but lacks the ability to expand a human function above an original biological boundary. In this way, augmentation is a category that most often includes cosmetic alterations, decorative body arts, and simple technological interventions which allow for restoration but not necessarily enhancement. On a broader level, however, all body modification technologies may been seen as 'improvement technologies'[61] and 'implementation technologies',[62] as proposed by essayists such as Daniel Callahan, Daniel Bell, and Norman J. Faramelli.[63] Indeed, in terms of professional opinion, the 2011 survey of American physicians by Hotze et al., indicates that a large majority of physicians believe that most of what they do in medicine "is to provide an enhanced life compared to the state of nature" (2011, 6).[64] Moreover, since all definitions of enhancement and augmentation are bounded by ideas of what is

[61] "Improvement technologies enable people to meet their felt needs or to go beyond the limits of their particular natural capabilities. As such, improvement technologies can enhance our physical dimensions or can help decorate or embellish our bodies" (Shannon, 1987, 14).

[62] "Implementation technologies are difficult to describe because their purpose is to assist in the implementation of other technologies. One can best think of these technologies as facilitators or enhancers. Thus the computer allows us access to other information technologies . . . planned obsolescence makes up part of this as well" (Shannon, 14).

[63] See Callahan (1981); Bell (1973); Faramelli (1971).

[64] Physicians sampled were from the American Medical Association (excluding retired, non-patient-care physicians, and those employed in federally-owned hospitals) rendering opinions regarding enhancement technologies. While Hotze et al., primarily focused on existing medical enhancement technologies and did not specifically include the options of cybernetic or nanotechnological implants in the listed set of 14 potential medical interventions (such as: real technologies aimed at making children grow taller, and hypothetical technologies that could improve a worker's functionality and speed) the overall focus on enhancement options and a working definition appropriated from the 2003 President's Council on Bioethics allow for reasonable use of results and assumptions regarding their similar application to our specific examination.

'normal', we may find that the boundary between enhancement and augmentation changes as society struggles with the term.

E. What is 'Normal'?

As a qualitative standard, normality can be defined by a society as that which is considered average, ordinary, or within acceptable current conventions.[65] With this in mind, we find that any definition of what is 'normal' must be framed within an understanding of a given society and circumstances of the term's employment.[66] The term is highly sensitive to shifts in public opinion and time; precisely what is considered normal today may not have been considered so in the past, nor may it be considered so in the future. Further, norms that are constituted by medical, legal and social practices and narratives may be only understandable within particular contexts.[67]

As Hogle notes, the concept of 'normal' is a relatively recent addition to the English language and was adapted for biological use only around the mid-nineteenth century (697). As both a label and a quantitative measure, the term is used by differing fields to judge against preconceived or naturally occurring standards. For the purposes of our exposition, it has been defined through its use in the biomedical community. Through methodological analysis of body functions, medicine defines what is normal within a measurable deviation and applies the data to a wide variety of physiological and psychological models. Thus we develop standards of normal blood pressure, normal heart-rate, normal patterns of human development, normal height, weight, intake and

[65] Indeed, Durkheim notes that the most common behaviour in a society is considered normal (1982, pp. 20-22, 85-107, 92-97).
[66] For conditions that lead to changing definitions of normality and health, see Hacking (1990); Porter (1995); Davis (1995); Lock (2000); Sinding (2004).
[67] See Canguilhem (1989); Sinding (2004).

excretion—averages all, and certainly malleable, but extremely useful for baseline comparisons and determinations of health. By convention, the normal range (a particular test, condition, symptom, behavior, etc.) is set to cover 95% of all values from the data garnered from a general population; accounting for such factors as age, size, sex, or ethnic background, values that prove normal can sometimes in fact be outside the normal range (MedicineNet, 2001, ¶1). The further one is away from the hypothetical statistically average person (the 'norm' becoming the center point of a curve), the more likely one is to be classified as abnormal (Hogle, 698). This statistical model is used by governments in managing population's health and labour; as Davis dubs, it represents a political-juridical-institutional state of normalcy which can be used to normalize bodies (107). Classification as 'normal' is dependent upon state approval, for governments create the guidelines of normalcy and regulate accordingly—regulations which may vary across borders.[68]

Because the definition of what constitutes a normal human state of health is in flux, there are a number of ethical challenges associated with current or proposed levels of normalcy. These include the validity of the (often medical) authority to define standards of normality, the marginalization of those deemed 'abnormal', and the hazards altering one's body to perceived patterns of normality. Csordas gives account of the major historical influences that have defined how the human body is analyzed, quantified and evaluated in the western technological world, noting how normal is utilized as a measure for body set-points.

[68] See for example Kohrman who notes that the Americans with Disabilities Act in the United States and the National Survey of Disabled Persons in China may thus define who is normal or disabled and funded care options (Hogle, 698).

> Rene Descartes' metaphor of the body as a machine, in conjunction with Francis Bacon's empiricism, has greatly influenced medical research and contemporary medicine. Medicine has made significant progress by seeing the body as being comprised of separable and identifiable mechanisms. Because the body has been understood as natural and universal, medical science has been able to conduct empirical study of the body, yielding statistical standards defining the 'normal' human body and methods by which medicine can manipulate and control bodies that diverge from those norms. (1998, 84)

Foucault observes that, in the development of modern medicine, human conditions are treated and individual complaints are managed in a manner that increases medical authority.[69] Or, as Csordas states, "Medicine offers treatments for aspects of embodied human life—fertility, height, baldness, death—in this way defining an expanding number of human conditions as pathological and amenable to treatment and thereby expanding its own influence. Even when treatments are not available, through seemingly benign techniques of surveillance (especially, for example, genetic testing), medicine seeks to bring all individuals, and increasingly all parts of their lives, into its purview in order to 'normalize' individuals and populations" (1998, 87). One of the greatest fears associated with authorities' continued redefinitions of what is medically normal is an increased classification of perceivable human deficiencies. Such trends creep towards forms of 'normalizing' the public and defining an individual's rights and privileges based upon classifications of normalcy.

Situating the term 'normal' often leads to classic ethical debates regarding eugenics, the rights of peoples with disabilities, and the value of human life if it is

[69] See Foucault (1973).

classified as less than normal. As Anita Silvers explains, the distinction between treatment and enhancement presupposes a notion of, and inadvertently valorizes, 'the normal'.[70] By viewing abnormal as the standard by which we apply medical treatment, or by viewing normal as a function of quality of life, we inevitably segment society. In this way it is hypocrisy to continually assure the physically and mentally challenged that they are just as normal as any other member of society and entitled to (often by law) the same rights and options of any other individual while, at the same time, moving forward with procedures that seek to find and eliminate their abnormal conditions. There are natural characteristics and differences between all peoples; the hazards begin when we attempt to distinguish which of those differences are normal and which are not.

Further problems arise when individuals, inundated with images and ideas of what is normal as given by popular culture or the latest trends, believe that they are somehow deficient.[71] If one is not 'normal' in height, weight, hair-colour, lip-thickness, nose-shape, bicep bulge, etc., one can take the necessary steps to remedy the abnormal conditions. Such surgeries can be prohibitively expensive, and the health risks can leave an array of problems, from scarring to paralysis. Despite these facts, in many modern societies modifications are commonplace and people appear to augment the natural forms of their bodies to be better than, or at least equal to, the given norm.

Due to the combination of the increase in social theories of the body and the rise of medical technologies, the margins of normality for the body are being tested and theories are expanding in order to encompass new variations that previously were only parts of

[70] See Silvers (1998).
[71] The variety of body-image related medical problems are numerous and potentially fatal. See Hutchinson (1985); Kilbourn (1999); Wolf (2002); The Canadian Women's Health Network (2012); National Eating Disorders Association (2013).

mythology. Today the boundary of what is normal seems to have moved farther away from traditional Western ideas and into exotic combinations. As Csordas notes in his history of the body and society, specialists in the field recognize that:

> The contemporary cultural transformation of the body can be conceived not only in terms of revising biological essentialism and collapsing conceptual dualities, but also in discerning an ambiguity in the boundaries of corporeality itself. Haraway points to the boundaries between animal and human, between animal/human and machine, and between the physical and nonphysical. Michel Feher contrasts the boundary between human and animal or automation (machine) at one end of a continuum whose opposite pole is defined by the boundary between human and deity. (2004, 330)

These views of the body have become standardized and conventional in modern society. The medical ethics that flows from the observation of the body in these models serves the public and is taken as customary, although debate and examination are ever present. Yet, as we shall outline in subsequent chapters, there are organized and published groups which seek to significantly change the scope of how society views the body and to embrace the position of a blurred (or nonexistent) boundary between human and machine (technology). More importantly to our examination, the changing idea of normality has a moral quality, as Hacking (1990) argues; the norm becomes the way we ought to be (Hogle, 699).

As previously noted, the gradations of body modifications may range from serious procedures, such as medically necessary restorative cosmetic surgeries or prosthetic interventions, to non-essential decorative body arts. As perceived conceptions of beauty and body normality change, so do the frequency and styles of body modifications,

particularly the non-essential arts. This is due to the ease of obtainment and increasing trends in individual expression via the human body. The current rise in modern augmenting, or non-enhancing, body modifications such as tattooing, piercing, brandings and scarification indicates how rapidly the norms of body image have changed.

A review of some forms of simple body modifications shows this change. Health Canada guidelines define tattooing as the art of permanently depositing pigment into the skin to a depth of 1-2 mm to create a design (CBC News Online, 2004, ¶5). Though the equipment varies, typically clusters of needles vibrating hundreds of times per minute are used to puncture the skin and deposit pigments. "The art dates back to 2000 BCE as a tribal custom in many different parts of the world, including Africa and North America. Only within the last few decades has its mainstream popularity exploded" (CBC News Online, 2004, ¶5). This increase in popularity is worldwide. In April of 2000, *The National Geographic News* reported that 15% of Americans were tattooed (or approximately 40 million people). In March 2002, *Esquire Magazine* estimated that 1 in 8 Americans were tattooed (Tattoo Facts, 2006, ¶4). A 2003 Harris Poll, estimated that fully 36% of those aged 25-29 have one or more tattoos, a figure supported by the *Journal of the American Academy of Dermatology* (Tattoo Facts, ¶5). Between 1960 and 1980, the number of U.S. women who were tattooed quadrupled, totaling between 50,000 and 100,000 tattoos annually (CBC News Online, ¶13). Yet the permanency of a tattoo is no longer an absolute, as regular removal of such a common body modification can be achieved through a series of laser-guided pigment reduction procedures which slowly restore the dermis to original conditions. According to the American Society of Dermatological Surgery, in 2002, 50% of the millions of Americans who get a tattoo eventually want it removed (Tattoo Facts, 2006, ¶3).

Traditional modifications such as piercing have also undergone a great shift in use, particularly in frequency and location. Health Canada reports that between 73% and 83% of women had their ears pierced, with between 34% and 52% having complications.[72] According to Léger Marketing research, while 18% of Canadians have a tattoo or a body piercing, 5% have both.[73] It is important to note that the ear is not the only site for body piercings; a vast number of sites on the body are commonly used, including but not limited to the nose, navel, lip, tongue, nipples and genitals. The statistical information regarding male piercings is still vague; however the general rise in the numbers of men with various body piercings is comparable to the trends in female statistics. As compared to body piercing, tattooing may be considered a more severe form of body modification as multiple needles, insertions, and inks are employed in the process. Yet, piercings can be as, if not more, acute.

As with other decorative body modifications, the process of branding or scarification has traceable cultural and religious roots, mostly centered on, but not limited to, African tribal societies.[74] As with tattooing, there is a re-emergence and growing popularity of this particular body modification in Western society, even though

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[72] See Health Canada (2005).
[73] See Léger Marketing (2002).
[74] Tattooing, multiple piercing, branding, cutting and scarification are some of the more radical, permanent non-mainstream body modifications and associated with the modern primitive movement. As Christian Klesse explains, "The term 'Modern Primitives' applies to people, who 'respond to primal urges' to do '*something* with their bodies…. The reasons individual Modern Primitives give for engaging in these activities, however, are highly diverse. Personal motives put forward include spirituality, rites of passage, fun, sexual enhancement, the importance of pain, aesthetics, group affiliation, shock value, etc….. One of the most significant characteristics of the Modern Primitives movement is their appropriation of 'primitive rituals'. In their search for radical corporal, psychic and spiritual experiences and their performance of sexual events and encounters, Modern Primitives seek inspiration by so called 'primitive societies' through the adoption of the communal rites and body modification techniques" (Featherstone, 15-17). However, others, such as Torgovnick (1995), reject an idea of sameness between Modern Primitives and those they attempt to emulate, citing the practice of genital tattooing and piercing as an example of a ritual rarely (if ever) reported in ethnographic studies (Featherstone, 17). Similarly, the process of branding or scarification, once limited to ancient or so-called primitive peoples has grown into an industry paralleling tattooing.

the process is painful and generally permanent.[75] From these cursory views of decorative body modifications, we observe that the norm of modifications has changed and will continue to do so. This thesis shall explore more examples of non-enhancing modifications in Chapter 4; not specifically in terms of their normalcy, for such definitions are dependent upon social climes, but as to their bioethical acceptability based upon religious guidelines.

Following Sabin and Daniels, in this thesis we shall use 'normal' in the sense of 'species-based norm'.[76] We thus limit the meaning of the term to biological functionality and original states and do not include the broader sense of social acceptability. In this way the variability of the term is somewhat curtailed because un-aided human abilities fall within, and help to define, what is normal. Thus a body modification or augmentation that presents as non-original, additive, or enhancing, may be viewed 'above', or 'beyond', the given norm, regardless of whether or not it is deemed acceptable in a given society.

A final important aspect associated with normality is functionality. Functionality extends beyond a single level; it extends to the person as a whole, the individual parts of the body, operations of the psyche, and even society itself. As McCormick notes, "It can be persuasively argued…that the peculiar temptations of a technologically advanced culture such as ours is to view and treat persons functionally" (McCormick, 1981a, 11).

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[75] What are the different kinds of scarification? The basic categories are branding (scarification through burns, either from heat, or from lasers or electrocautery devices), cuttings (fine scarification using a thin blade, sometimes coloured using tattoo ink, sometimes including the removal of patches of skin), and various other less common means including the use of chemicals and other non-traditional means. Why would someone want to do this to themselves? Many people who do these forms of body modification are doing it to mark a rite of passage in their lives. Even though many people hold that scarification is no more painful than tattooing, it is somehow more 'intense' to most people. It has very symbolic meaning to them and often their peers or partners (Bmezine.com, 2002, ¶2).

[76] See Sabin & Daniels (1994).

Functionality has been a part of technological advancements since the first rock-hammer was fashioned; indeed, the ultimate goal of a technology is to increase functionality. Problematic questions in bioethics arise when we begin to see functionality placed on such a high dais that it overshadows considerations towards the individual and society, thereby creating a disparity between the normal and the abnormal. Furthermore, a key category of bioethical importance which rests upon interpreted levels of functionality is that of 'personhood'. Despite the fact that human bodies are so central to medicine, 'the body' is rarely mentioned in the literature in terms of 'personhood'. A patient's 'personhood' is generally understood in terms of rationality or mental capacity and ability to function autonomously, instead of, for example, membership in the species *homo sapiens* or one's ability to form emotional bonds with others (Csordas 1998, 83). Moreover, because personhood has been so narrowly defined, and because bioethics has made personhood its central category, many of the significant problems in bioethics center on bodies whose status as persons is unclear. Such problems include bodies that lack or have lost rationality. Examples include: 'defective' neonates, anencephalic newborns, brain-dead potential organ donors, patients in a persistent vegetative state, fetuses to be aborted or experimented on, mentally handicapped and incarcerated individuals to be used as research subjects, or elderly individuals suffering from dementia or Alzheimer's disease. When these patients have not left rational and autonomous specifications as to what their preferences would be, other individuals possessing rationality, preference, and autonomy decide what to do with their bodies (Csordas, 1998, 83). Functionality is thus a litmus test for a body's rights in addition to its abilities. Diminished functionality labels the person as abnormal with a negative

connotation, while greatly increased functionality labels one as abnormal but with a positive connotation.

Today, sponsored by groups such as the Defense Advanced Research Projects Agency (DARPA)—the central research and development organization for the United States Department of Defense (DoD), the quest for higher functionality via powerful neural controlled artificial limbs is well funded and well-staffed. DARPA's programs are prime examples of technological development aimed at increased human functionality and geared towards a demanding public. The $30.4 million Revolutionizing Prosthetics 2009 Program was awarded to the Applied Physics Laboratory (APL) of Johns Hopkins Universityand is an example of technological and medical convergence in order to serve a public need.[77] There can be little argument that such service is ethical and beneficial, representative of an area of body modification that seeks the betterment of the individual on physical and psychological levels. Yet, as we saw in Chapter 1, advanced prosthetics, particularly those that result in increased functionality, can result in debates as to what is 'normal'.

With the definition of normality as malleable as it appears to be, several ethicists issue warnings when individuals seek to change their bodies to suit social whims. Parens, for example, warns about taking advantage of our ability to augment and enhance. He urges end-users to think about their true motivations in such endeavors: "When are we availing ourselves of a biotechnology because we have been duped by a dominant norm, and when are we availing ourselves of it because we're trying to play with the system or enter that system to change it? (25). As part of addressing the current gap in scholarship regarding selected religious responses to body modifications, this

[77] See Pope (2008).

thesis will also explore the issue of motivations and questions of authenticity in applying enhancement technologies. Suffice to say that a wise path for such a decision entails research and "educational strategies that would enable individuals to engage in the sort of self-exploration that could help them reach decisions about 'enhancements' in a more truly informed way" (Parens, 25).

Chapter 3—A methodology for the assessment of technology

A. Assessing a technological modification

The quest for innovative prosthesis and body augmentation devices is ultimately aimed at improving quality of life and is thus laudable. Yet the swift application of experimental technologies requires examination sooner rather than later to ensure efficacy with safety and equality. As noted, currently millions of people are carrying (or are implanted with) technological devices to augment abilities and senses. This in itself is not cause for concern; the incorporation of a technological body implant is not ethically challenging in and of itself. A cybernetic body modification becomes a cause for concern to the public only when a number of specific criteria are met. As we shall argue, the criteria to assess whether or when body modification technologies may pose ethical challenges are: implantability, permanency, power, and public interaction. A technology or device which fulfills all these criteria would be deemed a greater risk to the public and individual user as compared with a technology or device which does not. In this chapter we shall describe these four criteria in turn, and then apply them to a series of examples of current technologies and devices.

Implantability refers to a level of body interaction with the technology that goes beyond daily handling and storage. Merely to carry a device, even within the limits of direct contact with the human body, does not in itself make it implantable. Direct attachment to or within the body is required for a technology to be considered implantable. Common implantable devices include a hearing aid or an artificial heart. They are part of a great spectrum of currently used devices such as medical-grade valves, rings, grafts, meshes, stents and patches. On a bioethical level, implantability is associated with medical risk, the degree varying upon the substances, depth, and tissue

types, and can be seen as a challenge to various ethical paradigms based on the inviolability of the human body.[78] A detailed examination of risk, statistical rates of failure and current regulations of manufacture for such implantable devices is beyond the scope of this exposition. It is sufficient to say that no device is without hazard for throughout the process of their utilization, from initial manufacturing, insertion, and maintenance, there will always be associated risks of failure or rejection.[79]

Implantability is often linked to permanency since implantable devices are often permanent in nature. Yet there are examples of devices which are implantable but not permanent. Such devices are often used for specific tasks or periods of the day and may then be safely and harmlessly put aside. Devices that are permanent in nature require high levels of skill to implant, are not meant for daily removal, and would require much time, effort, and risk to remove. An artificial heart would be a classic example of a permanent device, since removal would require direct medical intervention and a high level of risk to the individual. Devices which are permanently used in the human body are generally designed from materials which are bio-neutral so as to avoid infections or

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[78] As presented in *Nanomedicine Taxonomy*: "'Hard' tissues such as bone and teeth heal by reproducing tissues indistinguishable from the original. However in cases where a dental or artificial bone implant is required, the structural material used in the implant may trigger immune rejection, corrode in the body fluids, or no longer bond to the host bone. This can require additional surgery or result in the loss of the implant's function. In many cases, the failure occurs at the tissue-implant interface, which may be due to the implant material weakening its bond with the natural material. To overcome this, implants are often coated with a biocompatible material to increase their adherence properties and produce a greater surface area to volume ratio for the highest possible contact area between the implant and natural tissue. 'Soft' tissues such as skin, muscle, nerves, blood vessels and ligaments repair damaged areas with fibrous tissue. Damaged tissue from various sources such as burns and ulcers can be self-repaired by the body, but can also result in scar formation. Graft material using artificial sheets can replace skin and other tissue with reasonable graft stability and cosmetic outcome. In other types of tissue, notably 'Ultrasoft' tissue such as cell membrane and organelles that exhibit metabolic function, tissue replacement can best occur when living cells are transplanted in a mesh-structured synthetic scaffold" (Gordon & Sagman, 10).

[79] For specific examples of risk and medical device recalls, see the U.S. Food and Drug Administration Alerts and Notices wherein possible contaminations, malfunctions, and defects in currently used implantable devices are found.

other risks to the user.[80] The permanency of an implant also implies a level of function would be lost if the implant were removed, resulting in disability and possibly death. Apart from the risks entailed by their removal, permanent body objects also introduce issues related to maintenance, replacement, cost-burdens and the use of scarce resources. More so than implantability, permanency is recognized as an important characteristic in assessing bioethical issues, as the risk of harmful side effects or outcomes in the use of a technology or device is mitigated if it is easily removed.[81] Additionally, the importance of permanency has been demonstrated by virtue of our ability to mentally reject transplants and grafts despite their viability. For example, in 2000, the recipient of the first transplantation of a human hand demanded it be amputated because he had become mentally detached from it.[82]

The criterion of power is defined or measured on a scale relative to the norm of human function as outlined by Sabin and Daniels. In other words, the power of a technology or device is determined by whether it is less, equal to, or greater than normal human capabilities. The criterion is best applied to individual devices or technologies on a case by case level. If an artificial body modification or enhancement device provides an end-user with an enhanced characteristic, function or ability that is beyond what one could reasonably perform without it, it fulfills the criteria of power. To aid in understanding the state of power, we may ask the question, "Can I achieve my goal without this?" If the answer is yes, although human competence and comfort may suffer, the specific device may have little real power as defined by our category. Although

[80] For miniaturization, electrode coating with growth factors, conductive tarnish with nanoparticles and nanofibre neuron cultured implants see Webster (2004); Merkel (2007).
[81] See Merkel (2007).
[82] See Dickenson & Widdershoven (2001).

almost any tool could be labeled as 'powerful' under the rubric of adding to human functionality (from an abacus to zamboni), we may limit the scope of such devices by our previous definitions of cybernetic, bionic, and enhancement. In this manner we find that such tools must have criteria such as: utilizing electronics or computerization, scalable to a micro or nano-level, capable of implantability, and employed for medical or restorative purposes. An example of a product with power would be the previously mentioned artificial skin made up of nanotube and fullerenes; with 100 times the strength of steel, the scale above the biological human norm is quite clear. While bioethical reflection upon any source of power is prudent, the conception of a human body with more 'power', be it physical or mental, would seem to require reflection upon notions of equality, fairness, justice and prudence—all of which this thesis shall examine in Chapters 4-6 as we look at specific religious and secular systems of bioethics applied to advanced body modifications.

Our last criterion, public interaction, aims to measure whether a body modification technology significantly alters current norms or boundaries of one's interactions with others. If an augmentation or enhancement has inherent characteristics which go beyond the confines of an end-user, either by way of its specific ability or by way of its use, then the category of public interaction is fulfilled. Is the device readily apparent to those around you? Does it cause public reaction or monitor the public sphere? Do its effects influence the user in such a way that their interactions with the public go beyond species-based or social-based convention? Does it allow for abilities or characteristics that outperform or outlast standard public convention? If the answer to any of these is positive, then the role of the augmentation or enhancement with regards to the greater community should be examined. Ideally, the public helps to shape the bioethical

guidelines that in turn serve the community, conducting technological innovations through responsible patterns of ethical codes which reflect the desired standards of a society. Since the greater whole helps form bioethical opinion and since the abilities of many new technological devices constantly interplay with society at large, one must consider such issues as privacy, safety, and distributive justice when assessing the social implications of such devices.

The more criteria that an augmentation or enhancement technology fulfills, the more we must examine its efficacy in the light of accepted bioethical guidelines. To illustrate this, Table 1—Gauges of Bioethical Instability of Technologies[83], lists examples of technologies that range from helpful to necessary and applies the above four criteria to them based upon their normal usage.

Table 1—Gauges of Bioethical Instability of Technologies

Technology	Implantability	Permanency	Power	Public Interaction
Television Remote	**x**	**x**	**x**	**x**
Cell-phone	**x**	**x**	**x**	✓
Hearing Aid	✓	**x**	✓	✓
Pacemaker	✓	✓	✓	**x**
Wearable Computers	**x**	**x**	✓	✓
Nanotube Artificial-Muscle Implants	✓	✓	✓	✓

As an example of a simple non-modifying technology, the remote control for a television, entails little bioethical reflection. It is neither practically implantable into the body nor very permanent; it has little actual power (since someone may elect to choose a channel manually or simply not use the remote control at all); and one generally cannot exercise any kind of interactive ability with it outside of the sphere of a room. Thus the

[83] Our use of 'Instability' does not imply a technology's constancy or morality. Rather, it is meant to give attention to a technology's capacity to cause ethical implications and present possible problems with the established guidelines of religious and secular bioethical approaches.

television remote scores in none of our proposed categories and would place low as a device requiring serious bioethical reflection.

Although often ranked as a cause for a breakdown in polite social communication and the degeneration of basic written English skills due to repetitive abbreviated texting, the common cell-phone presents a low bioethical challenge. Cellular devices are common, but are currently neither implantable nor permanent; their power stems from efficient communication, and, while useful, the same communication could technically be achieved through letters, faxes, personal conversations, or even semaphore. There is, however, a large component of public interaction to the cell-phone. Cell-phones can involve persons other than the individual using the device. By-standers often become unwilling participants as the communications of the cellular user are broadcast to all those in the vicinity—with varying degrees of concern to all parties. In terms of privacy the reverse is also true, as a cell-phone is able to record the unsuspecting public, photographing or videoing surroundings and broadcasting any number of applications wirelessly through a crowd without any but the user knowing or aware. Hence the prohibition of the use of cell-phones in changes rooms in gymnasia. As well, cell-phones can distract the user when they should be paying attention to a task, such as driving a motor vehicle, thereby endangering the public. This has led to all 10 Canadian provinces issuing some form of cell phone/distracted driving legislation and a widespread moratorium on the devices in public gyms.[84] Nevertheless, since only the criteria of public interaction applies to the cell-phone, it entails certain social concerns but little else.

[84] See CAA, Distracted Driving Laws in Canada (n.d.); Athletic Business, Cell Phones and Locker Rooms (2012).

While a common hearing aid is implantable, it is not a permanent solution to hearing loss, nor is it meant for 24-hour use (unlike its relative the cochlear implant).[85] However, the technical power of a hearing aid does give it the ability to gauge and amplify sound, enhancing the sense of an end-user beyond the general scope of those without a hearing aid. The hearing-aid also has consequences for public interaction, since the purpose of the device is to connect with others, and, while it may be considered ill-mannered, amplified public eavesdropping is certainly possible.

As previously stated, the use of pacemaker technology is also well established. Implantable and generally permanent, these devices have a power that is absolutely necessary to the end-user, a power which generally cannot be duplicated without the direct intervention of an organ-transplant. While it can be argued that a pacemaker entails some public interaction in that without it one may be bed-ridden, or because one must notify security staff before going through airport screenings, it is normally non-invasive in the public sphere and holds no great potential for either monitoring or influencing those around one.

Although these examples are relatively common in modern society, their use has not been without bioethical debate. There have been discussions about the efficacy of cochlear implants, deaf-culture, organ transplantation, do-not-resuscitate imperatives,

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[85] As outlined in *Nanomedicine Taxonomy*: "Cochlear implants are designed to substitute for the function of the middle ear, cochlear mechanical motion, and sensory cells. The implants transform sound energy into electrical energy that will initiate impulses in the auditory nerve. Cochlear implants include an electronic circuit that is surgically placed in the skull behind the ear on the mastoid process of the temporal bone. This circuit is attached to a bundle of tiny wires that are inserted into the cochlea. At the end of the wires are typically 8 to 24 electrodes that cause a different pitch percept when stimulated. The other part of the device is external and has a microphone, a speech processor, and connecting cables. Current cochlear implants have a number of drawbacks. They require major surgery and can eliminate any remaining natural hearing. Because of their large size, current cochlear implants often stimulate several nerve fibers at once. This causes users to experience imprecise or distorted sound, especially with complex sounds like music" (Gordon & Sagman, 16-17).

extraordinary measures in prolonging life, etc.[86] Such ethical deliberations have been occasioned, often, by the fact that these devices combine several of the criteria we have outlined as gauges of bioethical concern.

Wearable computing devices are a genre currently comprised of non-implantable and generally non-permanent arrays of wireless computers, broadcasting and imaging devices, all supported by portable battery systems. As precursors to implantable technologies, these devices display many of the characteristics that we find in Table 1. Wearable computing devices are gradated (one may choose to carry a laptop at all times or have multiple devices covering the body from head-to-toe) and are subject to hazards typical of daily use, such as magnets and power-spikes. Since they often employ broadcasting devices and are linked to the internet for data exchange and productivity, they do meet the criteria of power and public interaction—one may argue the latter more than the former. Wearables capable of broadcasting have already garnered considerable criticism from human rights activists and right-to-privacy groups, particularly when used by state law-enforcement agents.[87] We shall explore more of the ethical challenges associated with these wearable devices later in this chapter when we consider the University of Toronto EyeTap Personal Imaging Lab and pioneers in the use of wearable devices, such as Steve Mann. The two categories that these devices fulfill do imply that a moderate level of bioethical reflection is warranted in their study; issues regarding public security and privacy are the most apparent.

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[86] See Cauwels (1986); Balkany, Hodges, & Goodman (1996); Lane & Bahan (1998); Braun et al., (1999); Hench (2002); Hansson (2005); Berger (2005); Merkel et al., (2007); Blum (2009).

[87] For example, in 2012 Hong Kong police became the first to use wearable body cameras and have come under fire from human rights groups claiming it is used for identifying political dissidents rather than enhance evidence gathering (Lih Yi, 2012, ¶1); similarly, in 2011 Wafaa Bilal, assistant arts professor at New York University, installed a three-post titanium base camera implant in the back of his head which captured an image every 60 seconds (although, due to an onset of infection and pain, it was later removed), see Golijan (2011).

Artificial muscle implants using nanotube fibers provide a final example, meeting all of the categories in our register and thus warranting significant scrutiny. Coupled with other technologies such as durable tissue-engineered cartilage designed to withstand greater-than-average mechanical loads (Hogel, 2005, 697), and being implantable and permanent in nature, such nano-formed materials would allow for a power of increased strength and versatility that goes beyond the species-based norms we have outlined. The public sphere is also linked to such an augmentation for, on a basic level, any end-user would (unless in isolation) be in contact with the greater public and be required to temper the increased functions accordingly. While such an implantable device appears to be innocuous to public interaction, the degree of inequality it entails pulls it into this category. Outperforming in comparison to biological muscles and beyond the norm of public convention, an artificial muscle composed of nanotubes would function akin to the aforementioned Össur Cheetah leg, and thus brings about concerns for fairness and safety in competition and public forums.[88] This final example encompasses all of the outlined criteria, warranting careful bioethical investigation and the examination of multiple issues before any large-scale recommendations or implementations occur. We shall address these issues as we continue, seeking out possible common ground between selected bioethical systems in an attempt to bring plurality and reason to our conclusions.

B. Modern applications of enhancement technologies

[88] Analyzing the Össur product, we can see that it meets the categories of power and public interaction as it exceeds biological equivalents and is produced for competitive purposes. However, although it is possible to set it as a permanent feature of the body, it is currently removable and thus does not meet the criteria of permanence or implantable. Thus according to our criteria, while it remains detachable, it may be considered less of a bioethical challenge as compared to a similar device which could not be removed.

It now falls upon us to present examples of currently utilized and planned technologies in order to demonstrate the reality of cybernetic and nanotechnological enhancement of the human body. Speculations regarding the bioethical ramifications of theoretical applications do not promote accurate opinion as compared to concrete examples of current devices, products under development, and individuals or groups who have taken steps towards artificial body enhancement.

The idea of technology and the artificial influencing the human body is neither modern nor rare. Indeed, as Maguire and McGee write in *Implantable Brain Chips? Time for Debate*, worldwide there are at least three million people living with artificial implants.[89] They use dental, chin, breast, pectoral, penile, testicular, calf, hair, hormonal, medicinal, and dental prostheses. They also use bionic limbs, cardiac pacemakers, small implantable pumps (to assist in pulmonary or systemic circulation of blood), and other devices (McGuire & McGee, 1999, 7).

As early as the 1960's, NASA first considered serious research into human-machine hybrids for space exploration purposes; "Engineering Man for Space: The Cyborg Study" contemplated human-machine constructions primarily for use in extra-terrestrial environments.[90] Initially envisioned as an aid to humans working in space, this idea of joining micro-technologies and people has integrated itself into the daily lives of large segments of humanity today, as we have already seen. While body modification technologies appear to have the greatest impact on the individual, in fact it is society as a whole which has become increasingly integrated, sustaining our high

[89] We know this number to be vastly increased within the last decade and, given our aging populations, we are likely to see an exponential rise within the span of another generation; such numbers of people clearly show the opposite to rarity.
[90] See Driscoll (1963).

standards of living. Worldwide, millions of individuals have become increasingly reliant on both the levels of comfort that technology affords and the promises which future body augmentations offer. Such possibilities include impressive nanoscale applications to less-ambitious, yet certainly marketable, cursory cosmetic changes. This reliance on technological conceptions of a better life (be it human-machine hybrids or simply the latest in silicone breast implants) is just one facet of what many are calling the *hypermodern* condition.[91] It is a cultural phenomenon born out of post-modernism—expressed in art, literature, architecture, communications—which places emphasis on technology and a radical blending of the electronic into daily life.[92] We shall explore more of this particular paradigm as we examine existing prototypes of enhanced humans and current designs in bionic/cybernetic constructs.

Bionic/cybernetic components may serve one of two main purposes: to *replace* portions of the body or to *enhance* human capacities. In replacement cyborgs, the construct returns levels of function to the individual; for example, implanted artificial telescopic retinas permit some vision to those nearly blinded from macular degeneration. Enhanced cyborgs, however, do more than recapture lost function; the bionic/cybernetic implant allows an individual to do that which was previously improbable, if not impossible. Thus an implanted bionic eye which enables greatly magnified vision or access to the infrared spectrum renders the end-user an enhanced cyborg rather than a

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[91] The Hypermodern Condition can be viewed as a representation of the 'religion' of secular humanism coupled with a drive for technological evolution. While some may consider it an insignificant series of connected social movements and fads appealing to technology that hearken back to camouflaged myths and symbol, others view the phenomena as a dynamic re-valorization of the quest for meaning and a New Man. If a system is closed and fundamentalist in terms of new ideas it is dead and thus Hypermodernism's appeal to connectivity and transformation is worthy of study. Yet just as this movement tends to analyze and reduce the human to a collection of parts, it too can be reduced and explained as simply another manifested rebellion versus traditional religious thought.

[92] See Kroker & Kroker (1987a) (1987b); Armitage (1999) (2000a) (2000b); Lipovetsky & Charles (2005).

simple replacement cyborg. The enhanced implant in this second example would both replace lost visual acuity and confer new extra-human abilities.[93] According to our classification of body modification technologies, a replacement cyborg should be classified as utilizing an implementation technology. It may be distinguished from an enhanced cyborg which utilizes improvement technologies to achieve a level of human function that is beyond common biological standards. However, any distinction between replacement and enhancement should not be understood as a clear divide but rather as a spectrum. Bionic implants used for replacement purposes may also enhance function, a potential ultimately determined by specific programming or manufacturing parameters. For example, an artificial retina with the potential to provide extra sensory input exceeding species-based norms (e.g., access to the ultraviolet spectrum) may just as easily be designed not to do so. Moreover, most modern body devices may be bought, repaired, up-graded and replaced as required, a malleability which is transferred to the end-user. In effect, this allows a body to be increasingly enhanced as the technology improves itself, thus providing for extra-human abilities.

This spectrum of new extra-human abilities is cause for wonder and, for some religious ethicists, trepidation, if not fear.[94] On the other hand, proponents of enhancement technologies such as Nick Bostrom, Nick Agar, and others, suggest there is little to fear and uphold an individual's right and reasonable access to such advancements.[95] A modern example of human-machine enhancement is Kevin

[93] See Klugman (2001); Merkel (2007).
[94] Hook warns of the dangers to a technological re-making of the human form and the inherent diminishing of our morals lives as a consequence. See Hook (2002) (2004a) (2004b) (2004c).
[95] See Stock (2003); Bostrom (2003c); Agar (2004) (2007); Green (2007).

Warwick,[96] who, on Monday, August 24, 1998, became the first human to use his body to host a microchip. Under the title 'Project Cyborg 1.0', Dr. George Boulos led a 20-minute operation which placed a microchip inside Warwick's left arm. At the time the simple procedure quickly caught the eye of the media and reports of the world's first[97] cyborg soon followed.[98] Once inserted, the implant allowed for the professor's movements to be monitored by sensors in his office building and for remote-controlled initiation of devices such as lights, computers, and the coffee-maker. Yet, as *CNN* reporter Sam Witt explains:

> The approximately 23mm-by-3mm device stayed in Warwick's arm for only nine days, partly to avoid medical complications, partly because it was fairly limited in power. "Half of it is an electric coil," Warwick says, "and half is a number of silicon chips." The chips used only eight of an available 64 bits of information to communicate with the University of Reading's intelligent building. (Witt, 1999, ¶7)

This procedure allows us to explore the potential challenges of a limited but novel implant according to the outlined Table 1. Beginning with the category of power, we find that, although the array was able to grant Warwick the ability to turn on switches and relays from a distance, an analysis would rate it as low (if at all) on the power criteria. While the ability to exercise this function at a distance may have been increased, the

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[96] Director of cybernetics at the University of Reading, U.K.

[97] Since, as we have outlined, there were millions of persons walking the earth with devices from pace-makers to hearing aids for decades before this tiny operation, the use of 'first' is incorrect and perhaps sensationalistic.

[98] See initial media interviews with Warwick as outlined on his personal website: From *CNN*, McClimans, (September 2, 1998), "Is That A Chip In Your Shoulder, Or Are You Just Happy To See Me?"; Witt (January 14, 1999), "Is Human Chip Implant the Wave of the Future?"; From *Wired Magazine*, (Feb 2000), "Cyborg 1.0: Kevin Warwick Outlines His Plan To Become One With His Computer"; others include reports from the *BBC*, *Guardian Unlimited*, and *The Miami Herald* (Warwick, n.d., ¶1).

same function—that of turning on appliances—could be performed with or without the body implant and is neither beyond our species-based norms nor particularly unique given the many options we currently possess to do the same. This does not diminish the achievement of exercising a function through an implanted device, but it does show that this particular device is limited in its scope and adds little to the abilities of the body beyond that of convenience and novelty.

This brings us to the criterion of permanency. According to our discussion above, the permanency of a body augmenting device contributes to the justification for bioethical investigation. In this particular case, the device was removed in a little over a week, and thus the interesting (if slightly bland) abilities which it allowed were also removed. Thus permanency was limited in the case of 'Project Cyborg 1.0'. The quandary for bioethics truly begins when implanted devices are integrated so deeply, or are so life-sustaining for the user, that removal is no longer an option. As increasingly larger arrays of microchips are implanted into volunteers, in locations around the body which harbor vital organs or even brain tissue, irreversibility becomes inevitable. We shall explore more of this particular problem when we look at specific prohibitions on medical experimentation as put forth by religious ethicists, as well as the defined characteristics for human well-being, in subsequent chapters. But in the example of Professor Warwick it appears that our criterion of permanence has not been met.

Since the implant allowed for monitoring and public interaction, it also raises the inevitable question of privacy. When someone is implanted, they are potentially traceable. Professor Warwick was certainly aware of this particular problem; indeed his research and focus into cybernetic implants is meant to explore these ethical challenges.

Ensuring that the public is fully aware of this type of work and the serious nature of its impact upon humanity, he notes:

> Electronic tagging can be regarded as a more permanent form of identification than a smart card. Information on the holder can be read into a computer system. In a simple example, when a smart card or tag is presented, and the individual is recognized, machinery such as a light or a door can operate depending on what the system thinks of that individual's status. Going a step further, the individual could be implanted with silicon chip circuitry, which gives out a unique code, identifying the individual concerned. The potential of this technology is enormous. It is quite possible for an implant to replace an Access, Visa or bankers card. There is very little danger in losing an implant or having it stolen! An implant could carry huge amounts of data on an individual, such as National Insurance number and blood type, blood pressure etc. allowing information to be communicated to on-line doctors over the internet. Within businesses, there is the possibility [that] individuals with implants could be clocked in and out of their office automatically. The exact location of an individual within a building would be known at all times and even whom they were with. This would make it easier to contact them for a message or an urgent meeting. The technology could be extremely useful for car security. For example, unless a car recognized the unique signal from its owner, it would remain disabled. Depending on how the technology is used, there are good and bad effects. So much of this smacks of the Big Brother. With an implant, a machine will know where an individual is, in a building ... at all times. You might

> not even be able to pay a visit to the toilet without a machine knowing about it. Is this really what we want? (Warwick, 2005a, ¶1-6)

In the case of 'Project Cyborg 1.0', among all of our criteria, only public interaction appears to be of significant value. There can be little doubt that the monitoring of Dr. Warwick involved public tracking and the potential for interactions between himself and others in the vicinity of the implant. Yet, given that only two out of our four criteria (implantability and public interaction) have been met by the device, the project holds more impact as a precursor to future implants than as a device which warrants bioethical presaging. The greater challenge would come from stage two of the project.

Fully aware of the potential problems regarding his own health, privacy and public perception, Warwick continued to minimize the human-machine divide with the introduction of the 'Project Cyborg 2.0'. This second phase of his transformation was more permanent but just as detailed and documented as the first:

> On the 14th of March 2002 a one-hundred electrode array was surgically implanted into the median nerve fibers of the left arm of Professor Kevin Warwick. The operation was carried out at Radcliffe Infirmary, Oxford, by a medical team headed by the neurosurgeons Amjad Shad and Peter Teddy. The procedure, which took a little over two hours, involved inserting a guiding tube into a two-inch incision made above the wrist, inserting the microelectrode array into this tube and firing it into the median nerve fibers below the elbow joint. A number of experiments have been carried out using the signals detected by the array, most notably Professor Warwick was able to control an electric wheelchair and an intelligent artificial hand, developed by Dr. Peter Kyberd, using this neural interface. In addition to being able to measure the nerve signals transmitted down

> Professor Warwick's left arm, the implant was also able to create artificial sensation by stimulating individual electrodes within the array. This was demonstrated with the aid of Kevin's wife Irena and a second, less complex implant connecting to her nervous system. (Warwick, 2005b, ¶1-2)

Thus two people have taken the option of enhancement and can now communicate with each other and with electronic devices on levels that non-cyborgs cannot. The added abilities given by the 'Project Cyborg 2.0' include the power to control the movements of other electronic devices (an artificial arm and wheelchair), the sending of signals between the two newly augmented individuals (sharing of nervous system stimuli between the professor and his wife), as well as the upgraded traits that were outlined in 'Project Cyborg 1.0'. This type of neural-controlled computer-mediated communication is what Neurotech Reports calls neurotechnology:

> Unlike the field of biotechnology, which concerns itself with pharmacological and genetic engineering efforts to understand and control DNA, genetic material, and other complex biological molecules, neurotechnology is concerned with electronic and engineering methods of understanding and controlling nervous system function. Some of the very early firms in the neurotechnology field have scored great success building devices that restore hearing to deaf people, restore arm and hand function to quadriplegics, and accomplish a host of other feats using techniques of functional electrical stimulation of the human body. We believe that government and private research funding in this area will lead to one of the great spinoffs of our time as biomedical engineers apply their knowledge and experience building devices that sense and stimulate the human nervous

> system and interface with non-human systems such as computers, training systems, and virtual reality. (Neurotech Reports, 2008), ¶2-3)

Unlike the limited functions of the 1.0 implant, this greater array definitively allows for abilities which go beyond species-based norms and which cannot be duplicated by persons without the implanted augmentation. Given the greater size of the implant and the increased battery-life associated with the advanced microprocessor, the permanence of the implant has now also been achieved; to date, it has not been surgically removed. We may therefore conclude that all four of the criteria in the Gauges of Bioethical Instability Table have been met.

In this particular example, two of our categories (power and public interaction) have broken new ground in human-machine connectivity as the mediated nervous-system signaling between the two implant-users now allows for a type of communication that was previously unknown to the human species—effective *techlepathy*. This, as first outlined by George Dvorsky in 2004, is the use of technological implants to send stimuli directly to others with corresponding hardware connected to the nervous-system, thus sharing information, emotion, and sensations through technological devices in the manner of telepathy.[99] For Dvorsky and proponents of such computer-mediated mental communications, humanity appears to be on the cusp of a rather remarkable development:

> We are, for all intents and purposes, about to become a telepathic species. Such a development will occur this century and it will likely happen in three major phases. The first generation of telepathic devices will likely be of the subvocal variety in which communication travels one way, much like a normal

[99] See Dvorsky (2004).

> conversation. The second phase will also involve unidirectional transmission, but consciousness (i.e., language center output) will be output instead of subvocalized speech. And the third phase will likely involve the seamless bidirectional transference of consciousness and emotions to one or more receiving persons—in other words, telepathy in the truest sense. It's highly probable that the medium of exchange for such communication will be the Internet, or its future form, the global mind or Noosphere.[100] Given such an endowment, human cooperation and performance, particularly in team environments, will be greatly enhanced—whether it be a search and rescue team or a progressive rock band. Indeed, artists will undoubtedly exploit such advancements by creating unimaginably powerful expressions that involve the transference of conscious and emotive experiences. (Dvorsky, 2004, ¶3)

Staying true to his desire to have open discussions on all aspects of this experimentation, Professor Warwick provides a useful FAQ regarding his work and its ethical ramifications. His response to the question of the ethical issues surrounding his experiments is quite simple:

> As this is the first experiment we have conducted of this nature, we cannot prejudge ethics. When people become aware of what we have done and the result obtained, hopefully they will discuss the issues and ethical conclusions will result. These may be different, in different countries and cultures. (Warwick, 2005c, ¶14)

[100] While others such as Vladimir I. Vernadsky or Henri Bergson each put forward similar or contributory principles, this is best expressed by Pierre Teilhard de Chardin who synthesized the noosphere as a natural aspect emerging from the interactivity and cooperation of the human mind, a kind of collective consciousness borne of social networks and of a desire to come together. Stemming from Teilhard's Law of Complexity/Consciousness, the noosphere develops as humanity develops, striving towards an apex in which all is known. See de Chardin (1959); Vernasky (1998); Bergson (1998); Samson & Pitt (1999).

This approach reflects the pattern which bioethicists Caplan and Coelho note in their observations about the emergence of bioethics as a field of study and the pace of technological development outstripping ethical guidelines that for years have been used to address questions of the body and spirit. [101] For Professor Warwick, the enhancement experiment was quite limited, with minimal medical risks and with extra abilities conferred upon the array recipients more in the vein of quirky or interesting, rather than powerful or pervasive. Yet the experimental additions of utilizing the implants for nervous-system inputs between users takes the ethical discussion beyond that of individual medical risk or issues of permanent tracking. These new changes fall into our previously outlined definitions of going beyond species-based normal functioning and should certainly be classified as an improvement rather than a therapy, and thus an enhancement rather than a replacement.

Concluding his FAQ list, Professor Warwick expounds that "humanity can change itself but hopefully it will be an individual choice. Those who want to stay human can and those who want to evolve into something much more powerful with greater capabilities can. There is no way I want to stay a mere human" (Warwick, 2005c, ¶27). Such statements bring forward an important aspect that we must address in any examination of enhancement technologies, something that mere humans must be prepared to face as the technology that allows for extra abilities becomes increasingly available: the potential of social division.

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[101] "Antibiotics, chemotherapy, functional imaging, telemedicine, reproductive technology, artificial organs, and transplantation are just a few of the weapons in our medical arsenal today that simply did not exist only fifty years ago. Not coincidentally, the field of bioethics has also grown over the same time span. Much of the concern about ethics is driven by the power of our new technological medical prowess. All too often it seems as though medicine asks "Can we?" before asking "Should we?" and thus [many] are doubtful that ethics can ever keep pace with rapidly changing technologies" (Caplan & Coelho, 1998, 218).

In addition to the extensive list of inequalities between global citizens, we now have the option of technological enhancement. If the past is any guide it would be reasonable to assume that when factors such as economic viability, procedural ease, risk minimization, and enhancement diversity converge, the precipitance for body enhancement will begin among wealthier populations. Indeed, implanted arrays of microchips will offer computer-mediated communication and functions to those able to afford it, leaving those who cannot afford it to live with first or second generation communication as outlined by Dvorsky. It is not likely all individuals who opt for such enhancements will do so with motives of researching communications and computer control that the subjects of 'Project Cyborg 2.0' have shown; relative wealth will allow end-users to obtain enhancement for a variety of purposes. As issues of social justice are often at the forefront of current bioethical analysis, we shall also explore more of this potential to skew levels of social justice in Chapters 5 and 6 as we turn to specific religious and secular approaches to body modification technologies.

While the abilities bestowed upon the subjects under 'Project Cyborg 2.0' are outside the definition of medical treatment, there are several other applications of body modification technologies that appear to blur the line between restoring and bestowing. The University of Toronto EyeTap Personal Imaging Lab (ePI) introduced the advantages of wearable computing devices (sometimes known as 'smart-clothing'). Researchers used their own bodies in conjunction with their technological innovations.[102]

[102] Founded in 1998, ePI was formerly known as the Humanistic Intelligence Laboratory (HI Lab). The EyeTap device allows the eye itself to function as both a display and a camera. "EyeTap is at once the eye piece that displays computer information to the user and a device which allows the computer to process and possibly alter what the user sees. That which the user looks at is processed by the EyeTap. This allows the EyeTap to, under computer control, augment, diminish, or otherwise alter a user's visual perception of their environment, which creates a Computer Mediated Reality. Furthermore, ideally, EyeTap displays computer-generated information at the appropriate focal distance, and tonal range" (Mann, 2008b, ¶1).

The wearable devices of developers such as Steve Mann incorporate a large number of powerful computer applications into direct bodily contact. Mann explained the basic definition of this genre of computers in his 1998 address entitled "Wearable Computing as Means for Personal Empowerment", presented at the International Conference on Wearable Computing ICWC-98:

> A wearable computer is a computer that is subsumed into the personal space of the user, controlled by the user, and has both operational and interactional constancy, i.e., is always on and always accessible. Most notably, it is a device that is always with the user, and into which the user can always enter commands and execute a set of such entered commands, and in which the user can do so while walking around or doing other activities. (Mann, 1998, ¶3)

Unlike the Project Cyborg devices, wearable computers can be easily removed, although such an action is not necessarily recommended. Developed for a range of processes (from personal-imaging to the exploration of media-sciences), a wearable computing device "facilitates a new form of human-computer interaction comprising a small body-worn computer (e.g., user-programmable device) that is always on and always ready and accessible. In this regard, the new computational framework differs from that of hand held devices, laptop computers and personal digital assistants (PDAs). The 'always ready' capability leads to a new form of synergy between human and computer, characterized by long-term adaptation through constancy of user-interface" (Mann, 1998, ¶2).[103]

[103] Researchers further note devices like Nike Inc.'s distance-tracking shoes or Google Inc.'s Project Glass can record your every step and sight. Indeed, Nigel Shadbolt, an expert in artificial intelligence at southern England's University of Southampton, predicts such devices are as little as fifteen years away from being able to record every sight, noise and movement over an entire human life; This has given rise to ethical

As with cybernetic research at the University of Reading, the residents of the EyeTap Lab recognize the need to keep the public informed about their progress and ideas. In the case of microchips implanted under the skin, privacy issues regarding one's own movements and medical information cause concern. With wearable computers, the ethical concerns expand; this time persons *not* linked to the technologies actually become direct participants in the experiment, as the wearable devices capture real-time images of all that the user views (or whatever may be going on around them). Thus, almost any individual can find themselves being broadcast live on the internet simply by passing close to persons utilizing wearable computing devices.[104] Is there a difference between such a scenario and the common occurrence of monitoring by the hundreds of currently-employed security cameras in malls, shops, or on city-streets? On a fundamental level the difference is with regards to who is watching at any given time. It may be argued that security personnel and shop owners have the right to monitor premises. They inform the public that they are doing so. In the case of being in the vicinity of a wearable computer, the monitoring is not implicit and the viewing is not isolated to the person who is actually carrying the device. Via the internet, any number of people may be tuned into the users' specific eye-view, bringing the debate over privacy to new levels.

This particular example illustrates more than concerns regarding social privacy; it also contributes to the formation of McCormick's *homo technologicus* (as noted in Chapter 1). In response to the concerns of those who have discovered how difficult

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implications of "a superhuman workplace" and a lack of choice for employees who refuse to adapt in the context of a highly pressurized work environment (Satter, 2012, ¶1-15). See too Human Enhancement and the Future of Work (2012), a report from a joint workshop hosted by the Academy of Medical Sciences, the British Academy, the Royal Academy of Engineering and the Royal Society.

[104] This is distinguishable versus the current use by law enforcement agencies to follow the locations of paroles and others within the criminal justice system via the use of ankle bracelets and similar tracking devices.

arithmetic can be when one is deprived of a modern calculator, Steve Mann attempts to address a common concern regarding our dependence on technology:

> Freeing ourselves from mundane tasks like arithmetic or hand assembly of computer instructions lets us think at a higher level. Tools such as pocket calculators, assemblers, and compilers have greatly extended our capabilities, enabling us to develop a whole new set of higher level abilities. Indeed, we probably *will* develop a dependence on readily accessible computing, just as we have developed a dependence on wash-and-wear clothing—and desktop computers, for that matter. The fact that some primitive societies can still survive quite well without clothing while we've probably lost our ability to survive naked in the wilderness in all but the warmest of climates doesn't support the argument that we should do without clothing. (Mann, 2008a, ¶1)

The fact that the devices are constantly 'on', in working mode, and are designed to augment the senses of the wearer is an important aspect of the wearable computing world. Long-term adaptation is a goal insofar as the wearer is then able to use the devices as extensions of their body and mind.[105] Beyond the physical organs, the technology-body connection extends to differing levels of function. Marshall McLuhan, in *Understand Media: The Extensions of Man* (1964), suggests that just as mechanical technology extends the body, so electronic media extend the nervous system. Wearable computing allows for this parallel extension of the nervous system and at the same time forms new communities.

Maguire and McGee point to still others who take the augmentative devices to this new theoretical level:

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[105] See Mann (1998b).

> Thad Starner, a Ph. D. candidate in Media Arts and Sciences at Massachusetts Institute of Technology, dresses in a wearable computer and lives connected to the Internet using a miniature computer terminal at all times. His device is the first stage of what he calls 'the BodyNet, a computer network wired through human bodies'. (8)

Still based more in theory than current-day reality, these interweaving levels of communication bring out interesting questions regarding collective experiences and theories on hive-mind combinations.[106] As in Project Cyborg 1.0 and 2.0, it is the mental processes that develop between the human mind and the machine which truly add to the enhancement experience. The distinction between the wearable and implanted devices seems almost nonexistent particularly when users of the technology begin to feel linked to their added components. As Mann notes, "Someday, when we've become accustomed to clothing-based computing, we will no doubt feel naked, confused, and lost without a computer screen hovering in front of our eyes to guide us" (2008a, ¶3).

If one grants an analogy between an addiction to technology or body enhancement and conventional dependencies, risk to personal and public health intensifies. To date, there is little study into conditioned levels of artificial body stimuli, particularly of the type that bionic/cybernetic implantations offer, from the continuous input of permanent augmentation devices. While such potential new addictions warrant investigation, it is the attenuated issues regarding the nature of the body and its capacities that require bioethical reflection. Dependence on an increased level of functionality seems to oppose

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[106] Appropriated from Durkheim's social theories on shared beliefs and moral attitudes (see his1893 *Division of Labour in Society*), the collective consciousness of the hive-mind is also linked to the previously noted process of techlepathy. This sharing of information facilitated by technological implants allows for a level of consciousness beyond species-based norms.

models of human health which embrace biological frailties and flaws in refutation of increased categorization of abnormal traits.[107] This rejection of biological limitations and frailties appears to be a common strand amongst proponents of artificial enhancement. This has been noted, as we have seen, by ethicists such as Silvers, McKenny and Winkler, who see an increasing glamorization of artificial levels of human health.[108] These aspects of the hypermodern condition stand in opposition to religious paradigms which embrace human frailty and view vulnerability and limitations as necessary aspects of our teleology. As we shall see, from a Roman Catholic perspective, frailty characterises our humanity as well as that of a God who experiences the human condition to its ultimate end. We shall explore more of this issue of enhancement versus frailty as we examine the application of Roman Catholic bioethics to the bionic/cybernetic option in the next chapter.

Organizations dedicated to wearable computing display an interesting duality regarding levels of empowerment and social interactions—the combination of physical isolation and virtual collaboration. On one level, the increase in computer technology adds functionality and abilities to the end-user, thus giving the potential for increased services or respites to those in need. On the other, it can be seen as isolating, reducing the end-user to life in an enclosed artificial world. Ironically, the exact reverse is displayed when we examine the ability of enhancement technologies to allow multiple people to link together in electronic networks, thus sharing the common experiences and sensations of a social network. Shared sensory input is exclusive to users of

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[107] In viewing functionality as a benchmark of normality, human vulnerabilities and the array of imperfections, diseases, and conditions that can lead to less-than-perfect function and capacity are naturally classified as abnormal and undesirable. See Silvers (1998).
[108] See Silvers (1998); McKenny (1998).

technological enhancements. In one sense, this leaves the rest of society out of the loop, but in another sense it provides for access (if allowed) by the public; only those with the knowledge and physical devices may participate in a network of augmented beings. This is a combination of solitude and sociability with structures varying from conventional on-line social gaming systems[109] or social networks, to the physical connections perpetuated via the artificial implants between two persons sharing sensory information as achieved in Project Cyborg 2.0 between Kevin and Irena Warwick. Strange new models of how humans bond can certainly develop out of groups of device users, but exactly how or which long-term effects come of such experiences are yet to be known. Detractors such as Anne Foerst warn that these attempts to share personal experiences via virtual or electronic stimuli are less than authentic or meaningful and stress the importance of traditional body interactions:

> Because there is no physical commitment or connection in cyberspace, web communities may be ultimately indifferent and meaningless to the people involved. The understanding of humankind in recent years has changed from a dualistic, cognition oriented understanding toward an embodied and social one. The intelligence of humans is not the main characteristic of the species—it is much more the human capacity to connect and to survive in any given environment. Virtual reality, however, is a direct result of the assumption that embodiment and shared physical space are not important for community building

[109] If we take the findings of Castulus Kolo and Timo Baur's 'Living a Virtual Life: Social Dynamics of Online Gaming' to be accurate approximations of user-time, then the compulsion to immerse oneself into the virtual world on average will take up 23 hours a week in real time with a cost of approximately 75 U.S. dollars (2004, ¶23). Although the Kolo & Baur investigation limited itself to the *Ultima Online* environment we find that similar (if not greater) hours of game time are dedicated by the players to other online games that have comparable virtual populations and have since become more popular titles for users to purchase.

> because the body is not part of what turns a human into an individual. But if cognitive science theories are correct, then virtual reality spaces lack the required physicality, and relationships in them are incomplete. (Foerst, 2006, 924)

Given the new directions and significant issues that bionic/cybernetic body technologies bring to discussions regarding the nature of the person, the operation of the body within society, and risk (both physical and mental), these technologies must be considered of great consequence to all who are interested in matters of health, responsibility and morality. As noted in historic works such as the writings of German philosopher Ernst Kapp, the generalized combining of technology as an object of the human body is often considered in light of morality.[110] The entire application of technology to the human body and society at large is not simply a matter for cybernetic or nanotechnological consideration; it has for many years been the study of ethicists and theologians alike, interested in how we are shaping ourselves and the world around us.[111] A broad and inclusive approach to these phenomena is essential in order to bring a variety of views to the table and find consensus when calling for further research or policy recommendations on technologies that alter our bodies. Thus in the remaining chapters of this thesis we address the following two questions: how, if at all, do new

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[110] As presented in Ernst Kapp's *Grundlinien einer Philosophie der Technik* (1877)—the first book to bear the title "Philosophy of Technology"—which addresses the subject from an anthropological standpoint. After extensive comparisons between human anatomy and technological inventions, Kapp concludes that weapons and tools are essentially projections of human organs: the hammer an extension of the fist, clothing an extension of the body skin and hair, etc.; See Mitcham (2004). Carl Mitcham and Jim Grote write extensively on this idea and outline the approach of technology as 'object' and raising an alarm, Paul Ramsey writes, "The human self-image is turning into the image of technological production. This looming peril concerns the soul of the human species on this planet" (Ramsey, 142). With such a warning, we would do well to examine two significant aspects of new human cybernetic and nanotechnological enhancements: how do these technologies challenge traditional religious and secular-based bioethics and how may religious and secular bioethics contribute to ethical frameworks for augmentations and enhancements.

[111] See *Hastings Center Report* (1971-2011); Kennedy Institute of Ethics Journal (1991-2011); The International Association of Bioethics *Journal of Bioethics* (1987-2011); Beauchamp & Childress (2001); Andre (2002); Caplan (2006).

human cybernetic and nanotechnological enhancements challenge traditional religious and secular bioethics, and how may religious and secular bioethics contribute to ethical frameworks for cybernetic and nanotechnological enhancements. As explained in Chapter 1, we address these questions by selecting two interlocutors, the Roman Catholic bioethical tradition and Transhumanist philosophy. As a historic contributor to the field of bioethics and with a tradition of assessing new technologies (particularly technologies which affect the human body) along set moral principles, Roman Catholic determinants on non-enhancing and enhancing body modifications are valuable in determining a traditional religious response to such issues. Also valuable, the philosophy of Transhumanism represents a rare and eclectic set of beliefs; they point to previous social trends of non-enhancing modifications as precursors to embracing enhancing cybernetic and nanotechnological body modifications. Together, the two selected approaches can be used in the exploration of body modifications which goes beyond an analysis of a selected religious tradition's guidelines, into a dialogue between two groups with differing opinions but a common understanding of the subject matter.

Chapter 4—Roman Catholic approaches to non-enhancing body modifications

As explained in the Introduction, Roman Catholicism has been selected as the religious interlocutor for this thesis because of, among other things, its developed tradition of bioethics and its continuing institutional presence in the practice of health care. Before we can consider possible Roman Catholic responses to enhancing body modifications, however, we must describe the sources of Roman Catholic bioethics and review their application to non-enhancing body modifications. The latter has created precedents which can be used to derive Roman Catholic responses to technological enhancements. In addition, Transhumanism, our second interlocutor on issues raised by technological enhancements, regards non-enhancing procedures as precursors to cybernetic and nanotechnological body modifications.[112] Accordingly, in this chapter we identify the key sources of Roman Catholic bioethics and then discuss their application to non-enhancing modifications. However, before embarking, it may be useful to provide a snap-shot of the Roman Catholic bioethical tradition.

Roman Catholicism has a rich history of ethical thinking and has articulated a well-defined set of ethical parameters that address biotechnological advances. Historians and ethicists note that Roman Catholicism's distinctive branch of moral theology was heavily influenced by Augustine and Aquinas, who drew much from classical Greek philosophers, and was supportive of physicalism, personalism, and the natural law (Gula, 1989, 226).[113] Early examples of specific religious considerations of topics, such as the

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[112] More generally, on the importance of non-enhancing procedures such as cosmetic surgery and decorative body arts as facilitators of posthuman ideals, see Miah (2003).

[113] See Mahoney (1989), wherein he traces Catholic *theologia moralis,* as separate from other branches of theology and mostly in use since the end of the sixteenth century. See too Gula's definitions wherein "Physicalism refers to the tendency in moral analysis to emphasize, or even absolutize, the physical and biological nature aspects of the human person and human actions independently of the function of reason and freedom. Personalism is characterized by placing emphasis on dimensions of the human

duties and obligations of those acting as doctors and caregivers, were put forward by medieval theologians such as St. Antonius (Antoninus), the fifteenth-century Archbishop of Florence, leading to the inclusion of regulations regarding competence, diligence and honesty in Canon Law (Florentini, 1740, 277-92). Other notable examples include: Paolo Zacchia's 1612 *Quaestiones medico-legales*, addressing the relationships among medicine, law and theology; Franciscus Emmanuel Cangiamila's eighteenth-century book on sacred embryology; and the nineteenth-century development of the discipline known as pastoral medicine (Curran, 2003, 116). Early twentieth-century Roman Catholic pastoral medicine, medical moral-theology, and ethics can be seen in works of such authors as Bonnar (1939), Healy (1956), Kelly (1958), Kenny (1952), Niedermeyer (1935), O'Donnell (1956), Paquin (1957), Payen (1935), Pujiula (1953), and Scremin (1953).[114] These early contributions helped to shape the field so much that by the mid-twentieth century medical ethics had become a well-established sub-disciple in Roman Catholic moral theory.

Charles Curran points out that during the development of bioethics from 1950 to 1970, it was the constant changing of technology which constituted the "great interest and growth" (Curran, 2003, 117). Technological advances such as organ transplantation and reproductive devices became matters of legal interest and public policy and pushed Roman Catholic, as well as secular, bioethics to new levels.[115] Even while secular bioethics began to dominate the field during the 1960-70's Roman Catholic approaches

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person and actions which extend beyond the physical and biological to include the social, spiritual, and psychological dimensions as well" (226), as given by Daniels-Sykes (2007) note 49.

[114] See Curran (2003).

[115] It should come as no surprise, then, to find the technological advance of body augmentation and enhancement providing the same. Just as Roman Catholic bioethical approaches responded to advancements such as artificial insemination and the contraceptive pill, so too one can apply its medical-ethical methodologies to body modifications and cybernetic and nanotechnological enhancements.

to medical and moral theology started to shift.[116] Traditionally the Church emphasized natural law and the teachings of the magisterium (given in ever-increasing manuals of healthcare ethics) and "concentrated on the individual actions of physicians, nurses, and patients" and, of course, individual issues of human reproduction (Daniels-Sykes, 6). Catholic ethicists such as Kevin Quinn and Richard McCormick note that this 'piece-meal' approach has given way to a new methodology within Roman Catholic bioethics, one which relies much more on the "the tenets of Catholic social teaching: common good, human dignity, option for the poor, and stewardship" (Daniels-Sykes, 7).[117] As Daniels-Sykes explains, the shift away from manuals and magisterium to modern approaches allows Roman Catholic bioethics a broader understanding of bioethics in relationship to understandings of patient rights and patient autonomy (102). In this way, the Church is able to straddle some of the principles of secular bioethics while at the same time maintaining the foundations of a moral approach and their religious tradition. This is highlighted in the documents of Vatican Council II which "called for a greater respect for human dignity and initiated a shift to a more personalist and theologically-grounded moral methodology; ongoing advances in science and medical technology; the public disclosure of medical research abuses… and various liberation movements occurring in the United States and abroad, demanding a respect for individual and human rights" (Daniels-Sykes, 102).

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[116] See Jonsen (1998).

[117] With input from the outlined sources contributing to a Roman Catholic bioethical approach, human dignity from a Catholic evaluation is intrinsic; a status model that is based solely upon being human regardless of form or function. This stems from scriptural sources such as Genesis 1:26, the gospels of Luke and John, as well Church tradition and teaching on the topic of social justice as espoused in papal encyclicals and letters; see footnote #132, see too McCormick (1981b); Quinn (2000).

While contemporary Roman Catholic opinions regarding biotechnologies help define and show the realistic applications of current scientific research, previous declarations—from Thomistic views on totality and mutilation to papal encyclicals regarding human dignity and social justice—regarding science, society, and the individual present a definitive historic context from which future deliberations may flow. No single overarching Roman Catholic bioethical principle necessarily addresses all issues arising from new body modification technologies, although a fundamental regard for the safety and sanctity of life is constant through all of Catholic ethics. Since both non-enhancing decorative body modifications and enhancing cybernetic and nanotechnological body modifications cause no fundamental genetic changes they may be consistent with the Roman Catholic position of the "seamless garment" as explained by Joseph Cardinal Bernadine—now known as the Consistent Ethic of Life argument, it opposes a variety of practices including eugenics, abortion, capital punishment, assisted suicide, euthanasia, and unjust war, based upon a Roman Catholic understanding of the sacredness of life.[118] However, enhancement technologies may reinforce a disparity in the quality of human life, and thus raise concerns from a Roman Catholic perspective on social justice.[119] We shall consider these, and other issues, in Chapter 5.

A. Sources of Roman Catholic bioethics

In examining body modifications issues from Roman Catholic perspectives, Church doctrine and previous judgments set a precedent for several medical procedures that deal directly with human life, and, although precedent itself is no absolute in dealing

[118] See Bernadine (1983).
[119] See Shannon (2002).

with new issues, it does give us a historic road-map to follow. Roman Catholic bioethics derives its sources from several levels, including biblical interpretation, contributions of patristic and medieval theologians, contemporary Catholic bioethicists, magisterial pronouncements, and, most recently, appeals to concepts of social justice and human dignity. Each of these sources helps to answer our concerns regarding body modification technologies and may be utilized in order to build a complete picture of a Roman Catholic bioethical response. However, as we shall see in our application of approaches to non-enhancing technologies, few of these sources present with equal relevance to modern issues. Roman Catholic bioethics encompasses a multitude of theological, philosophical, and magisterial opinions. By using extant literature, ecclesiastic pronouncements, and contending Catholic bioethical opinions on technology and medicine, we can explore possible moral ambiguity of body modifications and enhancements as they relate to, and form from, each of these sources of Roman Catholic bioethics.

The first source of Roman Catholic bioethics, the Bible, is considered highly authoritative to theological foundations and yet is often criticized as irrelevant to modern bioethical issues; similar disapproval may be given to the principles derived from scriptural sources by patristic and medieval traditions. Such concerns are understandable, as the field of bioethics centers on body issues with rapid advances in technology presenting hitherto unknown problems. Where in the Gospels, for instance, do we find direct information on nanotechnology? Likewise, how could a medieval theologian such as Thomas Aquinas have foreseen events such as cloning, body augmentations, *in vitro* or extracorporeal gestations, and genetic manipulations? Addressing questions of body modifications and enhancement strictly with reference to

biblical sources is possible, but the modern Roman Catholic bioethical approach tends to elicit general principles from scripture rather than argue from particular passages when examining novel bioethical issues. As the connotations of specific terms and translations have shifted in the light of historical context, literal interpretations of biblical materials are infrequently used in Roman Catholic bioethical approaches. Catholicism recognizes the importance of a text's historic context and inherent problems in understanding an author's intention, often differentiating between narrative language and its interpretation. As explained in the *Catechism of the Catholic Church*, "The *literal sense* is the meaning conveyed by the words of Scripture and discovered by exegesis, following the rules of sound interpretation" (#116). In this way modern bioethical issues, which have no appropriate frame of reference within biblical materials, may be addressed by drawing interpretative inferences from the text in light of its historical context and its subsequent meanings in Roman Catholic tradition.

As the Church holds itself to be the definitive authority with respect to biblical interpretation, traditions which may bear upon a bioethical issue can be brought forward in conjunction with biblical resources to aid in moral judgments. This reliance on both tradition and broad interpretations of Biblical texts is reflected in many Roman Catholic statements, including the documents of the Vatican Council II. As promulgated on November 18, 1965, *Dei Verbum* ("The Dogmatic Constitution on Divine Revelation"): "…it is not from Sacred Scripture alone that the Church draws her certainty about everything which has been revealed. Therefore both sacred tradition and Sacred Scripture are to be accepted and venerated with the same sense of loyalty and reverence" (#9).[120]

[120] As noted by Denzinger (1492), this is in keeping with the declarations of the Council of Trent, session IV.

This approach has been confirmed in a number of declarations and Church documents issued subsequent to Vatican Council II.

Averring the precedent and virtue of apostolic succession, the Roman Catholic Church holds itself as having the authority to teach and correctly interpret scripture; emphasizing the "close connection and communication between sacred tradition and Sacred Scripture" (*Dei Verbum* #9).[121] Yet despite this veneration and recognition of the "divine wellspring" from which scripture flows, the Church acknowledges at least two key points in relation to knowledge and the interpretive value of scripture: 1) since God speaks in Sacred Scripture through human beings, the interpreter of Sacred Scripture, in order to see clearly what God wanted to communicate, should carefully investigate what meaning the writers really intended and what God wanted to manifest by means of their words (*Dei Verbum* #12); and 2) the Church does not draw its certainty about everything which has been revealed solely from sacred scripture (*Dei Verbum* #9)

The appreciation of the human factor in the entire process of scriptural creation and exegesis allows the Church to move beyond literal readings and into critical evaluations which "search out the intention of the sacred writers" and to give attention to literary forms (*Dei Verbum* #12). As explained:

> For truth is set forth and expressed differently in texts which are variously historical, prophetic, poetic, or of other forms of discourse. The interpreter must investigate what meaning the sacred writer intended to express and actually expressed in particular circumstances by using contemporary literary forms in accordance with the situation of his own time and culture. For the correct understanding of what the sacred author wanted to assert, due attention must be

[121] See PBC (1993).

> paid to the customary and characteristic styles of feeling, speaking and narrating which prevailed at the time of the sacred writer, and to the patterns men normally employed at that period in their everyday dealings with one another. But, since Holy Scripture must be read and interpreted in the sacred spirit in which it was written, no less serious attention must be given to the content and unity of the whole of Scripture if the meaning of the sacred texts is to be correctly worked out. The living tradition of the whole Church must be taken into account along with the harmony which exists between elements of the faith. It is the task of exegetes to work according to these rules toward a better understanding and explanation of the meaning of Sacred Scripture, so that through preparatory study the judgment of the Church may mature. For all of what has been said about the way of interpreting Scripture is subject finally to the judgment of the Church, which carries out the divine commission and ministry of guarding and interpreting the word of God. (*Dei Verbum* #12)

This position is ultimately rooted in the work of pioneering Roman Catholic exegetes, often in periods wherein the pope and Roman curia reacted harshly against ideas perceived to be intrusive and undermining of Church tradition and authority. And while a complete catalogue of such forerunners is beyond the scope of this work, we may note that the current position of the Church can be traced from the periods of attacks against 'innovations' of once-shunned and persecuted Catholic 'liberals' and 'modernists' to the forward looking pronouncements of encyclicals such as *Providentissiumus Deus* (1893) and *Divino Afflante Spiritu* (1943).[122]

[122] See Sullivan (1983); Barmann & Hill (2002); Coppa (2003).

In 1993, the Pontifical Biblical Commission (PBC) provided a statement of the Church's position on biblical interpretation. It noted how current historical-critical methodology helps to achieve analysis on multiple levels (such as rhetorical, narrative, semiotic, canonical, sociological, and psychological) and demarcates the limits of what it calls fundamentalist interpretations, classifying the "naively literalist" approach as "one...which excludes every effort at understanding the Bible that takes account of its historical origins and development. It is opposed, therefore, to the use of the historical-critical method, as indeed to the use of any other scientific method for the interpretation of Scripture" (PBC, 1993, ¶103).[123] As the PBC explains, literalist approaches to the scriptures historicize all material; considering as historical everything that is reported or recounted with verbs in the past tense, failing to take necessary account of the possibility of symbolic or figurative meaning. The literal approach shows a tendency to ignore or to deny the problems presented by the biblical text in its original Hebrew, Aramaic or Greek form; often narrowly bound to one fixed translation, whether old or present-day, and accepts the literal reality of ancient, out-of-date cosmology or scientific principles. Furthermore, it pays scant attention to the creeds, doctrines, and liturgical practices which have become part of church tradition, as well as the teaching function of the church itself (PCB, ¶105-110). Thus the PCB ultimately brands a fundamentalist approach as "dangerous and deceitful" because literal interpretation refuses to acknowledge that "the Bible does not necessarily contain an immediate answer to each and every problem" and "invites people to a kind of intellectual suicide" (PCB, ¶111).

[123] As noted by the PBC: "The actual term *fundamentalist* is connected directly with the American Biblical Congress held at Niagara, N.Y. in 1895. At this meeting, conservative Protestant exegetes defined 'five points of fundamentalism': the verbal inerrancy of Scripture, the divinity of Christ, his virginal birth, the doctrine of vicarious expiation and the bodily resurrection at the time of the second coming of Christ. As the fundamentalist way of reading the Bible spread to other parts of the world, it gave rise to other ways of interpretation, equally 'literalist,' in Europe, Asia, Africa and South America" (¶105).

Yet this admonishment on the part of Roman Catholic exegetes should not in itself be misinterpreted as a rejection of the over-arching validity and application of the biblical message to daily life. Extremism is avoided; as the PBC explains, "the literal sense is not to be confused with the 'literalist' sense to which fundamentalists are attached" (¶112). Similarly, a whole-scale reduction of scripture to relative situationalism, or equating the same to a mythic, devalued status, must also be avoided:

> It does not follow from this that we can attribute to a biblical text whatever meaning we like, interpreting it in a wholly subjective way. On the contrary, one must reject as unauthentic every interpretation alien to the meaning expressed by the human authors in their written text. To admit the possibility of such alien meanings would be equivalent to cutting off the biblical message from its root, which is the word of God in its historical communication; it would also mean opening the door to interpretations of a wildly subjective nature. (PCB, ¶118)

To avoid this pitfall Roman Catholicism maintains the aforementioned precepts, arguing that tradition is of significant value, alongside scripture, and that the Church is the ultimate authority in matters of true interpretation.

In short, for Catholicism, scripture is a resource for reflection and guidance when confronting technological advances. But apart from clearly defined biblical precepts, such as reverence for life and the promise of salvation, Roman Catholic approaches to bioethical questions rarely utilize literal interpretations of biblical texts in answering bioethical questions and almost never rely solely on scripture as a source of ethical guidance.

Turning to the second major source of Catholic bioethics, we find that prominent theologians have helped to shape Church policy and settle moral disputes with

interpretive opinions and religious writings. Over the last 2000 years, certain individual ecclesiastical writers have even been given the title of 'Doctor of the Church' because of the great benefit the Church has received from their scholarship.[124] While early Christian theologians often commented on a variety of ethical issues, modern technological bioethical dilemmas borne from new technologies are seldom addressed in their works, saving broad interpretation or parallel analogies. However, this lack of specificity does not necessarily hinder their contribution, for many of the foundations to moral theology derived from their writings are still applicable and utilized in Catholic bioethical responses, particularly criteria of social justice.[125]

One of the most prominent historical theologians to contribute to the foundations of Roman Catholic bioethics is, of course, Thomas Aquinas. Through his vast writings in the *Summa Theologica* and the *Summa Contra Gentiles* a number of philosophical and theological positions regarding human beings are thoroughly discussed. Discussions of ownership, stewardship, and the body's constitution and care are found in subsections of the *Summa Theologica*, such as *Prima Pars* ("Man Spirit and Matter"), *Prima Secundae Partis* ("Law"), and *Secunda Secundae Partis* ("Justice"). Aquinas's contribution to Roman Catholic bioethics has been significant in issues such as organ transplantations, selective amputations, and even capital punishment. He is the source of several important principles of Roman Catholic bioethics: the principle of totality—an opinion regarding the relationship between individual body parts and the whole; the principle of stewardship—a concept which assigns order to all things in the universe and, for this reason, limitations which constrain persons in decisions over their own body; the

[124] As noted in *The New Catholic Encyclopedia*, there are now thirty-three Doctors of the Church, of whom eight are Eastern and twenty-five Western (Forshaw, 2003, 802).
[125] See Matz (2008).

principles of integrity and mutilation—the limitations and morality of separating parts of the human body; and natural law—instinctive and intuitive universal norms of conduct set apart from positive, or human-made, laws, which may be judged as good or evil in accordance with one's conscience.

These principles act as foundations for many current Roman Catholic guidelines to non-enhancing decorative body modifications and may even be applied to enhancing modifications. Nevertheless, while integral as foundations to Roman Catholic bioethics, patristic and medieval authorities are less determinative than contemporary Catholic bioethicists, magisterial pronouncements, and issues of social justice such as human dignity. This delineation in standing is due in part to the difficulty in applying the patristic and medieval principles to modern interpretations of the body, given the lack of congruency between specific biological functions and medical possibilities unimagined centuries ago. Even more, it is due to the changes in definition and scope which have been applied to the principles themselves in recent years, as we shall see in examining the contribution of patristic and medieval theologians to cosmetic surgeries. Nonetheless, although the patristic and medieval principles may have limited application in our specific cases, they continue to influence Roman Catholic methods in approaching bioethical problems and, akin to uses of scriptural sources with reference to modern technological bioethical issues, can never be dismissed as irrelevant in any comprehensive Roman Catholic bioethical construction. Indeed, even today amongst Roman Catholic medical ethical programs acknowledgement and gratitude are paid to patristic and medieval sources. In the Maryvale curriculum we read: "we do not have to approach every moral decision *ab initio* from a *tabula rasa*. Wise men and women have lived before us and pondered the same problems. We stand upon their shoulders.

Sometimes we can see further than they. Often we are faced with new situations, especially in medicine. Humbly we acknowledge our indebtedness to them, while facing the new bioethical issues thrown up by modern science and technology" (n.d., Unit 1-A.2). Similarly, the fundamental moral principles in the Catholic Health Association of Canada's *Health Care Ethics Guide* are taken directly from Aquinas.[126]

In turning to the third source of Roman Catholic bioethics—contemporary bioethical reflection—we find that there are a great number of contemporary bioethicists who offer valuable insights related to specific healthcare issues. Many are practicing Catholics, but others are Catholics who have dissented from traditional magisterial positions, and still others are of varying religious or philosophical backgrounds. Few of these bioethicists specialize in cosmetic or cybernetic body modification technologies; however, many have greatly contributed to general discourses on issues with similar histories and scope. Thus Richard McCormick, Kevin O'Rourke, Thomas Shannon, Lisa Sowle Cahill, David F. Kelly, Charles Curran, Edmund Pellegrino, John Haas, Tom Beauchamp, Robert Veatch, H. Tristram Engelhardt, James Drane, Germain Grisez, Leon Kass, and others have (as we shall outline) examined issues of natural law, medical practice, scientific research, and issues of personhood, all of which speak to augmentation or enhancement issues. One Roman Catholic physician, Christopher C. Hook, has published a number of works regarding the religious (specifically Christian) aspects of nanotechnologies as well as approaches to genetic enhancement technologies, noting the parallels between the two subjects in their teleology of human improvement.[127] But such considerations are the exception rather than the rule.

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[126] See CHAC (1991).
[127] See Hook (2002) (2004a) (2004b) (2004c) (2006).

By virtue of their position and authority we may classify papal input and specific magisterial pronouncements as a distinct category which contributes to Roman Catholic bioethical interpretations. Drawing upon and often citing specific scriptural and patristic sources, papal and magisterial opinion often has the highest degree of dissemination and attention by popular media. When consulting official published Church documents it is important to note that they all do not hold equal value; there is a hierarchy to the magisterium and all published papal documents. The rarer solemn magisterium includes dogmatic definitions by councils or popes and may have been given *ex cathedra* status.[128] The continually exercised ordinary magisterium relates more to practices connected with faith and morals (in consent of patristic authorities, theologians, and decisions of the Roman Congregations). In decreasing order of importance, we may list Decretal letters, Encyclicals, Apostolic Epistles, Apostolic Exhortations, Apostolic Constitutions, *Motu Propio*, Common Declarations, Allocutions, Papal Declarations, Letters and Papal Rescripts.[129]

As with the writings of contemporary bioethicists, few papal or magisterial statements touch directly upon issues cybernetic and nanotechnological enhancement technologies. But past official positions regarding non-enhancing decorative body modifications yield a number of useful guidelines. While no specific magisterial or papal

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[128] Per Catholic Answers (2013), *ex cathedra* is a Latin phrase which means 'from the chair' referring to binding and infallible papal teachings which are promulgated by the pope when he officially teaches in his capacity of the universal shepherd of the Church a doctrine on a matter of faith or morals and addresses it to the entire world. The Roman Catholic Church derives from the concept from scripture such as: Mt 10:40, 16:18-19, 18:18, 28:20; Lk 10:16; 2 Cor 5:18-20; Jn 14:16, 26, 16:13. As Denzinger (2002) outlines, the authority of infallible *ex cathedra* statements are justified, "by the Divine assistance promised to him in Blessed Peter, is possessed of that infallibility with which the Divine Redeemer willed that his Church should be endowed in defining doctrine regarding faith or morals, and that therefore such definitions of the Roman pontiff are, of themselves, and not from the consent of the Church, irreformable. So then, should anyone, which God forbid, have the temerity to reject this definition of ours: let him be anathema" (1839-40).

[129] See Dixerit (2005).

bioethical statement or reflection has been classified as infallible under the guidelines set out by the Vatican Council I, they are, nonetheless, considered valuable contributions in shaping Church policy.[130] Since many popes have responded to differing bioethical issues through the years with reference to their specific historic and social circumstances—for example, between 1942 and1958 Pope Pius XII contributed more than 80 individual letters and addresses to differing medical societies and specialties with regards to Catholic morality and the medical arts[131]— a complete list of individual papal statements is beyond the scope of this chapter.

In addition to individual papal statements, the Pontifical Academies, founded to provide autonomous research and continuous study on academic topics of importance, serve as a resource for modern papal pronouncements. These academies are dedicated to specific fields: Science, Social Sciences, and Life, each founded (or rededicated) by popes interested in furthering the relationship between Catholicism and modern academic studies. The Pontifical Academy of Sciences (originally the *Linceorum Academia*) was founded in Rome in 1603, and as reported by the Vatican, after some vicissitudes, was named *Pontificia Academia dei Nuovi Lincei* by Pius IX in 1847, enlarged by Leo XIII in 1887, and received its current name from Pius XI in 1936 (PAFSSSL, n.d., ¶1). The Pontifical Academy of Social Sciences was founded by John Paul II in January 1994, with the objective to promote the study and progress of social, economic, political, and juridical sciences in light of the social doctrine of the Church. The founding of the Pontifical Academy of Life (PAL) followed on February 11 of the

[130] See Denzinger (2002).
[131] See the collected documents of Pius XII (Mar. 2, 1939 - Oct. 9, 1958) as put forward in Apostolic Constitutions, Exhortations, Letters, Audiences, Bulls, Encyclicals, Homilies, Messages, Speeches and *Motu Proprio* available at the Vatican website (www.vatican.va).

same year (PAFSSSL, ¶9). As outlined by the Vatican, the objectives of the PAL "are the study, information and formation on the principal problems of biomedicine and of law, relative to the promotion and defense of life, above all in the direct relation that they have with Christian morality and the directives of the Church's Magisterium" (PAFSSSL, ¶9). The PAL publishes a yearly Plenary Assembly Declaration as well as reflections on papal encyclicals, joint-statements, and summaries on various bioethical topics. With over 100 working members representing every continent, the academy has put forward research and opinion on such issues as stem-cells, human cloning, euthanasia, xenotransplantation, and definitions of brain-death.[132]

Our final category of Catholic bioethical sources relates to concepts of social justice. Social justice pronouncements have a long-standing history beyond the formal encyclicals of popes (e.g., Leo XIII's *Rerum Novarum*) and inform Roman Catholic responses to many modern bioethical issues. By applying ideas such as the preferential option for the poor, distributive justice, human rights, personal dignity, and ecological stewardship, the Church broadens the basis for its response to bioethical issues beyond concerns about human integrity and totality. Outlined in Church documents such as *Gaudium et Spes, Pacem in Terris,* and *Economic Justice for All*, these ideas were predominately founded in modern terms, introduced during Vatican Council II.[133] Today, the interests of social justice are so strong that some Catholic bioethicists have dubbed their fields as "the social teaching of theological bioethics", or "the

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[132] See http://www.academiavita.org

[133] For official Catholic documents devoted to social justice see *Rerum Novarum* (1891), *Quadragesimo Anno* (1931), *Mater et Magistra* (1961), *Pacem in Terris* (1963), *Dignitatis Humanae* (1965), *Gaudium et Spes* (1965), *Populorum Progressio* (1967), *Evangelii Nuntiandi* (1975), *Puebla Documents* (CELAM III, 1979), *Familiaris Consortio* (1981), *The Challenge of Peace* (USCCB, 1983), *Economic Justice for All* (USCCB, 1986), *Sollicitudo rei Socialis* (1987), *Centesimus Annus* (1991), *Santo Domingo Documents* (CELAM IV, 1992), and *Deus Caritas est* (2005).

amalgamation of theological bioethics and Catholic social teaching into Roman Catholic social bioethics" (Daniels-Sykes, 2).[134] There is also recognition that a bioethical issue must be examined on social levels in order to ensure safety, equality, and benefits to the common good. Without such examination a scientific advance may endanger individuals and the public by creating disparities on economic and social levels that oppress or even kill. On a basic level, the faithful are called upon to live in solidarity with, and consideration of, the social needs of others; thus a Roman Catholic should avoid a bioethical technology which the Church has deemed socially unjust or risk causing social sin such as economic disparity and violations of human rights. On an educational level, the Church endorses efforts to inform members and non-members about social issues facing the world. Finally, on a level of community organization, the Church actively encourages peoples to gather together, to discuss and take action on issues which may have negative consequences for society. This power to organize can be an effective tool in changing government policy and in setting community standards. It may range from the direct actions of officially organized church groups to concepts founded by liberation theology such as *conscientização*—the awakening of critical consciousness in uncovering forms of exploitation, making all parties aware of injustice and struggling against it.[135]

With regards to bioethical issues the Church typically appeals to aspects of social justice in advocating for positive change for disadvantaged persons, be they physically, mentally, or economically challenged. Given its emphasis on the common good (stretching beyond the Catholic sphere and into a global ethic for equality, honesty, and

[134] See Cahill (2005a) (2005b).
[135] See Freire (2006).

human dignity), social justice positions itself as a major contributor to Roman Catholic approaches for bioethical issues. In addition, because this source incorporates fundamentals such as distributive justice and human rights, and stresses the importance of serving the poor, it reaches across religious and philosophical lines to inclusive levels of cooperation and action more so than approaches based upon selected Christian scriptures, ideologies, or particular spokespersons. Given this broad and modern appeal of social justice as a source for bioethics, the Roman Catholic Church is able (as we shall outline in Chapter 5) to approach enhancing cybernetic and nanotechnological body modifications on a variety of community-oriented levels.

B. Roman Catholic approaches to common non-enhancing modifications

To view how the sources of Roman Catholic bioethics relate to our topic of non-enhancing body modifications, we begin with historic and current guidelines related to cosmetic surgeries. This type of body modification has been addressed, although sparsely, by way of historic principles such as totality, mutilation, and stewardship as found in patristic and medieval traditions. In contemporary terms, bioethicists and papal pronouncements address factors such as risk and medical professional and patient duties, while also appealing to concepts of social justice such as human dignity and common good. These types of body modifications fall short of the previously described definition of enhancement (see Chapter 2), but fulfill the basic criteria of altering the natural state of the human body either in decorative style or physical form. More importantly, such modifications are upheld as current examples of body technologies whose social acceptability have developed from stigma to assent. Indeed, as we shall see in Chapters 6 and 7, they are viewed as precursors to enhancing technologies by specific

philosophies dedicated to human-machine hybridization. We shall begin with an overview of how cosmetic surgeries have increased in popularity in recent times and various bioethical justifications. We will follow with an examination of Roman Catholic bioethical reflection on such surgeries, drawing on the sources of ethical deliberation described above. This understanding of a Roman Catholic bioethical position regarding a specific type of non-enhancing surgery may then in turn provide parallel reasoning for the justification or prohibition to other novel medical and technological procedures.

i. Cosmetic procedures

In the past, an unnecessary surgery—a medical procedure with no *direct* restorative or therapeutic medical benefit, or a similar process resulting in inordinately large risks of infection, scarring, and reduced functionality of muscle or nerve tissue— would have been avoided. Currently, however, strictly superfluous medical procedures—those we may define as unwarranted in order to maintain homeostasis or basic parameters of good-health—have become commonplace. Half a century ago cosmetic surgeries (once commonly referred to as plastic surgeries) were relegated to specialized cases of restorative measures to burn victims, deformities, or heavy scarring. Body modifications, such as basic tattooing, were a social rarity in Western culture, mostly found amongst sailors and prisoners. Present day indicators are the exact opposite. During the last decade there has been a yearly average of 10 million cosmetic procedures performed in the United States and 300,000 performed in Canada (ASAPS, 2012, 7; Medicard, 2005, ¶1):

> There were over 10 million surgical and nonsurgical cosmetic procedures performed in 2012 in the United States, according to a comprehensive survey of U.S. physicians and surgeons by ASAPS. Surgical procedures represented 17%

> of the total, and nonsurgical procedures were 83% of the total.… Since 1997 there has been a 250% increase in the total number of cosmetic procedures. Surgical procedures increased by 80%, and nonsurgical procedures increased by 461%. (ASAPS, 2012, 4-5)

The top five surgical cosmetic procedures in 2012 were:

- liposuction (313,011, up 60.4% from 1997)
- breast augmentation (330,631, up 226.8% from 1997)
- blepharoplasty/eyelid surgery (153,171, down 3.8% from 1997)
- rhinoplasty (143,801, up 4.9% from 1997)
- abdominoplasty (156,508, up 360.3% from 1997)

The top five nonsurgical cosmetic procedures in 2012 were:

- Botox injection (3,257,913, up 4009.1% from 1997)
- laser hair removal (883,893, up 53% between 2003-2004)†
- chemical peel (443,824, down 7.8% from 1997)
- microdermabrasion (498,812, up 28% between 2003-2004) †
- hyaluronic acid (1,423,705, up 659% between 2003-2004) † (ASAPS, 2012, 6)[136]

Similar statistics regarding decorative non-enhancing body modifications will be presented further on in this chapter. Although the statistical information points to females within 35-50 years of age having the highest use of cosmetic procedures (40%), there can be little doubt that the practice is in demand in younger cohorts (ASAPS, 2012, 12). The trend (principally amongst North American and European youth) of tattooing, piercing, brandings, and particularly cosmetic surgeries such as rhinoplasty, breast enhancements or reductions, liposuctions, and selective body-sculpting have created an entire industry based on what at one time society would have dubbed unnecessary

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[136] Statistics were collected via paper-based questionnaire, mailed to 23,000 board-certified physicians (9,300 dermatologists, 8,300 otolaryngologists, and 5,400 plastic surgeons). Findings were deemed to have a standard error of +/- 3.47% at a 95% level of confidence (ASAPS, 2012, 3).
† Statistics were unavailable for comparison to 1997 levels, but were included in 2004.

surgery.[137] While varying in permanence, several procedures have been developed in response to "transient fashions" including collagen injections to foot pads and toe-shortening to suit shoe styles, nipple shaping and navel repositioning to suit tight or revealing clothing, and facial reconstruction to mimic popular celebrities (Hogle, 705).[138] In terms of costs, approximately $10.9 billion were spent in 2012 in the United States on these procedures, and $600 million in 2004 in Canada (ASAPS, 2012, 14; Medicard, 2005, ¶1).

For further clarification, it is appropriate to note that rarely do we find theological complaints against the differing nonsurgical, common practices which are used on a daily basis in order to improve appearance: contact lenses, wigs or toupees, hair colour, cosmetics, etc.[139] The obvious difference between such procedures and surgery is that nonsurgical practices are mostly temporary in nature and do not alter the nature of the human body. Just as we gauge bioethical stability of a technology (see Table 1) so too may we apply the same criteria to limit an examination of these body modification practices; focusing on those which are more invasive, permanent, and public in nature. The criterion of power appears to be neutral in these cases as no specific extra-human ability which exceeds species-based norms may be identified. For example, the common application of cosmetic makeup would not meet the criteria of permanency, implantability, or power, although it would, ideally, have an effect on public interaction.

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[137] A more complete list of commonly available cosmetic procedures would include: abdominoplasty (tummy tucks), buttock augmentations, cheek implants, chin augmentations, forehead lists, gynecomastia (male breast reductions), hair transplantations, lip augmentation, otoplasty (ear surgery), thigh lifts, upper arm lists, vaginal rejuvenations, injectable autologous fat, collagen injection, poly-L-lactic acid injection, polymethyl methacrylate injection, and sclerotherapy.

[138] See Kalb (1999).

[139] Traditionalist groups such as Quakers, Amish, and Apostolic Christian Church members disagree. For a detailed (and literal-based biblical) interpretation on banned body adornments, cosmetics, and even dress code, see Does Appearance Matter (2006).

a) Roman Catholic ethical opinion

Writing for the *Journal of the National Medical Association,* Albert P. Seltzer recognized the need for religious opinion regarding what many were calling unnecessary (plastic) surgeries during the 1960's.[140] He attempted to bring together representative beliefs from a variety of traditions in order to better understand what guidelines pertained to religious patients. He asked the basic question: "How does the priest, rabbi or minister feel about rhinoplasty and other 'cosmetic surgery'?" (Seltzer, 1965, 205). Results indicate that the plurality of religious approaches to non-enhancing body modifications may be bounded only by the number of religions (organized or otherwise) themselves. Seltzer gives a synthesis of religious opinions from a Catholic, Protestant, and Jewish perspective gathered from views published in the journal *Eye, Ear, Nose & Throat Monthly* and shows a fervid relationship between cosmetic surgery and religion or spirituality. He shows this in his clarification of what some may dub medical and non-medical surgery (consonant with necessary and unnecessary), explaining: "What is the real difference, then, between medical and cosmetic surgery? As I see it from my personal experience, I would state that medical surgery saves the life, and cosmetic surgery saves the soul" (Seltzer, 205). Of course such a definition is rather personal. Today cosmetic surgery is considered a viable branch of medicine, whether restorative in nature or elective, and is generally measured as a part of human aesthetic, rather than spiritual, happiness.

[140] It should be noted that the presented opinions of the scholars, theologians, and ethicists often date to several decades ago, yet they are (remarkably) still contemporary in terms of Roman Catholic scholarship regarding these specific body modification, and thus perhaps indicative of an often overlooked subject within Catholic bioethics.

Seltzer's outline includes a synopsis of the mid-twentieth century Roman Catholic position and stands as a contemporary opinion piece which may be included as a source for a Catholic bioethical approach to cosmetic surgeries. He notes that, "The Catholic faith finds nothing intrinsically immoral in the restoration of normalcy or the adding of beauty, so long as three important rules are observed by the attending surgeon, namely a valuable reason, absence of risk to the general health of the subject, and a good and decent intention" (Seltzer, 205). Indeed, according to Charles G. O'Leary (medical chaplain at Mt. St. Alphonsus Esopus, New York, who rendered the solicited opinion with regards to Catholicism's response to cosmetic surgery): "There are no moral objections to Facial Plastic Surgery in its current use. In fact, in some cases it is not only permissible but also a necessity" (O'Leary, 1962, 61). Patient well-being, considered in terms of risk and added value, also informed Roman Catholic approaches to non-cosmetic unnecessary procedures which incidentally reshaped the body, such as a circumcision or the removal of a perfectly healthy appendix during the course of a general abdominal surgery.[141]

Since cosmetic surgeries may involve grafting and transplantation, it is worth noting the traditional stance on such procedures. Carlo Rizzo (in the *Dictionary of Moral Theology*) explains that grafting and transplantation are not permissible if practiced on human beings out of mere experimentation and without immediate therapeutic purpose, especially when very important organs are involved (1962, 553), but may otherwise hold merit. It is important to note that Rizzo is speaking of grafts which have been previously defined in four basic groups (very much along the same levels of organ transplantation): autoplastic, homoplastic, alleloplastic, and heteroplastic. These categories refer to the

[141] See Lynch (1967).

removal and reattachment of a tissue or organ from one part of the body to another dependent upon whether the donor is the same individual, race, or species (Rizzo, 553). With the advent of modern plastics and nanotechnology, a new addition must be made to the general list of grafting options—*synthplastic*: a non-biological, artificial graft. Whereas, Rizzo and other ethicists deemed that cosmetic grafts were allowed (along with elements removed from a corpse) if they could help a sick person (Rizzo, 553), the morality of synthplastic grafting is mostly unexplored by bioethicists.

More recently, Roman Catholic bioethicists Ashley and O'Rourke comment on cosmetic surgery by focusing on the questions of necessity and appearance. Both agree that non-restorative cosmetic surgery has no direct purpose for normal human function and may actually inhibit or destroy normal human function. Yet, Ashley and O'Rourke grant that while human appearance can hardly be called a "function" of the body it is certainly very important in human life, with regard to sexual attraction, social relationships, and our sense of personal worth. This justifies cosmetic surgeries if the purpose is to acquire, when lacking, what is generally regarded as a normal, attractive appearance for one's gender or even to enhance it (Ashley & O'Rourke, 340).[142]

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[142] As a comparison to the outlined Roman Catholic approaches we find various Protestant views of cosmetic surgeries. Such justifications are not necessarily rooted in principles derived from the patristic and medieval tradition or ecclesiastic pronouncements but, rather, rely on direct biblical interpretation and virtue-based ethical foundations. Given the great diversity within the Protestant tradition it would be difficult to speak with certainty as to all of the approaches towards body modification; however a simple moderate position is that of Reeves: "Protestant opinion names the trait of honesty of the deepest fundamental importance, remarking pertinently that 'David is not to parade in Saul's amour.' Protestant theory considers also that whatsoever contributes to the total effectiveness of a man is good, and whatsoever hinders him in normal life relationships is bad" (Seltzer, 206). The emphasis on this value of honesty is mitigated by differentiation between restorative and cosmetic surgery with an ethical dilemma occurring when someone attempts to become something that they are not. In addition, a patient's well-being must be considered as well as obligations to inquire into the motivations (Reeves, 1961, 857). However, the concept of the detrimental effects of vanity is more important within highly conservative groups or those with literal biblical interpretations. For example, the Georgia-based Baptist Convention proclaims that "[t]he concept of honor has virtually ceased to exist and so cannot be stolen…. 'Thou shalt not covet,' is totally absent from today's United States, where greed has become a virtue. This is the idol of

b) Magisterial and papal pronouncements

Papal statements concerning the validity of cosmetic modifications are rare. Although ordinary in terms of magisterial authority, such statements are sources of Roman Catholic ecclesial opinion at the highest level and as such often serve as guides to questions of moral legitimacy. Absent from Seltzer's outline, yet an example of this source of Roman Catholic bioethics, we find the brief comments made by Pope Pius XII in his speech at the inauguration of the Department of Plastic Surgery at the Hospital of San Roman Eugenio (October 4, 1958) and those of Pope Paul VI at the General Audience to the International Congress of Surgery (April 19, 1972). Artificial grafts appear to be morally acceptable, as in the statement of Pius XII on the traditional use of artificial or cadaver materials to spare living donors.[143] The remarks by Pius XII are of particular interest as they include factors such as psychology, social relationships, the nature of beauty, moral motives, proportionality, and what he terms "extraordinary means":

> The principles and rules of medical science … should therefore assist the surgeon…. The art and ingenuity of the plastic surgeon is manifested in a thousand ways, whether to build an entire ear and deliver it to a person born without or lost by trauma, or to reconstruct the closure of the fingers, to those who have lost the faculty for the mutilation of the thumb, or to restore the laryngotracheal passage, or to correct traumatic avulsion of the scalp, or simply to

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wealth, and it applies not only to money but to houses, automobiles, the latest computer, and in a sense even to physical beauty. The physicians' advertisements for unnecessary cosmetic surgery would have been considered unethical half a century ago; today they are standard" (Howard, 2003, ¶9). Other groups, such as the Evangelical Lutheran Church of America (ELCA) and the Mennonite Central Committee (MCC), have organized documentation regarding the human body offer respective religious interpretations on medical-moral issues. Independent Protestant congregations can hold totally different views on the modification issue; See MCC (2004).

[143] See Pius XII (1956).

correct for the right reasons, the external lines of the nose and other members…. If one considers…that plastic surgery was only the start of science in recent decades, we can expect wonderful things in the future, thanks to the assiduous study and increasingly perfected technique of distinguished scholars, whose interest is stimulated by a high sense of humanity, and often religion…. Let the thinking of an individual who seeks cosmetic surgery already comply with the normal canons of aesthetics, excluding any intention that is not right, any risk to health and every other reflection opposed to virtue….This desire or act, as presented by such thoughts, is not in itself morally either good or bad, but only the circumstances, which in practice can avoid any act, will give him the moral value of good or evil, lawful or illegal. It follows that the morality of acts regarding aesthetic surgery depends on the specific circumstances of individual cases…. In the moral evaluation of these major conditions relevant to the matter…are as follows: that the intention is right, that the general health of the subject is protected from significant risks, the reasons are reasonable and proportionate to the "extraordinary means" to which reference is made. For example, the wrongfulness of an action would be evident with the intent to increase the power of seduction, and so more likely to induce others to sin, or only to deprive an offender to justice, or to cause damage to regular functions of the physical organs, or is wanted for mere vanity or caprice of fashion…. The physician should investigate [patient] history, with his research objective, and which takes into account as a healing method, to affect not only the body but also

> on the conscious and unconscious mental state the patient, his feelings, his external conditions and future. [144] (Pius XII, 1958, 952-961)

Building upon the words of his predecessor, Paul VI in his address to the International Academy of Cosmetic Surgery and the Italian Society of Aesthetic Surgery cited Pius XII and noted how the Christian virtues of charity should guide the intention of the physician, above motives of profit or prestige—both of which, if primary concerns, are condemned by the Church as opposite to ideals of social justice such as equality, human dignity and a preferential option for the poor.

> Through the use of modern methods of surgery you are seeking to reduce birth defects or to rehabilitate impaired people to work, and to improve family relationships and social and applied adjuvant therapy in patients with psychosomatic or psychiatric disorders, resulting from the daily confrontation, which is particularly exacerbated with the normal physical and aesthetic of others. …Our predecessor Pius XII, on the occasion of the inauguration of the Department of Plastic Surgery at San Roman Eugenio Hospital, drew a deep and clear picture of your profession, giving the fundamental theological and moral principles that must regulate [the field] (October 4, 1958, *Speeches and Radio,* XX, 415-427). Among other things, he stressed that "on the one hand, the analogy, though pale and distant, between the work of the plastic surgeon and the divine Creator, who formed from the slime of the earth the first human body by infusing life into it, and on the other hand, the bringing of relief to so many suffering, and finally the indefinite variety of treatments, all contributes to the high interest of this part of the surgery" (*Ibid.,* 421). This allocution, the

[144] Author's translation.

> penultimate pronounced by him, remains an exemplar testament of moral ethics to your art, and we refer to it because the action that you perform is always respectful of the laws of God, and guided by the noble intention of helping the handicapped who suffer, inspired by the Christian virtue of charity, held above special interests, prestige, and profit. [145] (Paul VI, 1972, ¶14)

These two papal statements give clear guidelines in regards to cosmetic modifications: a) right intention; b) reasonable risk to health; c) virtues must not be opposed by the act; and d) given the above, cases must be judged individually based upon their own specific circumstances. These caveats are similar to the opinions of Roman Catholic bioethicists and researchers outlined above, and attempt to incorporate judgments based upon human reason such as proportionality in terms of health risks and individual motive. For example, a cosmetic surgery aimed solely at increasing seductive ability or to alter one's features to avoid identification in criminal behaviours would violate both a) and c), if not all three primary considerations. Such statements are in keeping with Roman Catholic bioethical opinion but are more precise, and addressed in personal terms to both patients and physicians involved in cosmetic modifications. In addition, the statements incorporate many of the concepts given by patristic and medieval sources (as we shall next examine) which have acted as foundations to general Roman Catholic medical ethics for so long.

c) Principles derived from patristic and medieval tradition

The contemporary opinions and papal pronouncements we have outlined are traditionally grounded in, or commensurate with, principles derived from the reflections of patristic and medieval writers. The most important of these are the principles of

[145] Author's translation.

totality, mutilation, and integrity, which have been traditionally used to assess the moral validity of surgical punishments as well as voluntary or involuntary amputations. In this section we begin by exploring these principles in turn, including an analysis of their interpretation and relevance in modern Roman Catholic bioethical reflection, particularly with regard cosmetic modifications. Following this, other important patristic principles which speak to body issues will be examined and likewise applied to cosmetic interventions. Lastly, we will link these traditional principles to modern opinions and ecclesiastical pronouncements.

John Gallagher gives a succinct definition of the principles of totality and mutilation in *The Principles of Totality: Man's Stewardship of His Body*: "the principle of totality states that in certain cases, mutilation is allowed when it is necessary for the good of the whole. 'Mutilation' here means, 'any procedure that either temporarily or permanently impairs the natural and complete integrity of the body or its functions'" (Gallagher, 1984, 218). While mutilation may be permitted in certain circumstances, it nevertheless warrants serious deliberation. As defined in the *Dictionary of Moral Theology*, "mutilation belongs to the category of murder: the difference is that mutilation is partial destruction of an individual, whereas murder is the total destruction of the physical life… Moral law is concerned with mutilation because no man is absolute in his dominion over the body" (Bender, 1962, 805). In addition, the exact gravity of an instance of mutilation does not depend upon the size of the mutilation, but rather upon the importance of the organ involved.

These definitions stray very little from the original treatment of the principles that Aquinas set down in his *Summa Theologiae*, Question 65, Article 1. Aquinas addresses

the question of amputation from the aspect of the body as a whole entity, created whole and to be kept whole. He writes:

> Because a member is a part of the whole human body, it is for the sake of the whole, as the imperfect is for the sake of the perfect. Hence a member of the human body is to be dealt with according to what is expedient for the whole. Now a member of the human body is of itself (*per se*) useful to the good of the whole body, yet accidentally (*per accidens*) it may happen to be hurtful, as when a decayed member is corruptive of the whole body. Accordingly so long as a member is healthy and retains its natural disposition, it cannot be cut off without detriment to the whole human being. (Q. 65, A.1)

This idea would be applied through much of Western history in cases such as elective surgeries, amputation, and grafts, linking the motive of a procedure to religious conceptions of human stewardship, responsibility, and function.[146]

Yet there is a deeper level to the totality that Aquinas outlines. The body is not merely limited to the individual's physical form; 'the body' is also extended as an example of the whole of society. One of the basic differences between a personal application and a social application of the idea of the body is the degree of independence that an individual has within society as opposed to the dependence of an individual body part to the body. The natural function of a limb such as a leg or an arm is moot without the body which it serves; it exists for the benefit of the body. This aspect of the principle traditionally leads to ethical reflections on capital punishment and penalty by mutilation such as loss of a hand or eye in restitution for a crime. While some argue that the benefit to the whole of society is increased with the death of a criminal (even Aquinas makes

[146] For Aquinas's influence on medicine see Foster (2001); Seifert (2004); Fagiolo (2007).

reference to this possibility),[147] the Church's position today asserts that this application of totality is a violation of the life of the individual and not licit.[148] Thus we see that although totality and mutilation are relevant for a discussion of body modification, or as guidelines in determining whether a procedure is unethically marring, the sanctity of, or risk to, life holds ultimate authority in Roman Catholic tradition. Hence, in a Roman Catholic approach to modification issues, sanctity of life and respect for health will take precedence over other considerations, holding true on both individual and societal levels.

Furthermore, as views of the body developed and medical technologies changed, reflection on the principles of totality and mutilation has expanded to take into consideration psychological benefits, temporary loss of rationality, and human integrity. The idea that human totality extends beyond the physical figures, for example, in discussion of organ donations, has been noted. As outlined in *Transplantation of Organs: A Comment on Paul Ramsey*, "Warren Reich speaks of the subordination of the physical perfection (of the donor) to his own perfection of grace and charity…This would expand the notion of the total person (psychological and spiritual, as well as physical) beyond that which was originally envisioned in the 'principle of totality'" (McCormick, 1975, 503). This psychological aspect to totality and mutilation is not an unexplored direction; indeed, Pius XII strongly implies that not only physical goods, but

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[147] "For this reason we observe that if the health of the whole body demands the excision of a member, through its being decayed or infectious to the other members, it will be both praiseworthy and advantageous to have it cut away. Now every individual person is compared to the whole community, as part to whole. Therefore if a man be dangerous and infectious to the community, on account of some sin, it is praiseworthy and advantageous that he be killed in order to safeguard the common good, since 'a little leaven corrupteth the whole lump' (1 Corinthians 5:6)" (Aquinas, II. 2. Q. 64 A. 2).

[148] We read in Pope John Paul II's encyclical *Evangelium Vitae*, "…I confirm that the direct and voluntary killing of an innocent human being is always gravely immoral. This doctrine, based upon that unwritten law which man, in the light of reason, finds in his own heart (cf. Rom 2:14-15), is reaffirmed by Sacred Scripture, transmitted by the Tradition of the Church and taught by the ordinary and universal Magisterium. The deliberate decision to deprive an innocent human being of his life is always morally evil and can never be licit either as an end in itself or as a means to a good end" (# 57).

certain psychological goods, can justify mutilation (Gallagher, 227). In fact, cosmetic surgery for the purposes of correcting physical deformity or for the augmentation of physical attributes (that are not a threat to health) is, as Janet Smith writes, "customarily justified as being for the sake of the psychological well-being of the whole person" (Smith, 1991, 185).

As with the principle of totality, there has been an evolution in the idea of mutilation. Mutilation has several differing levels, the common denominator being the altering of natural functions. As John J. Lynch states in the *New Catholic Encyclopedia*, "The use of anesthetics, narcotics, hypnosis, etc., which deprive one temporarily of the use of reason, also entails mutilation" (Lynch, 1967, 146).[149] Yet, when performed under normative circumstances, they are altogether licit if medically indicated for the patient's benefit. The purposeful use of narcotics would then be a mutilation of reason, just as precious as one's limbs or organs. Yet, a form of applicable mutilation can be seen in blood transfusions and donations, since such actions do not "diminish one's bodily integrity to any considerable degree and because the 'borrowed' elements soon replace themselves. It would seem preferable, however, to classify these procedures as minor mutilations…" (Lynch, 147). Arguably, mutilation of reason is greater than minor mutilation of the flesh as lack on control and intent violates many of the Roman Catholic justifications for an unnecessary surgery.

Body and soul in unity has always been an important element in Roman Catholic moral theology, and discussions of totality and mutilation have involved consideration of the hierarchy of natural life functions under the principle of integrity. As Haas outlines

[149] See too Palazzini (1966).

in *Ethics & Medics—A Catholic Perspective on Moral Issues in the Health and Life Sciences*:

> Usually the principle of totality is seen as being directed toward the preservation of the physical whole of the human body while the principle of integrity refers to the respecting of the hierarchical ordering of the members of the body with 'the values of intellect, will, conscience, and fraternity (being) preeminent' [*Gaudium et Spes*, no. 61]. As Pope Pius XII pointed out in his address to the Congress of Psychotherapy and Clinical Psychology on April 15, 1953, 'Man is an ordered unity, one whole, a microcosm, after the fashion of a State whose charter, determination by the end of the whole, subordinated to this end the activity of the parts in the right order of their value and function.' (Haas, 1995, 2)

In the case of an incidental surgery, a minor mutilation to the body is performed in order to allay a possible risk to future health and, as with cosmetic surgeries, may not be judged as illicit in and of itself by Roman Catholic bioethicists. Case-by-case examination is the recommended course of action.[150] For example, Roman Catholic

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[150] Pius XII statement on totality and non-essential surgeries, given in 1952 at the First International Congress on the Histopathology of the Nervous System, is relevant in this regard. Pius XII notes that the use of certain principles, such as totality, must be interpreted in light of its application to individual circumstances wherein questions of the parts and the whole are clearly defined—a doctrine itself does not define a case, rather the case may be interpreted with respect to the doctrine. As he explains in the example of totality: "We respect the principle of totality in itself but, in order to be able to apply it correctly, one must always explain certain premises first. The basic premise is that of clarifying the *quaestio facto*, the question of fact. Are the objects to which the principle is applied in [a relationship] of a whole to its parts? A second premise is the clarification of the nature, extension and limitation of this relationship. Is it on the level of essence or merely on that of action, or on both? Does it apply to the part under a certain aspect or in all its relations? And, in the field where it applies, does it absorb the part completely or still leave it a limited finality, a limited independence? The answers to these questions can never be inferred from the principle of totality itself. That would be a vicious circle. They must be drawn from other facts and other knowledge. The principle of totality itself affirms only this: where the relationship of a whole to its parts holds good, and in the exact measure it holds good, the part is subordinated to the whole and the whole, in its own interest, can dispose of the part." (Pius XII, 1952, 13). The Address includes three sections: I. The Interests of Science as Justification for Research and the Use of New Methods. II. The Interests of the Patient as Justification of New Medical Methods of Research and Treatment. III. The Interests of the Community as Justification of New Medical Methods of Research and

tradition accepts incidental appendectomy surgeries even though risks of septicemia may be very low. As O'Donnell explains, since the patient is already under general anesthetic and the abdomen is already open, the mutilation involved "is so slight that any reasonable cause would justify it. In addition, the removal of the danger of a later illness which would require emergency surgery would justify it as a reasonable act of wise administration provided no additional risk is involved" (O'Donnell, 1956, 79). This would not be the case with the removal of a healthy appendix or, for example, healthy tonsils, if the initial condition of an ongoing surgery was not met—the key requirement being a patient already in a state of surgery.

Our final principle to be considered is that of stewardship. While two encyclicals, Pius XI's encyclical *Casti Connubii* (*On Chastity in Marriage*, 1931) and Paul VI's *Humane Vitae* (*On the Regulation of Birth*, 1968) do not speak directly to issues of cosmetic modification, both stress the importance of this principle and situate it within serious ethical deliberations involving the body. The principle of stewardship places certain limitations on what human beings may do to their bodies. We see this expressed by Pius XI when he says: "…Christian doctrine establishes, and the light of human reason makes it most clear, that private individuals have no other power over the members of their bodies than that which pertains to their natural ends; and they are not free to destroy or mutilate their members, or in any other way render themselves unfit for

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Treatment. It is within point 13 of section II that we find the conjunction of a person's bodily stewardship, totality, and mutilation given as: "Because he is a user and not a proprietor, he does not have unlimited power to destroy or mutilate his body and its functions. Nevertheless, by virtue of the principle of totality, by virtue of his right to use the services of his organism as a whole, the patient can allow individual parts to be destroyed or mutilated when and to the extent necessary for the good of his being as a whole. He may do so to ensure his being's existence and to avoid or, naturally, to repair serious and lasting damage which cannot otherwise be avoided or repaired" (Pius XII, 1952, II.13).

their natural functions, except when no other provision can be made for the good of the whole body" (1930, 71).[151]

A Roman Catholic response to any medical procedure, necessary or not, must therefore always consider a person's obligation to be a good steward of the body. The very definition of mutilation is connected to stewardship or 'dominion' over the body. As Hogan explains, "In exercising stewardship, the person is permitted the use of the faculties and powers of the body and soul in accord with the immanent finality of the faculties or powers in the service of the whole. The person may not destroy the faculties or powers unless their destruction is required for the good of continued existence or that of mending or avoiding serious injury" (Hogan, 1993, 25-26). Gallagher outlines this stewardship with reference to Luis Molina, "Man is not the master of his own life and members as he is the master of money and of other external goods which pertain to him and which he possesses. The Lord indeed conceded to men dominion over external goods … but dominion over life and members, the Author of Nature who created them, reserves to Himself" (Gallager, 224). In terms of cosmetic modifications, any procedure which destroys a natural function of the body has violated the principle of stewardship. However, since the vast majority of augmentative surgeries do not overtly destroy natural functions such as sensory perception or movement, it would appear that such violation is attenuated.

Although the traditional connections between stewardship, natural law, totality, and the human body have remained as a strong guide to bioethical problems, there has been a definite evolution in the theology—just as there has been an evolution in the sciences. Speaking at the Nash Lectures in 1988, on the topic of 'Moral Theology in the

[151] See too *Humane Vitae* #'s 11, 13, 17.

Year 2000: Reverie or Reality?', McCormick outlines some of these historic interpretations. He starts with the position of Franciscus Hurth (advisor to Pius XI and Pius XII):

> "The will of nature" he says, "was inscribed in the organs and their functions." He concluded: "Man only has disposal of the use of his organs and faculties with respect to the end which the Creator, in His formation of them, has intended. This end for man, then, is both the biological law and the moral law, such that the latter obliges him to live according to the biological law." For this reason, John C. Ford, S.J. and Gerald Kelly, S.J., wrote in 1963: "One cannot exaggerate the importance attached to the physical integrity of the act itself both in papal documents and the Catholic theology generally." (McCormick, 1988, 11)

Yet McCormick goes on to explain that Vatican Council II advanced beyond "such 'physical integrity' when it proposed as a criterion 'the person integrally and adequately considered.' As Louis Janssens words it, 'From a personalist standpoint what must be examined is what the intervention as a whole means for the promotion of the human persons who are involved and for their relationships'" (McCormick, 1988, 11). The emphasis on the importance of relationships within the principles is an expanded view compared to the earlier theology and, as we shall see in our subsequent chapter, will be a significant standard in assessing scenarios of cybernetic and nanotechnological enhancement technologies.

Apart from papal or magisterial input, others have noted the importance of Aquinas's principles to Roman Catholic medical-moral theology and responses to body modifications which may imply selfishness or greed. According to Gilman, from the viewpoint of theology, the question is this: "by trying to improve on God's work and

create a human being other than He created or intended, do we not attack the scheme of Providence?" (Gilman, 2002, ¶1). He further reminds us that Roman Catholic teaching defends aesthetic surgery by evoking the theological principle of totality in which a part of the body can be sacrificed for the good of the whole; even if the intent of the procedure is to achieve "physical beauty". As Gilman notes,

> One can sacrifice a 'too Irish' nose if the end result is a more coherent body, in one's own estimation. The moral evaluation of the act must show that: a) the intention is right; b) the general health of the patient is not placed at risk; and c) the motives must be proportionate to the means employed. Aesthetic surgery cannot be sanctioned if the purpose is mere vanity or fashion. And what is not 'mere vanity'? Aesthetic surgery, for example, can be sanctioned if it ameliorates 'grave psychological effects . . . such as a sense of inferiority.' Then it is seen as not only permissible but also a necessity. (Gilman, 2002, ¶5)

A final category of cosmetic modifications, those of gender reassignment surgeries, incorporate many of Gilman's points. However, the Church deems these specific body modifications as illegitimate and does not grant consent based upon psychological totality or aesthetics.[152] While gender reassignments correspond to requests to alter the body to fit the psychological and emotional desires of specific individuals, there are no changes to chromosomal natures or natural reproductive functions. As Williams Saunders Herald, columnist for *The Catholic Herald*, writes: "No transsexual surgery will ever be able to duplicate completely the anatomy or the functioning of the opposite

[152] Such surgeries are distinct from cases of gender identity disorder in children, caused by neonatal physical malformation of reproductive organs, and the subsequent internal and cosmetic corrections chosen by parents in consultation with medical experts which determine function and gender. See Zucker & Bradley (1995); Fitzgibbons & Nicolosi (2001).

sex. A male transsexual will never be able to ovulate or conceive; and a female transsexual will never be able to germinate sperm" (2001, ¶3). Similarly, current Roman Catholic instructions regard transexualism as erroneous psychological development, suggesting treatment with psychotherapy and denying individuals who have undergone gender reassignments the sacrament of marriage or ordination. Further disapproval stems from the procedure's permanency, its illusory quality in disguising original gender, and its mutilation of a healthy, non-diseased body.[153] This determination is based upon a number of Roman Catholic bioethical sources including Vatican Council II's *Gaudium et Spes* (The Pastoral Constitution on the Church in the Modern World), catechetical teachings, and papal pronouncements.[154] More than the specific conditions of this cosmetic modification, such a position is indicative of the Church's special consideration for reproductive and sexually-related issues. Indeed, the Church pays particular concern to reproductive issues as previously noted in the encyclicals of Pius XI and Paul VI and continues such focus in present day declarations.

d) Summary

Given the above review, a primary (though not exhaustive) list of considerations for cosmetic modifications from a Roman Catholic perspective includes the need to: maintain Catholic interpretations of stewardship and responsibility for the sanctity of human life; weigh the risks to health and the proportionality of benefits to possible losses in function; discern proper motives aimed at improving human psychology and

[153] Fitzgibbons et al., (2009).
[154] See *Gaudium et Spes* #14; *CCC* #2297; Norton (2003); Benedict XVI (2008); Lewis (2009).

relationships; and respect bodily integrity, with an emphasis on the special position of natural gender and reproductive organs.[155]

Intent and circumstances are always of key importance to understanding individual reasons for cosmetic modifications. Church guidelines appeal to human rationality in connection with tenets of the faith in hopes of generating moral actions which uphold personal and social dignity.[156] However, according to Roman Catholic theology, this ability to act responsibly through rational means towards the good is never forced by the Creator upon individuals or society, and thus an individual's choice is ultimately their own.[157]

ii. Tattoos and piercings

Spinoza said that "desire is the very essence of man," although it is doubtful that his contemplation of rational ethics and humanity ever touched on the subject of injecting inks into the dermal layer of the skin in order to achieve particular designs of meaning.[158] Yet it is precisely the essence of desire which motivates a person to body modification, be it decorative or otherwise. In order to understand Roman Catholic bioethics to non-enhancing decorative body modifications, we shall briefly outline the

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[155] Implicit in the above is a Roman Catholic understanding of natural law. Because natural law is judged by the Roman Catholic Church to be universal, the Church uses it as a tool to address all persons, regardless of religious or philosophical affiliation, holding that reflection on many bioethical issues should be common to all humanity. For example, the Maryvale medical ethics program states: "Medical ethics is not just a Christian or a Catholic specialty. It applies to all men and women, because it is based on truly human values, on an accurate picture of human nature and of what is best for human beings. It is based on the Natural Law, the dynamic law written in the human heart. If we obey that law of nature, we grow healthy and strong to our full moral stature. Hence a proper medical ethics is universal." (n.d., Unit 1-A.3)

[156] There is a general lack of specific scriptural reference to the subject of cosmetic modifications. As outlined, scriptural sources have always been an important part of Roman Catholic ethical approaches yet apart from a few references to cosmetics as beauty-products (NIV 2 Kings 9:30, Jeremiah 4:30, and Ezekiel 23:40) and isolated prohibitions against priests with bodily 'defects' (NIV Leviticus 21:17-23) general biblical precepts regarding the sanctity of life are more applicable to this particular non-enhancing body modification.

[157] See *CCC* #3, A6; *Dignitatis Humanae* #3.

[158] Spinoza (1991).

historical and religious discourse (or lack thereof) about common decorative modifications. We will then focus on selected virtues derived from Roman Catholic principles and scriptural sources which are used as ethical guides to these modifications, outlining their definitions and application. Next we will examine varying moral opinions on each decorative modification, highlighting divergent perspectives within the Catholic tradition, and view selected examples of body imagery which display characteristics that can be used to judge their acceptability. Finally we shall apply the remaining sources of Roman Catholic bioethics and compare our findings with what we have concluded with regard to cosmetic modifications.

a) An overview of common decorative body modifications

A complete history of the more common decorative body modifications is outside the scope of this thesis.[159] Here we provide only a general overview. It is important to note that the sociological importance of such non-enhancing modifications has been written on at great length particularly in the last few decades.[160] As well, we find that the psychological value—the *why* people seek body augmentations—has also been a topic of great debate; it has appealed to Carl Jung, Sigmund Freud, and B.F. Skinner, where we find almost as many identifiable causal factors as there are tattoo designs: power, sexuality, gender, possessiveness, authority, membership, memory, love, hate, individuality, rebellion, art, etc.[161] Most of this scholarship covers the historical and modern approaches to decorative modifications, post-modern theory regarding the

[159] Here we are delineating 'common' decorative body modifications (tattoos and piercings) by their statistical popularity in Western social environments, compared to 'uncommon' modifications which fall below medians, remaining relatively rare in the general public (including scarifications, brandings, flesh-removal and other body sculpting techniques). See Jablonski (2006); Pérez-Cotapos (2010).
[160] See Sanders (1989); Atkinson (2003).
[161] See Steward (1990).

culture of the body, and a great focus on the modification community including personal experiences and motivations in quests for improvement.

Beginning with tattoos, a body of scholarship has focused on their traditional use to represent clan affiliation or tribal associations and current Western trends expressing individuality with motifs often obscure to all but the owner—there is a long a colourful record to the art. A variety of texts discussing tattooing note that at various times through history the practice was predominantly utilized by such groups as Maoris, North American Indian tribes, Hawaiian islanders, royalty of certain ancient Greek city-states, Coptic Christians, to say nothing of the stigmatizing tattoos used to mark criminals or gang affiliation, low-caste members of society in feudal Japan or the Nazi identification of Jews.[162] Today, however, the scope appears to have no boundaries; the tattoo is a common body modification, particularly popular with youth, and has developed into a decorative art which goes beyond specific group association.

As with tattooing, piercing has a rich history: various forms, diverse motivations, and modern popularity, all shaped by particular social climes and geographic location.[163] Common body piercings have general social acceptance with few stigmas such as criminal association which often followed tattooing. This is not to say that throughout

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[162] See Brian (1979); Steward (1999); Hayman (2000); Atkinson (2003).

[163] Even apart from adornment purposes, it is referenced in the Bible; Exodus 21:5-6 says that freed slaves who want to continue to serve their master could have their ears pierced in court as a sign of permanent service (DeMello, 2007, 94). In Ancient Roman histories, we read that nipple piercing was practiced by Roman centurions who to signify their strength and virility and was enforced upon gladiators as a mark of property and genital protection (Wilkerson, 2004, ¶2). The location of a body piercing appears to have no boundaries, culturally or physically, as we find Aztec, Maya and American Indian tribes who practiced tongue and septum piercing as well as lip labrets as part of their religious rituals and for adornment (Wilkerson, ¶3-4). Even the Victorian era witnessed a surge in specific types of piercings, such as the colloquially termed Prince Albert, frenum and nipple piercings, and a variety of others purely for the pleasurable sexual effects (Wilkerson, ¶7). Although the popularity of ear piercings has undergone periods of waxing and waning—the Middle Ages saw a decline in European ear piercings as did North America during the 1920's—the practice persevered and beginning in the 1960's piercings increased with vigor. See Ferguson (1999); Stirn (2003); Laumann & Derick (2006).

history the practice has remained constant, popular, or has even been considered morally licit; as with all fashions there have been periods of general social disapproval and individuals rallying against any use of piercings.[164] As Margo DeMello notes in the *Encyclopedia of Body Adornment*, the practice of piercing spans cultures, has multiple applications, and multiple body-locations.[165] In recent decades piercings have become influential and have been utilized as a signifier for differing segments of society; for example, the gay community, punk-rockers, rappers, and even basketball players. Today the forms of body piercings are numerous—from dermal anchoring, ear spools and plugs to conventional hoops, pins and studs (DeMello, 94).

More so than a cosmetic surgery, decorative body modifications are often conjoined with a spiritual or transcendent function. While the changes offered by a successful cosmetic surgery certainly involve the uplifting of the psyche for the patient, the choices behind decorative procedures such as tattooing or branding often reside on deeper psychological and spiritual levels. In *Tattoo: Its Role in Psychic Compensation,* Hayman explains, "Through permanency, placement, and outside reinforcement, the tattoo thus works to support the holding of consciousness on a meaning that is of profound compensatory significance to the individual. In that, the meaning is brought into direct relationship to the body, the tattoo … makes a unique contribution to the integration of spirit and instinct" (2000, 47).

Tattoos are mediator symbols used to bring the presence of objects, ideas, or spirits into focus for the individual, on display (although not always for all to see) in order to

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[164] See Jablonski (2006).

[165] "From mummified remains there is clear evidence of elaborate ear-piercings in Egyptian culture over 5,000 years ago. Pieces were often elaborately enameled and gold earrings frequently portraying items in nature such as lotus blossoms" (Wilkerson, ¶1).

bring the symbols to the forefront. While the forms and sophistication of modifications such as tattoos have progressed, the power of tattoos as mediator symbols is not new. For example, historically, the tattoo acts as a sign, indicating rank, abilities, lineage, and acceptance, particularly with regards to religious ceremonies or as marks of devotional practices.[166] Today, such motives remain, as indicated by Meredith Price in the *Jerusalem Post* when she asks what types of people get tattoos today? The common answer: "those who want a tattoo as a reminder of a turning-point in their lives…those who use tattoos as a way to turn something negative into something positive" (2006, 2). Echoing such sentiments, Steward recounts several instances of religious persons, even priests, employing his services in order to adorn themselves with specifically Christian motifs (79). As Hayman notes, "[d]evotion may be expressed in prayer, meditation, asceticism, or religious pilgrimages. It may also be expressed through a tattoo. With its permanent placement on the body, the tattoo allows the individual to express graphically intense loyalty and enduring commitment" (67). Thus we find religious tattoo imagery by the millions—patron saints, holy objects, symbols, icons, phrases, images of deities, marks signifying pilgrimages, ancestors, life and death, and more. Indeed the whole process of obtaining a tattoo is ritualistic in nature. The very act signifies the passage, or, initiation and rebirth; a process of individuality and the quest for spirituality tied to a body modification. In a Christian context the link between suffering and religious enthusiasm cannot be ignored; it finds a parallel in modern body modification enthusiasts

[166] See Montserrat (1998). Indeed Hayman outlines an early example for us recounting the narrative of Otto Friedrerich von Groben, who in 1675 made a pilgrimage to Jerusalem: "There came a Christian from Bethlehem who had a whole sack full of figures cut in wood from which I selected the design… He took hold of my arm with one hand and with the other went over the design that had been drawn out, prick by prick. This he did so deeply, that the blood flowed at every prick, and caused considerable pain… He who is weak of constitution may well be on his guard… because the pricks cause considerable swelling in the arm, and through the inflammation often bring about a fever that is very dangerous…" (2000, 75).

seeking spiritual connectivity through their arts by suffering through the very real pain in order to achieve a desired effect, mirroring the sufferings of religious zealots and martyrs.[167] Such a connection, however, may be dismissed by other Christians as falsely seeking spiritual enlightenment through the body, or as being led into such practices by evil itself.

b) Roman Catholic approaches to tattoos and piercings

Unlike our discussion of cosmetic procedures, there is little to be gleaned from Roman Catholic bioethical opinion or from magisterial or papal statements regarding common decorative modifications. Rather, the Roman Catholic discourse on these practices often appeals to scripture, specific virtues derived from Thomistic principles, and notions of social order and the common good.

Despite the popularity and long history of decorative body arts, few mentions of them may be found in apostolic letters, encyclicals, bulls, or papal addresses. A rare case is a decree by Pope Hadrian I (772-775) declaring an early ban against the practice of tattooing.[168] The ban was aimed at the use of pagan tattoos and imagery. Historically the technical prohibition on tattooing by the church during the eighth-century was loosely observed at best, as the practice was generally not considered a form of self-mutilation (clerical castration had been summarily banned by Council of Nicaea in 325 CE).[169] While tattooing is an invasive procedure which may appear to have characteristics of mutilation in its use of dermal injections, it does not meet the criterion of being functionally destructive. Tattooing was, in fact, commonly practiced by Anglo

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[167] See de Chardin (1950); John Paul II (1984), *Salvifici Doloris* (On the Christian Meaning of Human Suffering); Kreeft (1986); Kane (2002); Garcia (2006).
[168] See Cubitt (1995).
[169] See Leclercq (1911); As Armondo Favazza writes in *Bodies Under Siege,* with regards to this type of self-mutilation, "prohibition became the official position of the Roman church forever after" (1987, 149).

Saxon and Celtic Christians, as well as by the Eastern Orthodox and Coptic branches of Christianity.[170] In his *Tattoo History: A Source Book*, Steve Gilbert notes numerous findings by German scholar Franz Joseph Dolger, who completed a thorough exploration of early Christian records of religious tattooing. Dolger writes, "An edict issued by the Council of Calcuth (Northumberland) seems to indicate a distinction between a profane tattoo, and a Christian tattoo. They wrote, 'When an individual undergoes the ordeal of tattooing for the sake of God, he is to be greatly praised. But one who submits himself to be tattooed for superstitious reasons in the manner of the heathens will derive no benefit therefrom'" (Gilbert, 2001, 150). Beyond these scant references to decorative body arts, no papal letter, address, or encyclical has directly commented on tattooing, piercings, or other decorative body modifications.

1) Applications of the *Catechism* and virtues

To understand Roman Catholic responses to tattoos, piercings, and other common decorative body modifications, it is useful to turn to the modern version of the *Catechism of the Catholic Church* (*CCC*) and related documents or pronouncements. The *CCC* is magisterial in origin and is the official teaching text of the Church, promulgated by John Paul II in his Apostolic Constitution *Fidei depositum*. It is, as the text states, the "valid and legitimate instrument for ecclesial communion and a sure norm for teaching the faith" (4.1). The *CCC* is delivered in four parts, the contents of which are abundantly footnoted with references to Roman Catholic teaching sources: scriptures, patristic and medieval theologians, decisions of the ecumenical councils, and recent authoritative papal statements. As a set of questions and answers to modern living and as a foundation for Roman Catholic religious instructors, the *CCC* is used as a point of reference and

[170] See Montague & Grira (2010); BMEzine.com (2011).

guide by Catholics around the world and, as we shall see, is often the central focus in Catholic discussions regarding decorative body arts.

On a basic level the *CCC* (#2297) forbids unwarranted amputations and mutilations, labeling both as morally wrong. This declaration could apply to many decorative body modifications if one assumes that such procedures are mutilative in nature. However, the statement is truly aimed at criminal circumstances (such as kidnapping and hostage taking) wherein torture by bodily mutilation is threatened or used. Since the *CCC* holds no overt prohibition regarding decorative modifications, we find that its use of various virtues as guidelines for behaviour is more germane to specific procedures.[171] As we will outline, various Catholic groups either justify or inhibit specific decorative body modifications by appealing to virtues such as modesty and obedience, as well as values such as bodily integrity and risks to human health, directly citing the *CCC*. As such, we will first briefly examine the foundations of such virtues and outline their contribution to twentieth-century magisterial assessments of body adornments.

The *CCC* expresses concern about forms of body fashion, behaviour, and exploitation by referring to the virtue of modesty:

> There is a modesty of the feelings as well as of the body. It protests, for example, against the voyeuristic explorations of the human body in certain advertisements, or against the solicitations of certain media that go too far in the exhibition of

[171] As Aquinas explains: when we are treating of virtues in general we are defining virtue as "that which makes its possessor good, and his work good likewise" (I-II, 55, 3; I-II, 56, 1). Ultimately, the end of moral virtues is human good (Q.47 A.6), which Aquinas derives in part from previous explanations of virtue as forwarded by Pope Gregory I (*Magna Moralia*, II A.49).

> intimate things. Modesty inspires a way of life which makes it possible to resist the allurements of fashion and the pressures of prevailing ideologies. (#2523)

Modesty itself is not considered one of the traditional four cardinal virtues; rather, as derived from patristic and medieval Roman Catholic sources, it exists as a subset (along with abstinence and chastity) of temperance.[172] As expressed by Aquinas, "there is need for a virtue to moderate other lesser matters where moderation is not so difficult. This virtue is called modesty, and is annexed to temperance as its principal" (*SSP* Q.160 A.1). Modesty is less prominent than temperance in that the former is more concerned about weaker passions whereas the latter, strong passions (Q.160 A.1. R.2).[173] It is nonetheless found to be necessary in all things (Q.160 A.1. R.2) and is subdivided into four applications: the movement of the mind towards some excellence as moderated by humility; the desire of things pertaining to knowledge, moderated by studiousness; the regard of bodily movements and actions, required to be done becomingly and honestly; and the fourth regards outward show, for instance in dress and the like (*SSP* Q.160 A.2). This fourth application of modesty is most relevant in cases of decorative body modifications such as tattooing and piercings since today such procedures are commonly grouped as a trend of fashion—decorative, driven by styles, and subject to individual taste.

This definition has changed little across the ages, as demonstrated by Catholic apologist John Delany's description of modesty as "the righteous habit which makes a man govern his natural appetite for pleasures of the senses in accordance with the norm

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[172] For example, Tertullian poetically dubbed modesty "the flower of manners, the honour of our bodies, the grace of the sexes, the integrity of the blood, the guarantee of our race, the basis of sanctity, the pre-indication of every good disposition; rare though it is, and not easily perfected…" (1885).

[173] As per Delany's definition, the virtue of temperance is that righteous habit which makes a person govern their natural appetite for pleasures of the senses in accordance with the norm prescribed by reason.

prescribed by reason" (1912, ¶1). Delany further describes modesty in his contribution to the *Catholic Encyclopaedia* as,

> …holding in reasonable leash of the less violent human passions. …[modesty] guards [a person] against the radical malice of pride. … In the government of the exterior of a man modesty aims to make it conform to the demands of decency and decorousness…. Such things as his attire, manner of speech, habitual bearing, style of living, have to be made to square with its injunctions. To be sure this cannot always be settled by hard and fast rules. Convention will often have a good deal to say in the case, but in turn will have its propriety determined by modesty. (1912, ¶2)

A unique example of papal opinion regarding modesty and fashion is found in the November 8, 1957, address of Pope Pius XII to a Congress of the "Latin Union of High Fashion". Directed at the rising hemlines and plunging necklines which were (and in many places still are) a cause for consternation, particularly when visiting religious holy-sites or in worship services, these comments reflect the Church's awareness of changing styles in body adornment and interpretations of beauty. As reported in *L'Osservatore Romano*, November 9, 1957, Pius XII directed his remarks to the moral aspects of trends in fashions (specifically women's fashions), identifying the three purposes of fashion as the promotion of hygiene, decency, and adornment. These last two purposes provide for the most parallels if we expand the scope of fashion to include common decorative body modifications. While hygiene is linked to aspects of health, interpretations of decency and body adornments (as we shall see) have a greater spectrum of acceptability. The Pope noted early in his address that "[i]n order to avoid restricting the scope of this third requirement to mere physical beauty and, even more, to avoid associating fashion with

lust for seduction as its first and only reason, the term adornment is preferable to beautification. This penchant for the adornment of one's own person clearly derives from nature, and is therefore legitimate" (1957, ¶2).

As a brief summary, Pius XII recognizes several aspects of adornment and gives recommendations with reference to several virtues. He notes how trends in clothing and fashion are situational and generational—youth seek "attractiveness and splendor that sing the happy themes of the spring of life, and which facilitates, in harmony with the rules of modesty, the psychological prerequisites necessary for the formation of new families" (¶3)[174], while "those of mature age seek to obtain from appropriate clothing an aura of dignity, seriousness, and serene happiness" (¶3). He also suggests that body adornment "consists in the harmonious reconciliation of a person's exterior ornamentation with the interior of a 'quiet and modest spirit'" (¶4), further explaining that the Church does not "censure or condemn styles when they are meant for the proper decorum and ornamentation of the body, but she [also] never fails to warn the faithful against being easily led astray by them" (¶4). In order to ensure that an individual does not rely on hedonistic motivations in choosing body adornments, the Pope reminds the faithful that the Church "knows and teaches that the human body, which is God's masterpiece in the visible world, and which has been placed at the service of the soul, was elevated by the Divine Redeemer to the rank of a temple and an instrument of the Holy Spirit, and as such must be respected" (¶5). A trend in adornment would thus be deemed illicit if the intent of the maker or user was evil in nature; for example, to "create unchaste ideas and sensations" (¶5); "[m]oderation, above all," he writes, "must provide

[174] Interestingly and perhaps typical of Pian-era opinions, family-orientated procreative reasoning is never far from moral judgements regarding young persons.

a pattern by which to regulate, at all costs, greed for luxury, ambition, and capriciousness" (¶6).

In addition to modesty, Pius XII's comments denote the virtue of prudence which, like modesty, is used in modern Roman Catholic judgments concerning decorative modifications.[175] According to Aquinas, prudence implies direction to some appetible end (Q.55 A.1 R.53), is in a certain sense called 'wisdom' (Q.47 A.1 R.2), and is right reason applied to action (Q.55 A.3). Delany outlines this particular virtue as "an intellectual habit enabling us to see in any given juncture of human affairs what is virtuous and what is not, and how to come at the one and avoid the other" (1911b, ¶1).[176] Additionally, as prudence is a rational endeavor used to judge all our actions, it blankets all the moral virtues. As Delany notes, it is not aimed at perfecting the will, but rather "the intellect in its practical decisions" (¶191b, 1). Since prudence applies to all the virtues, its absence will cause the best intentions to go astray: "[t]hus, without prudence bravery becomes foolhardiness; mercy sinks into weakness, and temperance into fanaticism. But it must not be forgotten that prudence is a virtue adequately distinct from the others, and not simply a condition attendant upon their operation" (Delany, 1991b, ¶1). Yet Aquinas contends that prudence "above all requires that man be an apt reasoner, so that he may rightly apply universals to particulars, which latter are various and uncertain" (Q.49 A.5 R.2). Herein we find the peril, for while intentions may be virtuous, if one fails to be an "apt reasoner" the outcomes of one's actions may not be good.

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[175] Although one can argue that temperance may also be implied, his comments on seriousness and maturity in choices of modest adornments are more suggestive of prudence.
[176] See also Lehmkukl (1887); Rickaby (1896) (1908).

To aid in the correct application of prudence and modesty we often find the virtue of obedience cited in Catholic debates regarding common decorative modifications. Differentiated from 'canonical obedience', which is aimed at religious orders, ordinary obedience is the habitual complying with a command or precept and is a part of the virtue of righteous conduct (Delany, 1911a, ¶1).[177] This description is derived from the *Summa* wherein obedience "proceeds from reverence, which pays worship and honor to a superior, and in this respect it is contained under different virtues, although considered in itself, as regarding the aspect of precept, it is one special virtue" (104, A3, R1). As to reasons for obedience, the virtuous habit is considered by Aquinas as "an obvious consequence of the subordination established in the world by natural and positive law" (Delany, 1911a, ¶1).[178] Or, as Aquinas explains, "Wherefore just as in virtue of the divinely established natural order the lower natural things need to be subject to the movement of the higher, so too in human affairs, in virtue of the order of natural and divine law, inferiors are bound to obey their superiors" (Q.104 A.1).

In Roman Catholic moral theology, disregarding any of the virtues is irresponsible, possibly leading to scandalous behaviour, improper actions, and a variety of sins. An analysis of the Roman Catholic interpretations of moral faults and their associated penalties is outside our limited scope, but it is generally vainglory (pride) with its subset of vanity which is most often cited in prohibitions against various decorative modifications.[179] Pride is considered a species of contempt of God, termed one of the blackest of sins by Aquinas, which, as Delany notes, surfaces when "the creature refuses

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[177] See Vermeersch (1911); Aquinas (*ST* 104).
[178] As to whom we are to obey, Delany comments that "there can be no doubt that first we are bound to offer an unreserved service to Almighty God in all His commands" (¶1).
[179] Theologians and Church leaders such as Ponticus, Gregory I, and Aquinas all contributed to descriptions of specific sins; See Aquinas (*ST* I-II: 84:4).

to stay within his essential orbit" (1911c, ¶1). Widely considered the most serious of the traditional seven sins, pride manifests itself in vanity and narcissism. In the *Modern Catholic Dictionary,* John Hardon summarizes vanity as "associated with an exaggerated importance attached to multiple details, especially external appearances, which in no way contain the value attributed to them. It is ostentation in fashion, wealth, or power..." (1999, ¶1).

While a respect for virtues is an important component in Roman Catholic opinion on tattooing and piercing, commentators display differences in judging which actions or images are scandalous in nature and the breadth of corresponding (if any) disobedience. As we shall show, certain reviewers either warn of, or indict, these modifications as overtly soliciting scandal by way of shocking imagery or specific immodest body locations. In terms of definition and use, *CCC* #2284 warns of scandal to the self and to others and labels it as: "an attitude or behavior which leads another to do evil. The person who gives scandal becomes his neighbor's tempter. He damages virtue and integrity; he may even draw his brother into spiritual death. Scandal is a grave offense if by deed or omission another is deliberately led into a grave offense." In addition, *CCC* #2285 states: "Scandal takes on a particular gravity by reason of the authority of those who cause it or the weakness of those who are scandalized." And *CCC* #2286 adds: "Scandal can be provoked by laws or institutions, by fashion or opinion." Precise definitions as to what constitutes an action, image, or attitude as scandalous are vague, apart from the notion of tempting others into immorality. Given that scandal is borne from the actions of tempting others, one might conclude that its gravity may be limited if the temptation is resisted or otherwise ignored. Such an assumption, however, misses the spirit of the original action, for, successful or not, the scandalous act, attitude, or image

must have been immoral in itself regardless of its effect on others. In addition, scandal is deemed more acute in proportion to an individual's position or authority, and may be applied to a wide variety of scenarios.

Along with virtues, current commentaries on decorative body modifications referencing the *CCC* refer to concerns about human health. Roman Catholics using the general precepts put forward by the *CCC* relating to human health rarely have divergent interpretations of its meaning, unlike scandal. *CCC* #2288 defines life and physical health as precious gifts entrusted by God. In addition, our responsibility to care for both extends beyond the self by "taking into account the needs of others and the common good." From a Roman Catholic perspective, risk to health is thus a key consideration in determining whether a decorative body modification is legitimate; any procedure which exceeds normal standards of risk would thus be considered suspect.

2) Unofficial Roman Catholic positions

Given Roman Catholic teaching on the various virtues and the contributions of the *CCC*, we now turn to specific unofficial public Roman Catholic recommendations regarding common decorative body modifications. As previously discussed, cosmetic modifications appear to have Church sanction provided that a number of traditional and modern bioethical guidelines are followed. However, approval for decorative body modifications is less certain. This may be illustrated by comparing two opinions about decorative body modifications, both of which are non-magisterial in nature but publicly presented as guides for Catholics considering tattoos or piercings. The first is a conservative Roman Catholic opinion expressed by Father Peter Joseph, a contributor to

the traditionalist publication *Latin Mass Magazine*;[180] the second, a review of tattooing from Catholics United for the Faith (CUF), an international lay apostolate founded in 1968 by H. Lyman Stebbins to support, defend, and advance the efforts of the 'Teaching Church' in accord with the teachings of Vatican II.[181] Each of these opinions is representative of a segment of the Roman Catholic Church today, reflecting Tridentine and Post-Vatican II ideologies respectively. Both are unofficial in terms of magisterium, and yet both appeal to official Roman Catholic doctrine as previously outlined.[182]

Fr. Joseph writes at length on the negative aspects of tattooing and piercings that should concern Roman Catholics. In his article *The Morality of Tattoos and Body Piercing* we find a series of arguments to discourage any such activity, a 'top-ten' list of reasons against body modifications:

> 1. *Diabolical images*. Tattoos of demons are quite common, yet no Christian should ever sport an image of a devil or a Satanic symbol.
> 2. *Exultation in the ugly*. This is a mark of the Satanic, which hates the beauty of God's creation and tries to destroy it and to ruin others' appreciation of it. More than just being ugly, some body piercing is the expression of delight in being ugly.
> 3. *Self-mutilation and self-disfigurement*. This is a sin against the body and against the Fifth Commandment. Some body piercing verges on self-mutilation. At best, multiple body piercing is self-inflicted abuse. A form of self-hatred or self-rejection motivates some to pierce themselves or decorate themselves in a hideous and harmful fashion. The human body was not made by God to be a pin cushion or a mural.
> 4. *Harm to health*. Doctors have spoken publicly on this health issue. In 2001,

[180] The self-described *Journal of Catholic Culture and Tradition* seeks "to offer an antidote to the universal phenomenon of an accelerating secularism that is hostile to the One True Church and the salvific charge given to it by our Lord. To disseminate through a variety of disciplines the fullness of Catholic culture and fight against the corrupting influence of the compartmentalization of knowledge. [It] aim[s] to develop the *Latin Mass* journal into the intellectual arm of Catholics working for the return of the Church to tradition and authentic organic development" (Latin Mass Magazine, 2006, ¶3).

[181] Catholics United for the Faith "is organized as a private association of the lay faithful in accord with the discipline of the Catholic Church. It is incorporated in civil law as a Minnesota non-profit corporation duly registered in the State of Ohio. CUF's organizational structure includes: a governing board of directors, an executive committee of that same board, officers, and departments. Each level within the structure is entrusted with certain functions and authority as established in the association's statutes, articles of incorporation, and by-laws" (CUF, 2006, Mission Statement ¶2).

[182] Both are also rare examples of Catholic reflection on the specific topic of common body modifications.

researchers at both the University of Texas and the Australian National University reported on harm to health caused by tattoos and body piercing. Some earrings (on the navel, tongue or upper ear) are unhealthy and cause infections or lasting harm such as deformities of the skin. They can also poison the blood for some time (septicemia). Certain piercings (e.g., on the nose, eyebrows, lip, tongue) do not close over even when the object is removed. Such body piercing, therefore, is immoral, since we should not endanger health without a reasonable motive.

5. *A desire to shock and repel*. It can be appropriate to shock people, as for example, when one recounts the plight of poor and hungry people, or protests against crimes or terrible exploitation. This can be a healthy thing, when done properly and with due care, to arouse people out of complacency, so that they realize something must be done. But to shock people for the thrill of shocking people, with no intention to promote truth and goodness, is not a virtue, but a sign of a perverted sense of values.

6. *Indecency and irreverence*. It is always immoral to get or exhibit tattoos of indecent images or phrases, or derisive figures of Our Lord or His Mother or holy things.

7. *Signs of a sexual disorientation*…. In the 1970s, an earring worn by a man in the left ear, or the right, or both, was a code-sign of his personal orientation and thus a form of picking up partners. As such, it was blatantly immoral, and generally an advertisement of one's immorality.

8. *Unsuitability*. Sometimes people tattoo themselves with a big image of a crucifix or other holy pictures. The human body is a most unsuitable place for such an image, even if it be a beautiful one. Whenever these people go swimming, for example, they are exhibiting this image in an inappropriate fashion. No priest would ever go down to a shopping center in Mass vestments, not because there is something wrong with vestments, but because there is a time and a place for donning special religious symbols.

9. *Vanity*. Some men in particular tattoo their upper and lower arms in order to be ostentatious and impressive. It is a means of drawing attention to themselves. No one who meets them can fail to notice the tattoos—to the point at which it is in fact a constant distraction. It detracts from the person, and focuses attention too much on the body's external appearance. The same can be said for a stud on the tongue, a ring in the nose, or earrings all over one's ears and eyebrows.

10. *Immaturity and imprudence*. An action acceptable or indifferent in itself can become wrong if the intention or motive is wrong. Some young people adopt outrageous fashions out of an immature desire to rebel against society or against their parents. Such disobedience against parents is sinful. Some do it out of an immature desire to conform to their friends, and others out of an equally immature desire to stick out from everyone around them. Some do it out of boredom, because it is something different, because it gives them a thrill, because it is something for their friends to admire and comment on.

Universal Criteria: In any culture, things can arise, become acceptable, and become part of the culture—but this does not necessarily make them right…. Let us never fall for the ploy that tries to argue from borderline or difficult cases that

> there are no guidelines or principles, and that there is no such thing as a just mean or moderation, just because they are hard to define. (Joseph, 2002, ¶1-10)

Fr. Joseph's guidelines incorporate several of the principles derived from patristic and medieval sources as well as appeals to the virtues. His guidelines are also in keeping with those put forward by Pius XII. However, his addition of such judgments as immaturity (#10) or the exaltation of the ugly (#2) bring moral and aesthetic opinion into the debate, illustrating differences in sensibilities and desires for convention. While some of the 'top-ten' reasons recall such sins as narcissism or arrogance, others, such as the body being an unsuitable place to display artistic designs or statements of belief, appear to be based on conservative social conventions of fashion. Although some may charge that Fr. Joseph's list is mostly based upon private interpretation and is highly polemical, several points are not without corroborative data. For example, point #10 cites disobedience and rebellion: as Samuel et al., note, 9% of tattooed patients admitted that their first tattoo had been acquired while under the influence of alcohol or drugs (2001, 475).[183] However, more germane to our examination is the example his list provides in representing a branch of Catholicism decidedly against the application of such body modifications, by reason of modesty, obedience, and prudence, which speak to traditional views of stewardship of the human body and human dignity, viewed as gifts of the Creator.

As a comparison with Fr. Joseph's 'top ten' points we turn to a set of guidelines published by CUF and directed to Roman Catholics seeking decorative body modifications. We will consider how the CUF guidelines approach the topic, to what extent they appeal to the same principles or values as Fr. Joseph's 'top ten' points, and

[183] See to Kotch et. al.'s study of body art, deviance, and American college students (2010).

why they differ. A point-by-point comparison between Fr. Joseph's 'top-ten' points and CUF's guidelines would indicate certain commonalities; however, several key features differ stemming from the groups' interpretive differences of Roman Catholic bioethical sources. By examining these features we may present those which find common interpretation and, in turn, use such answers to assess which sources of Roman Catholic bioethics hold more importance as decorative common body modification guidelines.

Rather than presenting an itemized list on the morality of tattooing, CUF sets out a series of questions persons should consider when seeking decorative body modifications and discusses the relevance of major sources of Roman Catholic moral theology on such modifications. Whereas Fr. Joseph chiefly draws on biblical sources in order to prohibit decorative body modifications, CUF explores the extent to which a given biblical passage may in fact be relevant in the present context:

> Some … have argued that the Bible forbids tattoos and body piercing. They typically cite the following verse: 'You shall not make any cuttings in your flesh on account of the dead or tattoo any marks upon you: I am the Lord' (Lev. 19:28). References to this verse are not present in important magisterial documents and in the principal writings of the Fathers of the Church. It is the consensus of Catholic biblical commentators that this prohibition is not part of the unchanging moral law, but part of the ritual law specific to the Old Testament. Many commentators believe that this prohibition was intended to separate Israel from its Canaanite neighbors; some believe that the cuttings in the flesh and tattoo marks to which the verse refers were part of idolatrous Canaanite worship. The context of the verse favors this interpretation. The preceding verse reads, 'You shall not round off the hair on your temples or mar the edges of your

> beard' (Lev. 19:27)—this prohibition is certainly not applied to members of the Church. The Church does not teach that Sacred Scripture forbids tattooing and body piercing, but the Church does offer principles by which to discern whether, in particular situations, it is sinful to be tattooed or have one's body pierced.[184] (CUF, ¶2)

As we have already noted in our overview of the sources of Roman Catholic bioethical reflection, literal biblical interpretations are rarely used to address specific contemporary bioethical issues. Rather, Roman Catholic bioethics places greater emphasis on contemporary theological and magisterial concepts such as clarity of intent and human reason, stewardship and risks to health, and concepts of social justice, to answer ethical quandaries. The CUF guidelines reflect this prevailing approach and ultimately advise readers that "[t]attoos and acts of body piercing are not intrinsically evil" (¶1).

There is perhaps more affinity between Fr. Joseph's position (if not his rhetoric) and the CUF guidelines on the value of preserving one's health. The CUF guidelines cite the virtue of prudence in relation to *CCC* #2288 and #2297, explaining:

> Prudence dictates that persons considering tattoos or body piercing research any health risks that may be involved. If a particular act of tattooing or body piercing entails a likely risk to health, it would be more or less sinful depending upon the gravity of the risk. If a particular act involves mutilation—if the act renders a bodily organ unable to perform its function—the act is immoral. (CUF, ¶7)

[184] Such a position is echoed in many secular approaches to decorative modifications. For example, Steward, who comments on Leviticus 19.28 and Galatians 6.17 in *Bad Boys and Tough Tattoos*, notes that "Saint Paul may be speaking figuratively; there is no way of knowing. On the other hand, the context might very well denote the 'protective' mark which kept Cain alive" (1990, 153).

Although numerous health problems may result from common decorative modifications, improper hygiene during and after the procedures contribute to the vast majority of incidences.[185] This does not dismiss all risk, as illustrated by documented cases of life threatening complications.[186] However, such statistically minor risks are not as much of a concern in terms of a Roman Catholic bioethical response as the destruction of function.[187]

As CUF notes, "In most cultural contexts… [having] ears pierced is compatible with respect for health and bodily integrity, charity, and respect for the souls of others" (¶13). Yet cases of decorative modifications involving skin-piercings often have a heightened sensitivity to the criteria of functionality. More so than tattooing, piercings have a particular association with the principle of mutilation on the grounds that the function of an organ or sense may be impeded by the physical damage done during the piercing process. While conventional piercings involve minimal perforations to the skin, mucosa and often the underlying cartilage, other forms may, as outlined by de Cuyper (2010), entail increased damage. We shall discuss specific examples of such uncommon decorative modifications in the next section of this chapter. Unlike Fr. Joseph's list, CUF's statement also emphasizes the maintenance of future functions. This is an application of the Roman Catholic priority of good health beyond immediate risks; if

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[185] Given proper standards, common risks such as blood borne diseases and bacterial infections caused by streptococcus pyogenes and staphylococcus aureus, pyogenic granuloma, chondritis, pseudomonas aeruginosa and staphylococci are limited; as are after effects such as keloids, contact dermatitis, and advanced scarring (de Cuyper, 48).

[186] Such as complications due to Ludwig's angina, sepsis, pneumonia, glomerulonephritis and toxic shock syndrome (de Cuyper, 48).

[187] Current dermatological studies indicate that the most common complications brought on by tattooing include eczematous to lichenoid eruptions, streptococcus pyogenes, staphylococcus aureus, erysipelas, cellulitis, sepsis, and spinal abscess infections, gangrene, and blood borne diseases such as HIV. However, all are statistically low in properly maintained and licensed establishments where autoclaves, antibiotics and sterile conditions are common practice enforced by law. See Korman, Grayson & Turnidge (1997); Handrick et al., (2003); Kazandjieva & Tsankow (2007).

function is preserved for the moment but endangered for the future, justification is jeopardized. Prudence must then consider any consequences to bodily functions by reason of aesthetic choice, particularly as stewardship of one's life is (ideally) long-term.

CUF also speaks of maintaining integrity of the body when tattooing or piercing, but there is a marked, albeit subtle, difference between its application and Fr. Joseph's. Fr. Joseph warns that tattoos and piercings violate integrity by self-mutilation, citing the reasons of self-inflicted abuse, self-hatred, or self-rejection as motivators. CUF appeals to the *CCC* #2258, an instruction outlining the sacredness of life, and incorporates a short list of questions when considering these modifications. The questions are simple, designed for personal reflection upon motivations and concern for others who may be offended by such aesthetic choices. Additionally, CUF introduces the criteria of 'common good' into the debate, indicative of a post-Vatican II response to social justice issues. This is highlighted in their appeal to *CCC* #2288, which instructs that concerns for health are a social responsibility wherein God's gifts of life and health must take into account the needs of others and the common good. Similarly, CUF encourages persons to ask themselves, "Can the expense involved be justified in light of the needs of my family, the Church, and the poor?" (¶12). At the same time, CUF notes that certain body modifications may be endorsed in cultural situations which embrace the convention: "Catholics must also consider the common good when they decide whether to be tattooed or have their bodies pierced. In certain instances—for example, in indigenous cultures in which tattooing is a rite of passage to adulthood—the common good practically demands that a person be tattooed" (CUF, ¶8). This is not to say that CUF necessarily advocates decorative body modifications in all societies; indeed, CUF notes how in the West

convention generally does not call for such procedures (¶8).[188] Nevertheless, CUF's regard for cultural interpretation, social convention, and even distributive justice is mostly absent from Fr. Joseph's 'top ten' list.

While the two approaches emphasize differing Roman Catholic sources, they converge in their consideration of intent and imagery—un-Christian, derogatory, or shocking representations being prohibited. CUF agrees that if the act of modification itself has the intent of evil (see item 5 on Fr. Joseph's list), made solely for the purpose of insult or malice, then the modification is not made in good will, thereby rendering the act illicit:

> Even if a tattoo's words and images are not uncharitable in themselves, the act of obtaining a tattoo can be rendered immoral if done so with an evil intention—for example, in order to spite one's parents or society (*CCC* #1752). Persons considering body piercing should also be aware of the implicit messages that the particular act of piercing conveys in a particular time and place. Some acts of body piercing can imply approval for the immoral homosexual lifestyle. Other acts of body piercing can imply active participation in, or a desire to participate in, other unchaste acts. In such cases, the acts of body piercing are immoral

[188] This focus is similarly echoed in Rev. Lukosh's article "Physical Graffiti: Tattoo You? A Catholic perspective on Body Art" in *Envoy Magazine* which attempts to answer moral questions on tattooing's impact on society as a whole (in conjunction with concern for Catholic family life). As with our previous examples, Lukosh—a Catholic deacon in the Archdiocese of Portland Oregon—looks to various sources of Catholic tradition to answer moral questions regarding decorative body arts. Yet Lukosh refutes the perception that tattooing today (particularly in Western cultures) is motivated by its original principles such as religious or spiritual contexts, having succumbed to acculturation on the economic, social, cultural, and artistic levels, largely emptying body art of its former religious, educational and aesthetic content (n.d., 22). In such an interpretation the social dimension of modern tattooing is at best misguided, at worst fraudulent, in that it does not represent by intent or function the same purpose it once held in foreign or antiquated cultures. However, such a critique minimizes a society's continuity of change, ability to appropriate from other cultures, and adaptability, as well as generalizing the motivations of modern tattoo aficionados to inferior or false reproductions of past cultural reasons.

> because they appear to manifest an approval of sin and thus scandalize others. (CUF, ¶10)

This point of agreement centers on the warning against a piercing's implication of participation in unchaste acts, specifically homosexual behaviour, which is labeled by both groups as immoral and referenced to *CCC* #1868 and #2284 by CUF. Such a specific condemnation of homosexual association is, in fact, not overtly addressed by *CCC* #1868 or #2284, which speak to an individual's responsibility for sins committed by others when we cooperate in them, and (as previously noted) the offense of scandal by deed, omission, or by tempting others. A more precise traditional Roman Catholic criticism against homosexuality is given in *CCC* #2357, wherein natural law serves as a basis for the Church's disapproval. However, as the Church also deems that homosexual desires are not in themselves sinful, "people tempted by homosexual desires, like people tempted by improper heterosexual desires, are not sinning until they act upon those desires in some manner" (Brom, 2004, ¶2). Further, "[homosexuality's] psychological genesis remains largely unexplained" (*CCC* #2358); homosexuals are called to embrace the virtue of chastity (*CCC* #2359) and every sign of unjust discrimination in their regard should be avoided (*CCC* #2358). As such, we are left with some contradictory material; both groups counsel against certain piercings which may imply homosexuality (deemed immoral) and yet their same oft cited source, the *CCC*, calls for non-discrimination and welcomes homosexuals who take up chastity.

Perhaps more important to our specific examination is the apparent datedness of both Fr. Joseph's and CUF's reading of the association of piercings with homosexual behaviour. While ear piercings increased in popularity among North American homosexual subculture after World War II, today such specific associations are

considered obsolete if not moot.[189] As such, while common to both groups, prohibitions based upon assumptions of sexual identity need not be included in any collective list of guidelines to common decorative modifications.

Fewer problems are found in the second point of commonality between CUF and Fr. Joseph's positions, that of provocative imagery in tattooing. CUF holds that "tattoos whose words and images celebrate the demonic, are unchaste, or otherwise offend against charity are immoral" (CUF, ¶9)—a position which mirrors many of Fr. Joseph's points (1, 2, 5, 6, 8). Difficulties in evaluating an image as demonic or unchaste are relatively minimal, as such depictions have clear characteristics; however, consensus as to which modifications offend charity will vary.[190] While individual interpretation differs, Roman Catholic directions include a variety of guidance as to the importance of beautiful imagery, in contrast to immoral imagery. For example, *CCC* #1162 cites St. John Damascene (*De imag.* 1,27: 94,1268A,B) on imagery in the liturgy: "The beauty of the images moves me to contemplation, as a meadow delights the eyes and subtly infuses the soul with the glory of God." Although such references are aimed at religious art (*CCC* #2502) more than conventional imagery, nonetheless the Church endorses artistry as a form of practical wisdom, uniting knowledge and skill, a distinctively human form of expression, beyond the search for the necessities of life (*CCC* #2501). As the Church gives no specific recommendation in evaluating imagery, apart from reasonable judgments made in good conscience, a broad definition (as in *CCC* #1866) would be to classify a vice according to the virtues it opposes (pride, avarice, envy, wrath, lust,

[189] See Hall (1991); Porterfield (2003); Vogue (2005); Bmezine.com (2010).
[190] Indeed, Lois Magner's *A History of Medicine* claims that when looking at the decorative motifs applied to the body, objectivity is impossible (2005, 14).

gluttony, and sloth or acedia). Thus depictions which appear to glorify any of the vices may be deemed unsuitable.[191]

C. Roman Catholic approaches to uncommon non-enhancing decorative body modifications

In addition to the common decorative modifications we have just discussed, there is a wide variety of procedures that are less common and more radical.[192] Like common modifications, uncommon modifications are historically rooted in Australian, African, and American Indian tribal customs such as initiation rites or indicators of social rank (Pérez-Cotapos, 38). But unlike common modifications, the more extreme uncommon modifications entail multiple sites, differing incision sizes, and often stretched or heavily-altered body locations. Pocketing or embedding involves making a hole into the skin or the mucosa and implanting the larger part of a material through the defect into the subcutis. Flesh tunnels (tunnelling or gauging) result from progressive widening of the opening with insertion pins, tunnels or plugs of increasing diameter. Stapling and corset piercing in a ladder-like distribution is mostly done on the chest or in the genital area.[193] JewelEye*,* introduced in the Netherlands as a new fashion trend in 2004, entails specially developed jewels implanted in the conjunctiva of the eye (44). These uncommon modifications also include patterns of scarifications, brandings, flesh-removals, and unique body sculpting techniques. In order to obtain scarifications, "incisions are made in a manner that stimulates the abnormal growth of scar tissue in order to obtain a

[191] Per the *CCC*, people must encourage individual purity by avoiding "entertainment[s] inclined to voyeurism and illusion" (#2525).
[192] Such uncommon modifications are statistically below 10% of current surveyed groups. They are relatively low in popularity even amongst modification enthusiasts and have a higher degree of social stigma. See Pitts (2000); Bone et al., (2008); Jennings (2009).
[193] See de Cuyper (2010).

hypertrophic or keloid scar" (Pérez-Cotapos, 38). In cases of brandings, "third-degree burns are inflicted on the skin with the aim of producing permanent scars. Designs are created on the skin by burning caused by fire, cold, or by some chemical agents" (Pérez-Cotapos, 38). Body sculpting is extremely variable. As Pérez-Cotapos notes, common forms include tongue splitting—which is realized by tearing progressively a monofilament from the middle to the top of the tongue; ear pointing—a surgical procedure to create "elf-like" ears; extreme variants such as intentional amputation of fingers and toes; and transdermal implants with spikes protruding through the skin and subdermal implants of bone plates or horns to create bizarre shapes (39).

As displayed in our Appendix, Images W through Z3, uncommon modifications entail substantial losses to functionality and form, thereby raising the level of health risk above conventional medical standards, hygiene, and sterility. Irrespective of visual pattern or location, damage to the dermis after uncommon decorative body modifications may be permanently beyond repair. Since the epidermis and dermis have either been removed completely or severely injured, risks of skin infections are forever increased. In such cases, only the subcutaneous fat tissue layers remain intact, providing little protection from agitates. As outlined by Pérez-Cotapos in *Dermatologic Complications with Body Art*:

> As with the other forms of body art, scarification or branding is not a manifestation of a psychiatric disorder, but rather, a method of self-expression and a form of rebellion and provocation against the traditional and formal society. In addition, scarring and branding have been shown to be associated with substance abuse and high-risk behaviors among adolescents. (2010, 38)

Given the Roman Catholic position on mutilation, it is unlikely that a Roman Catholic approach could sanction uncommon decorative body modifications. Although, as Gallagher explains, mutilation is allowed when necessary for the good of the whole, and the principle of totality includes psychological good, in light of the risk to health, uncommon modifications cannot be justified from a Roman Catholic perspective. Although the gravity of mutilation depends upon the importance of the organ involved, the importance of skin cannot be underestimated.[194] The risk to health here is above the norm, and as such the principle of stewardship is violated. Additionally, from a Roman Catholic view, the virtues of prudence and modesty simply do not appear to be upheld by uncommon decorative modifications. Finally, although social and cultural convention has been recognized as a mitigating factor in judging decorative modifications, they would rarely apply to uncommon modifications. Indeed, given the physical exaggerations and differing locations of uncommon decorative body modifications in Western culture today, it has been claimed they do not accurately represent indigenous or historic primitive body art and have no cultural context apart from 'idolization'.[195]

D. Roman Catholic guidelines for non-enhancing decorative body modifications

From Roman Catholic guidelines related to cosmetic surgeries and decorative body modifications we can derive a list of principles which serves in judging these body augmentations. First, throughout we find an emphasis on stewardship, including the overarching importance of human health, the safeguarding of bodily functions (with an emphasis on reproductive purpose), and mindfulness of medical risks. This is consistent

[194] See Halloway & Jones (2005).
[195] See Lukosh (n.d.); Eubanks (1996); Perlingieri (2003).

with what Seltzer found with regard to cosmetic procedures and also concurs with a Roman Catholic notion of prudence. Second, discussions of cosmetic procedures and decorative body modifications highlight the importance of proper intent or motive. As in many Roman Catholic ethical questions, an individual's intent is of great importance to moral validity, though a good intent alone may not be sufficient for approval.[196] Modifications made out of malice, offence, deceit, or frivolity cannot be justified under a Roman Catholic rubric, as compared to modifications aimed at psychological improvement, displays of devotion, common cultural practices, and journeys for authenticity. Third, the virtues of modesty and obedience introduce specific considerations whereby one's responsibility to respect social and community sensibilities must be weighed against one's desire for adornments. For instance, modifications whose forms appear to exalt those sins which oppose virtues should be rejected. Fourth, in keeping with Roman Catholic teaching on both virtues and social justice, economic considerations must be factored in, particularly if the practical burdens of life for one's self or others outweigh the desire for a body modification. Lastly, all of these principles must be applied on a case-by-case basis.

From a Roman Catholic perspective such a list is justified not only from the collective agreements between sources but on the basis of obedience to the conception of human freedom as outlined in *CCC* #2526. This contrasts with secular approaches to libertarianism in that, per Roman Catholic teaching, "so called moral permissiveness rests on an erroneous conception of human freedom; the necessary precondition for the development of true freedom is to let oneself be educated in the moral law" (*CCC*

[196] See sections of the *CCC*: The Morality of Human Acts, #1750, 1752 & 1753; The Eighth Commandment, # 2484 & 2485; Respect for Human Life, #2263 & 2269; Respect for the Dignity of Persons, # 2286.

#2526).[197] In this way, the truth, as outlined by and according to the Church, may be followed in order to improve the moral and spiritual dignity of humans.

A practical way to anticipate how the above principles might apply to decorative modifications is, as suggested, to evaluate specific cases. The Appendix of Decorative Body Modification Images illustrates various decorative body modification procedures (all images are copyright Bmezine.Com unless otherwise noted).[198] Beginning with the tattoo, Images A through G present examples which clearly do not impede bodily function, nor exhibit text and imagery unacceptable to Roman Catholic sensibilities. Although variable in size, they present little in terms of shock value or a general definition of being inherently scandalous. Indeed, the artistic nature of the works implies devotional qualities and the tattoos are in regions of the body which may be readily covered to avoid offence. In these examples, health risks were minimal, as all were created in modern facilities following government health codes with sterile equipment. Client testimonials indicate a high degree of personal satisfaction and psychological gratification with these works, linked to religiously-oriented devotion.

In contrast, Images H through M do not meet the same standards. The designs seem contrary to Roman Catholic morals, highlighting diabolical figures or blending religious icons with violence. Questionable health practices have produced a high level of risk, as prison-fashioned tattooing instruments or unregulated needles were employed

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[197] For the purposes of our thesis we can define libertarianism as holding freewill and autonomy as fundamental principles in determining just social and individual action, advocating doctrines of self-ownership, and protection against interference from others, with a heritage of individuals limiting the power of the state.

[198] BME stands for Body Modification Ezine. BME contains the personal experiences of thousands of people all over the planet, in photo and text form. It serves to document the activities of the body modification community in as complete a fashion as possible. See Bmezine.com (2006).

during the process.[199] Motifs of gang violence, initiation, and affiliation indicate negative social motivations, employ socially unacceptable symbols, and even suggest ongoing danger to personal health if viewed by rival gangs. A specific example is seen in Image J which presents a swastika; although the swastika is a historic symbol with both Ancient Roman and Buddhist origins, it now has racist connotations associated with Nazism and white-supremacists. Given the above conditions, Images H through M cannot be justified from a Roman Catholic point of view.

As with tattooing, body piercings may best be judged on a case-by-case basis. Do they meet a standard of acceptability by presenting a minimal risk to health and follow social or cultural trends related to the common good and proper intent? As illustrated in Images N through Q, small-scale piercings have little effect on the functionality of a nose, ear, tongue or limb. However, in Images R-T, multiple-punctures to specific sites go beyond the limit of normal tissue repair. Even if removed, the scope of tissue damage is such that, barring corrective cosmetic surgery, the area will not retain original standards of human function. Of particular note is the example of nipple piercings (Images U & V); the process of multiple piercings has rendered the functionality of the nipple greatly damaged. From a Roman Catholic perspective, such functional mutilations have heightened concerns in cases of mothers with infants, as a woman's biological function of breast-feeding may be damaged (if not destroyed) due to impairment to the nipple, sulcus, and connective tissues to Montgomery glands. In such cases it may be argued from a Roman Catholic perspective that functional damage endangers the health of newborns and in so doing adds a new consideration to the debate:

[199] Threats of such work include syphilis, hepatitis, infectious organisms, allergic reactions to tattoo inks and pain or burning during magnetic resonance imaging examinations because of metallic pigments. See Limentani et al., (1979); Ko, Ho, et al., (1992); Long & Rickman (1994); Health Canada (1999).

a prohibition based upon maternal reproductive responsibility. Similar objections apply to modifications which impede the functioning of the nose and sinus (See Image R), as well as individual piercings of the fingers (See Image T), which cause difficulty with breathing, standard dexterities, and manipulations of human digits. Such uncommon decorative modifications often result in irreversible damage to nerves and tissues. While they do not display violent or anti-Christian motifs, they are unacceptable from a Roman Catholic perspective based upon arguments of function, modesty, and stewardship.

More so than piercings and tattoos, the uncommon modifications of scarifications, brandings, flesh-removals, and sculpting appear to violate acceptable levels of risk, proper intent, and basic virtues. As with extreme piercings, the considerable damage to function poses immediate and future health risks rendering such modifications as unjustifiable according to Roman Catholic morality. In addition, the "shock value" of such modifications would render them immodest, and the nonconformist nature of such procedures is associated with various vices deemed scandalous.[200]

Moral sanctioning of body modifications, be they surgical or not, is more than a matter of individual conscience and avoiding shocking or un-Christian imagery. As we have seen, there has been a shift within Roman Catholicism from approaching body issues solely by way of rules of totality or mutilation, as these traditions have been expanded and reexamined. Intent, social good, and stewardship (including safeguarding function and health) take priority in the argument. This is not to say that a definitive consensus on the differing forms of decorative body modification has been reached by Catholicism (or other Christian denominations). Indeed, we find that habitually conservative groups and those inclined towards a literal application of biblical texts still

[200] See Pitts (2000); Jennings (2009); Kotch (2010).

find any modification procedure (unless medically necessary) anathema. The differences between Fr. Joseph's and CUF's approach to tattooing and piercing are illustrative of these differences between traditional and liberal approaches to theological and moral questions. With an emphasis on biblical, patristic, medieval, and pre-Vatican II theology, the traditional Catholic groups most often view the world as an ordered and structured reality, static in origin, and best judged in the same form. Truth (both as a quality and in the revealed word) is seen as timeless, and certainty is achieved through strict definition and clear logic.[201]

From a more liberal Catholic perspective, this is an outdated ahistorical approach, with little appreciation for development of doctrine, pluralism in theology, or ambiguity in morality. Even so, the two approaches share several common elements: concerns for proper reasoning and motivation, risks to the body through disease or violence, and an acknowledgement of the gravity of such a decision. These moral justifications remain in flux, often leading to differing paths dependent upon religious alignments. Yet, taken as a whole, it appears that body modification as a form of adornment is ordered to the ultimate good of the person and to humanity if it observes modesty and avoids vanity, and if it respects the fundamental integrity of the human person—including the integrity of the body—and is thus morally permissible (Lukosh, 23).

There is continuity, then, in Roman Catholic approaches to the body, hearkening back to basic rules of stewardship and responsibility as explained in the principles of totality and mutilation and progressing through ecclesiastic pronouncements regarding risk and morality in modern medical procedures. Roman Catholic approaches to non-enhancing modifications thus give a set of definable and useful parameters which may

[201] See Daly (1980); Doyle (1992); McCarthy (1994); Stourton (1998); McClory (2000).

serve as guidelines for evaluating the morality of enhancing modifications. However, since such procedures are technically more complex and affect an individual beyond mere appearance, there are further issues and considerations which must be addressed from a Roman Catholic bioethical perspective. We turn to these in the next chapter.

Chapter 5—Roman Catholic approaches to enhancing body modifications

Beyond decorative body modifications, enhancement technologies allow for new versions of the body which, in turn, brings forward a combination of traditional and novel bioethical issues. As previously outlined, elements of the body may be reshaped and specific functions enhanced beyond species-based norms. A Roman Catholic approach to non-enhancing modifications appears to validate certain procedures, object to others, and addresses various controversial issues brought on by common and uncommon decorative practices. We have noted how this approach to decorative body modification and the principles by which it is judged are derived from a variety of Catholic sources and we have argued that it is reasonable to assume a similar Catholic methodology can be applied to enhancing modifications.

In this chapter we begin with an overview of current Catholic definitions of technology, corresponding issues, and related positions on experimental medicine and science aimed at increasing levels of human health or comfort. Following this, we consider major problems associated with enhancement technologies, including aspects of human vulnerability, commodification, distributive justice, eugenics, social fragmentation, and authenticity. Finally we combine our previous guidelines regarding non-enhancing modifications with the derived Catholic positions regarding enhancement issues in order to build a comprehensive approach to both. As compared to the previous chapter, cybernetic and nanotechnological enhancement technologies call for an

emphasis on the Roman Catholic sources of expert opinion, papal and magisterial input, and social justice more so than the scriptural, patristic, and medieval theological sources. This is, in part, due to their novelty, but since (as we have outlined) there is always an underlying continuity between sources we shall still encounter many of the previously outlined principles.

A. Roman Catholic perspectives on biomedical research and experimentation

Official Catholic positions have addressed the general topics of the morality of technology, computerization, and scientific progress. However, the emphasis has been on the social implications of technological advances and the potential for increased communication. For example, the statement by Pope John Paul II in connection with World Communications Day, May 27, 1989, *The Church Must Learn to Cope with the Computer Culture*, highlights the Church's enthusiasm for the use of computerized communications and urges youth culture to promote social morals via the same.[202] Such statements stem from a general Catholic approach to technology which insists that, while technology itself may be morally neutral, its application will always involve moral choice.[203] Thus scientific research and technological applications are not morally

[202] Pope John Paul II's statement emphasized that "the Church must also avail herself of the new resources provided by human exploration in computer and satellite technology for her ever pressing task of evangelization". Along with furthering the message of the Church through the newest methods of communication, the pontiff praised the ability of technology to "store information in vast man-made artificial memories, thus providing wide and instant access to the knowledge which is our human heritage, to the Church's teaching and tradition, the words of Sacred Scripture, the counsels of the great masters of spirituality, the history and traditions of the local churches, of religious orders and lay institutes, and to the ideas and experiences of initiators and innovators whose insights bear constant witness to the faithful presence in our midst of a loving Father who brings out of His treasure new things and old." In addition, he praised the youth of today and their ability to develop computer-culture to promote moral solutions and dialogue "among all the diverse races and classes who share this shrinking globe." Quoteing *Communio et Progressio* (#70), John Paul II advised that the Church "trust the young" and entrust to them the duty to "employ these new instruments" for the benefit of the Church and society.

[203] See *CCC* #2294.

unbiased. In addition, moral actions cannot be inferred from a technology's technical efficiency, or "usefulness [in] accruing to some at the expense of others" (*CCC* #2294). Accordingly, the Church encourages followers to use technology for the benefits of society while at the same time reminding individuals that the interior and spiritual dimension of life must be guarded and nourished with times of quiet reflection, meditation, and contemplation—which is increasingly difficult in the age of the cell phone and internet (Lombardi, 2008, ¶2).[204] This reminder was officially promulgated at Vatican Council II in the dogmatic constitution *Gaudium et Spes* wherein unfettered focus on technological progress and ambivalence towards seeking higher moral discovery is considered scientific hubris and a danger to humanity.[205]

In identifying enhancement technologies, current Roman Catholic definitions of cybernetics focus more on mental perceptions and an artificial intelligence's ability to form abstractions than on the integration of computerized elements into a human body. Wallace and Ledley attest to this briefly in their article on "cybernetics" in *The New Catholic Encyclopedia*, touching upon the broader uses of body modification when they define the role of the "cybernetician":

> The cybernetician is committed to a program of research in which animal and human means of communication are studied through the use of electronic and mechanical devices…. In order to bridge the gap, the researcher in this area must 'down-grade' living phenomena until they approach the level of the nonliving,

[204] Doing so helps to ensure, in the words of Catholic theologian Karl Rahner, "that we are open to something ineffable" (1978, 34).

[205] "Indeed today's progress in science and technology can foster a certain exclusive emphasis on observable data, and an agnosticism about everything else. For the methods of investigation which these sciences use can be wrongly considered as the supreme rule of seeking the whole truth. By virtue of their methods these sciences cannot penetrate to the intimate notion of things. Indeed the danger is present that man, confiding too much in the discoveries of today, may think that he is sufficient unto himself and no longer seek the higher things" (*Gaudium et Spes* #57).

> and 'up-grade' mechanical and electrical phenomena to confer on them the status of vital activities. (2003, 451)

These quotients of communication and the simulated formation of concepts amongst artificial intelligences are large parts of the cybernetic world but, as discussed in Chapter 1, there are further possibilities including enhancements beyond species-based human norms that should be addressed. Unlike this partial definition of cybernetics, the Church formally recognizes the intuitive distinction between therapy and enhancement, in much the same manner as the previously outlined positions of Hogle, Sabin and Daniels, and DeGrazia. This is given in the encyclical *Dignitas personae* (On Gene Therapy and Enhancement), wherein therapy refers to procedures or practices that aim to cure pathology or diseases whereas enhancements aim to improve personal capacities or abilities (25).[206] As indicated by the encyclical's title, this basic agreement on the definition of enhancement stems from examinations into genetic modification technologies and helps form the basis for Catholic responses to similar issues.

To guide technological innovation, the Roman Catholic Church has made a number of pronouncements regarding scientific research, human experimentation, and specific constituents of medical ethics such as patient-doctor relationships, physician responsibility, and consent. As with non-enhancing modifications, these pronouncements are based upon the sources for Catholic bioethical approaches outlined in Chapter 4. While similar, there are subtle differences in emphasis in the use of these sources between issues of non-enhancement and enhancement. A Roman Catholic approach to non-enhancing body modifications accentuates virtues grounded in patristic and medieval theology, carried forward by papal and magisterial input, and underscored

[206] NCBC ethicist Stephen Napier further notes the same; see Napier (n.d.).

by natural law. Roman Catholic approaches to enhancement technologies will also involve papal and magisterial input, but will emphasize modern bioethical experts and social justice more than natural law and patristic/medieval teachings. Collectively, the sources address the general condition of humanity's drive for increased scientific knowledge as well as specific issues linked with the science of human enhancement. For example, in addressing current enhancement issues, although the Church warns against experimental science and technologies that have the potential to change human nature, it does not discourage the individual's drive for self-improvement through innovation. Such a position is common among today's bioethical experts and theologians, Catholic and non-Catholic alike. One such expert is noted Lutheran bioethicist and Director of the Institute for Theology and Ethics, Ted Peters. According to Peters, God is the loving force who created human beings as rational makers and thus does not halt our own ongoing creation; the freedom of responsibility that we acquire through the creative process is part of the human condition (Peters, 93). As it happens, Peters concludes that transformation is part of the divine creative process, so that creation will not be complete until it is transformed (93)—a position which (as we shall outline in Chapter 6) finds support in differing post-modern philosophies.

Current Roman Catholic approaches to biomedical research demonstrate a balance of opportunity and caution in its support of the quest for knowledge and the search for medical advancements. As the Pontifical Academy for Life (PAL) states,"[i]n principle, therefore, there are no ethical limits to the knowledge of the truth, that is, there are no 'barriers' beyond which the human person is forbidden to apply his cognitive energy" (PAL, ¶3). Indeed papal statements have defined the human being as "the one who seeks the truth" (*Fides et ratio,* 28). Yet the Church places moral limits on this quest and in so

doing presents the moral orientations dictated by natural reason, convinced "that she offers a precious service to scientific research, doing her utmost for the true good of the human person" (John Paul II, 2003b, ¶4). This "true good" is more than the intellectual probing of the material world, it is the effort of going beyond observable data ("visible realities"), as *Gaudium et Spes* explains, "to those which are unseen."[207] The Church bounds the search for knowledge by setting ethical limits for human behaviour, since "what is technically possible is not for that very reason morally admissible" (*Donum Vitae,* 4). Thus, a Catholic approach to human enhancement will be marked by limitations upon technologies which are outside of the moral standards set by Church doctrine.

A further aspect of a Roman Catholic acceptance of any scientific advancement has become clearer in several mid twentieth-century papal and magisterial sources. Beginning with Pius XII, more so than previous pontiffs, guidance was offered to health institutes, colleges of physicians and specialists, and those in the scientific community, regarding the moral nature and standards of their work. In his address to the First International Congress on the Histopathology of the Nervous System, Pius XII outlined three general principles which remain and serve as a platform for issues involving science, medicine, technology and humanity: 1) the interests of medical science; 2) the interests of the individual patient to be treated; and 3) the interests of the community, the

[207] "Man judges rightly that by his intellect he surpasses the material universe, for he shares in the light of the divine mind. By relentlessly employing his talents through the ages he has indeed made progress in the practical sciences and in technology and the liberal arts. In our times he has won superlative victories, especially in his probing of the material world and in subjecting it to himself. Still he has always searched for more penetrating truths, and finds them. For his intelligence is not confined to observable data alone, but can with genuine certitude attain to reality itself as knowable, though in consequence of sin that certitude is partly obscured and weakened. The intellectual nature of the human person is perfected by wisdom and needs to be, for wisdom gently attracts the mind of man to a quest and a love for what is true and good. Steeped in wisdom, man passes through visible realities to those which are unseen" (*Gaudium et Spes,* #15).

bonum commune (1952, 5). The first two principles correspond with traditional Catholic values mostly derived from patristic and medieval sources which address the rights, duties, and virtues of medicine. Similarly, the third principle is linked to traditional Catholic sources, enhanced by the increased importance given to social justice and the preferential option for the poor after Vatican Council II. In defining each of the above Pius XII included general caveats which were consistent with common interpretations of the Hippocratic Oath, such as the need for patient consent and the bounded rights of patients, who cannot confer rights they do not possess. Bounded by virtue and morality, patients may lack certain rights. Accordingly, no request deemed morally illicit by the Church should be followed by a doctor even if given by the patient (Pius XII, 1952, 12). This is echoed in the modern day *CCC* #2295, wherein the Church denies the dignity and morality of any experimental research, even with a subject's consent, if life, or physical and psychological integrity, are exposed to avoidable risks.[208] It is also in keeping with the previously outlined Catholic positions on stewardship, for as Pope Pius notes, the patient "is not absolute master of himself, of his body or of his soul. He cannot, therefore, freely dispose of himself as he pleases….The patient is bound to the immanent teleology laid down by nature. He has the right of use, limited by natural finality, of the faculties and powers of his human nature. Because he is a user and not a proprietor, he does not have unlimited power to destroy or mutilate his body and its functions" (13).[209]

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[208] "Research or experimentation on the human being cannot legitimate acts that are in themselves contrary to the dignity of persons and to the moral law. The subjects' potential consent does not justify such acts. Experimentation on human beings is not morally legitimate if it exposes the subject's life or physical and psychological integrity to disproportionate or avoidable risks. Experimentation on human beings does not conform to the dignity of the person if it takes place without the informed consent of the subject or those who legitimately speak for him" (*CCC* #2295).

[209] "Not withstanding by virtue of the principle of totality, a patient's right to use the services of their organism as a whole; the patient can allow individual parts to be destroyed or mutilated when and to the

This bounding of rights goes beyond immediate health procedures and includes medical experiments or research when they entail serious destruction, mutilation, wounds or perils (14). As stated, "Without doubt, before giving moral authorization to the use of new methods, one cannot ask that any danger or any risk be excluded" (38). Applied to non-enhancing and enhancing modifications, Roman Catholic limits to personal autonomy are based upon individual stewardship and the common good of society over the interests of research and even the desires of the patient.

Pius XII's principles have been carried forward, and this same spirit is echoed, in more recent Catholic publications such as the collective documents of the PAL. For example, the 2003 concluding communiqué of the PAL, on the "Ethics of Biomedical Research for a Christian Vision," outlined an appreciation for the nature of biomedical research to aid humanity and expand knowledge. Yet the PAL insists such work go forward based upon values which safeguard human dignity, avoiding "any form of instrumentalization or destruction of the human being and keeping itself free from the slavery of political and economic interests" (John Paul II, 2003, 4). Additionally, as did Pius XII, PAL displays the current Catholic emphasis on social justice by assigning the responsibility of care to all those working in scientific research aimed at bettering society. As such, the PAL emphasizes a concern for the safety of all living things and the environment in addition to respecting human rights.[210] Beyond the

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extent necessary for the good of his being as a whole…to repair serious and lasting damage which cannot otherwise be avoided or repaired" (Pius XII, 1952, 13).

[210] "Obviously, the acquisition of a growing technical possibility of intervention on human beings, on other living beings and on the environment, and the attainment of ever more decisive and permanent effects, obviously demands that scientists and society as a whole assume an ever greater responsibility in proportion to the power of intervention. It follows that the experimental sciences, and biomedicine itself, as 'instruments' in human hands, are not complete in themselves, but must be directed to defined ends and put in dialogue with the world of values….the ultimate aim of every research activity in this field must be

concern for human rights, PAL emphasizes the *bonum commune* by linking the moral standards of biomedical research and experimentation to global social justice issues such as economic disparity and human exploitation:

> Given the growing limitation of the resources that are available for the development of biomedical research, it is in fact necessary to pay great attention to achieving a just distribution between the different countries, taking into account the living conditions in the various parts of the world and the emergence of the primary needs of the poorest and most harshly tried peoples. That means that all should be guaranteed the conditions and minimal means so that they can enjoy the benefits deriving from research, and develop and support an endogenous capacity for research. (¶10)

Collectively, such statements are given as part of the Church's chosen mandate to speak to social problems. This duty is an integral part of Catholic social teaching as indicated through encyclicals, canon law, and conciliar documents over the last century;[211] a function of the Church is to signal to society when threats to humanity, as it perceives them, are immanent (Thomas, 2003, 787). As D.M. Thomas notes, "part of the prophetic role of the Church is to alert its members and the world at large as to violations in the area of social justice. As life in the world becomes more dependent on the products of technology, sensitivity to availability and distribution becomes more a moral issue" (787). Indeed the intellectual tradition of Catholic social thought incorporates the work of patristic and classical theologians as well as the continuing work of individuals and

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the integral good of man. The means it uses, must fully respect every person's inalienable dignity as a person, his right to life and his substantial physical integrity" (PAL, 2003, ¶2-4).

[211] See *Rerum Novarum* (1891); *Gaudium et Spes* (1965); *Populorum Progressio* (1967); *Solicitudo Rei Socialis* (1987); *Centesimus Annus* (1991); *Caritas in Veritate* (2009).

contemporary schools addressing the issues and institutions of social living, from Liberation Theology to Eco-theology.[212]

B. Roman Catholic responses to ethical problems raised by enhancement technologies

While unapplied technology may be morally neutral, a number of bioethical concerns arise in the application of enhancement technologies. As noted in Chapter 1, ethicists from diverse approaches identify concerns with enhancement technologies derived from parallel issues or previously encountered bioethical problems. Chief among these concerns, and particularly relevant to Roman Catholic bioethical approaches, are the reductionism of the human body to constituent commodities, social concerns arising from the disparity of function between enhanced and non-enhanced individuals, a devaluing of persons without full or enhanced functionality, and ethical issues arising from the quest for perfection.

i. Commodification

Current Roman Catholic magisterial pronouncements have laid bare a looming moral problem with any enhancement technology: that of commodification, the reduction of life to measurable economics. This was alluded to in the previously noted 2003 PAL communiqué and has been a feature of Catholic Church teaching for several decades, although specific concerns have focused on reproductive technologies and the marketplace for human organs more than enhancement technologies.[213] Indeed, the expansion and innovations of reproductive technologies have caused bioethicists to focus on commodification and the increase of cultures "preoccupied with commercial

[212] See Berry (1999).
[213] See also *Centesimus Annus* (1991).

consumption" (Wright, 2000, 10). Arguing that human culture has already embraced a reductionist view of life, Indiana University professor of law R. George Wright explains the link between commodification and human dignity,

> [T]he commodification of life, along with overly reductionist views of life and culture, do not bode well for the deep respect of human dignity in the future. There is ultimately no reason to accord genuine respect to mere commodities, or to mere mechanical objects, however complex or high their market price. Commodities generally do not possess dignity in the sense classically ascribed to humans or to rational persons. Nor is it at all clear why humans would really possess dignity in this sense if being human were thus reducible. We can certainly admire the sophistication of a piece of computer hardware or of a software program. But we do not ascribe genuine dignity to either, or even to their combination. (Wright, 12)[214]

A Catholic rejection of reductionism upholds the body as both good and admirable, while at the same time insisting that individuals are "more than a speck of nature", more than the "sum of mere things" (*Gaudium et Spes* #14). It is also a feature of the progression in Catholic social teaching from Leo XIII's *Rerum Novarum* (1891) to *Centesimus Annus* (1991) wherein concerns have expanded beyond charity to include justice, from industrial evils to all social problems. This refocusing on the poorest segments of society is a theme of Roman Catholic social teaching and results in

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[214] Further outlining human dignity within a Roman Catholic approach, in 'The Natural Law: Recent Literature,' McCormick connects rationality to the spirit, and quotes J. Etienne in repudiating a theory of nature which patterns God as a 'transcendental engineer'. We can read, "J. Etienne, with nearly every informed modern writer, rejects a concept of nature which mirrors God as a transcendental engineer who had preploted man's course and embedded this plan in a multitude of concrete personas. Such a caricature is a result of human imagination. Rather, man's essential dignity is in his rationality. This is his prerogative and his fundamental responsibility" (1991, 177).

apprehension towards advancements which could lead to further disparity between all peoples and disadvantages to the underprivileged.[215]

As enhancement technologies offer an array of benefits beyond species-based norms, they inherently hold great value and bring forward economic issues on social and individual levels. Socially, body enhancements act as a new commodity for markets with a corresponding influence on the businesses of medicine, research and development, insurance, manufacturing, advertising, and law. Individually, body enhancements entail material goods and the required services for their installation and maintenance. Current market trends indicate that the sale of body parts such as organs is a booming global business; indeed the World Health Organization estimates that 10 % of transplants worldwide are organs that have been sold to the recipient (Shmaltz, 2013, ¶3). As Hogle and others have noted, engineered artificial tissues capable of enhancement constitute a different sort of economic problem, where supply is theoretically readily available yet possibly restricted by politics and market regulations on the trade of human materials (Hogle, 712).[216] We shall outline further issues with distributive justice later in this chapter; yet as Hotze et al., conclude in their 2011 survey[217] on enhancement technologies,

> [If] such interventions were to become available by prescription tomorrow, inequalities in access to them would arise both on the basis of insurance coverage and ability to pay and also because of variation in physician willingness to prescribe them. Both of these factors would likely exacerbate existing social

[215] As expressed in *Gaudium et Spes,* "A consistent theme of Catholic social teaching is the option or love of preference for the poor. Today, this preference has to be expressed in worldwide dimensions, embracing the immense numbers of the hungry, the needy, the homeless, those without medical care, and those without hope" (#42).
[216] See Franklin (2001); Waldby (2002).
[217] Utilizing a random sample of 1500 physicians.

> disparities across racial, ethnic, economic, and other sociodemographic lines, as already advantaged groups are more able to actively seek physicians willing to prescribe them enhancements and to pay for these interventions out of pocket. (11)

Stemming from Roman Catholic concepts of social justice and increasingly highlighted in papal documents after Vatican Council II, the link between the body and economics has become a focus of Catholic ethical reflection. The Church addresses the body and economics on both individual and social levels and has maintained a consistent policy of declaring the body and all its parts as priceless. Also, a Roman Catholic approach to issues of commodification incorporates an awareness of the negative effects of relativism and connects it to the degradation of human dignity. This social tendency to commoditize the human character, through marketing to consumers, the treatment of workers, and a rise of style over substance, occurs when people start accepting or passively ignoring treatment towards the human person that ultimately devalues human dignity (Minchak, 2007, ¶2). This is a devolution of the person to an object, a collection of parts, rather than an incorporated subject, similar to Catholic eco-theologian Thomas Berry's thesis regarding humanity's treatment of the earth and the ensuing environmental crisis.[218] On social levels the Church maintains health is a universal good to be defended, not commodified, and organizations offering health services must (in the words of Benedict XVI) "rethink their particular role in order to avoid having health become a simple 'commodity,' subordinate to the laws of the market, and, therefore, a good reserved to a few, rather than a universal good to be guaranteed and defended" (CNS, 2012, ¶3). Applied to individuals, this policy has traditionally been used to

[218] See Berry (1999).

address issues stemming from reproductive technologies wherein a Roman Catholic approach rejects processes which involve economic measures or the possible trade of body parts.[219] Additionally, papal pronouncements charge that consumerism is a path towards dissatisfaction. As John Paul II explained: "Excessive access to all kinds of things,—sometimes called consumerism—enslaves people and does not make them happy. The more one possesses, the more one wants, while the deeper human hopes remain unsatisfied and even stifled." (*Solicitudo Rei Socialis* #28). This is a continuation of the themes of Vatican Council II, which stressed that people are worth more than their possessions and, ultimately, that "[t]echnical progress is of less value than advances towards greater justice, wider kinship and a more humane social environment" (*Gaudium et Spes* #35). In order remain consistent with previous judgments and maintain a focus on the preferential option for the poor, a Catholic approach to enhancement technologies must reject a market of upgrades, interchangeable implants, and an industry based upon an economy of increased body function.

ii. Eugenics and vulnerability

The historical opposition to traditional eugenics is well documented and addressed on both secular and religious levels. Eugenics literally means "good breeding" and is defined as the study of agencies under social control that may improve or impair the racial qualities of future generations either physically or mentally (Forrest, 1974, 260); ultimately, it is the quest to eradicate human imperfections and thus reshape society. Both the word and the definition were fixed by Sir Francis Galton, the founder of the

[219] See Capaldi (2000), wherein the market for human organs is addressed from a moral perspective and with reference to substantive norms derived from Roman Catholicism, specifically the works of Pius XII and John Paul II; John Paul II *Evangelium Vitae* (*#'s* 15 & 63); Indeed, John Haas, president of the National Catholic Bioethics Center and a member of the PAL, notes the selling of organs and body parts as a "false anthropology" (Schmalz, ¶15).

movement. The science has two chief divisions: heredity and environment. Galton believed that heredity was by far the more important, deriving his main idea from the breeding of race-horses; just as we breed horses to enhance attributes, so also, it is contended, we can breed humans for the same. The eugenics movement, however, consists of more than study and historically included public action in the way of legislation, administration, and the influencing of human conduct (New Advent, 2003b, ¶1). The resurgence of eugenics via genetic manipulation has not escaped notice of either bioethicists or theologians, both on guard against the many moral violations which have historically been associated with the technology. Examples of Roman Catholic bioethical sources which have responded to historical and new eugenic movements include papal encyclicals such as *Casti Connubii* (#63, 66, 68, 70), *Dignitas personae* (#2, 22, 27), *Donum vitae* (#6 & 8), *Evangelium vitae* (#14 & 63) and denunciations of the technology at the PAL general assemblies, as in 1998 when it met to discuss the implications of the Human Genome Project.[220]

As eugenics aims to reshape the human condition by the elimination of physical and mental shortfalls, it connects to a number of body modification issues as well as topics of social justice. For example, eugenics links back to our definition of normal, in that governments have authority in providing or denying funding of medical treatments based upon the system of classifying human deviations from bodily norms. Hogle notes that physical conditions can be given political significance because the non-standards may be perceived as costly to a society both economically and politically (698). In the

[220] As reported by Catholic World News, Pope John Paul II denounced the spread of a trend toward 'new selective eugenics,' and the tendency to use prenatal diagnosis as a tool for identifying and then eliminating handicapped children. He called for measures which could offer legal protection for every human life (1998, ¶1).

history of eugenics, as Kevles (2003) and Pernick (2000) document, it is then possible for authorities to adjust the 'norm' and 'defectives' using social-scientific programs. This is further linked with our examination of cosmetic surgeries, for, as Proctor (1988) and Weindling (1990) explain in their histories of eugenics, measurements of body symmetry and proportion were at one time central to the definition of physical fitness and those with visible anomalies could be culled from the population in order to maintain the ideal imagined form. Such actions are a matter of record in Germany before World War II, wherein a cult of beauty and bodily perfection served the state (Hogle, 704). Eugenics is further linked with vulnerability and, in turn, with human dignity and functionality; for when our capabilities are refereed by biological standards, segments of the population will inevitably be labeled as inferior to the norm and, as Rose (2001) posits, health comes to be seen as fitness [appropriateness].

While early denunciations on the part of Pius XI and Pius XII addressed the theoretical application of eugenics borne out of Darwinian sociology, a modern Catholic approach to eugenics has been rekindled by current genetic manipulation technologies. Thus, in 2009 the PAL academic congress focused on "New frontiers of genetics and the dangers of eugenics" and featured a number of theologians, scientists, and ethicists studying those processes which attempt to perfect human nature through biomedicine. Lecturing at the conference, Barbara Chyrowicz noted specific types of eugenics, all of which target the human body in the quest for social perfection. This includes selective eugenics, the purpose of which is to prevent the birth of offspring with genetic or structural disorders, thereby facilitating, as Chyrowicz suggests, a "a paradox…in its claim that human beings should be killed not only for the sake of their own alleged good, but also for the sake of the good of those who have not come into existence yet" (2009,

15). Selective eugenics is integrally linked with the issue of abortion as well as reproductive technologies which require multiple embryo development and prenatal screening, topics which have been a focus of Catholic bioethics. However, the application of enhancement technologies through cybernetic and nanotechnological implants holds more in common with the second type of eugenics, that of genetic manipulation in an effort to increase function and exceed species-based norms. Such an application has been spoken of as the "new eugenics" and is recognized (as we have outlined) as enhancement which goes beyond "external cosmetology", "beyond correction", and is, in reality, "transgressing therapy" (Chyrowicz, 15). Although 'new' in terms of approach, the foundation of improving society through our capacities remains. So too does the original eugenics' suggestion that a proper concern for humanity's future entails the moral obligation to take up enhancement.[221]

The process of manipulating genes to achieve a 'new eugenics' imperative has been conceded by the Church as inherently risky and a violation of the principle of stewardship. The Roman Catholic approach recognizes difficulties associated with classifying certain enhancements as medical interventions (such as the previously discussed case of immunizations in Chapter 2). Nonetheless, it sees that "[t]he most serious moral controversies over enhancing human nature concern situations when the purpose of the enhancement in question is to endow the human organism with an expression of its traits that will surpass the potential of the *Homo sapiens* species" (Chyrowicz, 15). In its critique, the Church consistently declares two features: a) the focus of programs in eugenics (new or old) is fundamentally flawed, and b) both the new and old eugenics present a danger to the weakest members of society: the vulnerable, the

[221] See Wikler (1999); Agar (2004); Harris (2007); Savulescu (2008).

poor, and the voiceless. The first feature links eugenics to human vulnerability and directly challenges its basic premise that the elimination of human frailty is good. The second critique again falls within the Church's purview of social justice and is argued from economic, legal, and moral grounds.

In terms of misplaced focus, Roman Catholic bioethics answers that a push towards genetic perfection, even with the utmost sincerity and possibility of achieving a better society, does not genuinely consider the purpose of a human being—that accomplishment of "moral perfection [proportional] to his potentialities and his efforts, always assisted by the grace of God" (Chyrowicz, 15). Within Roman Catholic bioethical approaches, the nature of the body cannot be solely viewed as oriented towards a goal of earthly perfection.[222] Throughout history the Church has said that defects of the body (be they physical or mental) are to be seen as signs of spiritual testing, prowess, and even gifts; to be authentically human is to be subject to vulnerability.[223] As with our previously outlined topics there are contributions from a number of sources which form contemporary concepts and approaches to vulnerability. Certainly, scripture is a source of numerous examples of healing to overcome the vulnerabilities of body and spirit, while at the same time acknowledging finality to the body. Biblical examples of healing and human frailty are reflected in various Catholic medical-ethics programs, which take up themes found in Acts 3:16 and 9:34, Phil 2:26, 2 Tim 4:20, 2 Cor 12:18, James 5:13, etc. At the same time, Roman Catholic tradition

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[222] As Discalced Carmelite and philosopher Edith Stein observed, "a man's one-sided endeavor to achieve perfection easily becomes a decadent aspiration in itself; our desire for knowledge does not respect limits placed on it but rather seeks by force to go beyond these limits; human understanding may even fail to grasp that which is not essentially hidden from it because it refuses to submit itself to the law of things; rather, it seeks to master them in arbitrary fashion or permits the clarity of its spiritual vision to be clouded by desires and lusts" (1987, 70).

[223] See de Chardin (1950); John Paul II, *Salvifici Doloris* (1984); Kreeft (1986); Vanier (1998); Kane (2002); Garcia (2006); Krause (2010).

acknowledges the finality of the body and notes the great paradox that in this world death is the final healing—liberation into God's presence (Maryvale, Unit 1-B.8). Similarly, Catholic experts in the field and publications from the PAL extoll the virtues of vulnerability and emphasize the accessibility of moral good to all persons, the healthy as well as the handicapped. Defending vulnerability over eugenics, Chyrowicz notes, "natural defects are not an obstacle in attaining salvation, while killing the handicapped certainly is" (15).

Such a view of the value of vulnerability is not confined to a Roman Catholic ethos or even a religious ethos; as Reich points out many, many contemporary philosophers increasingly regard vulnerability as part of the basic identity of all humans (Reich, 184). Indeed, a list of those who incorporate human vulnerabilities on purely philosophical grounds includes Emmanuel Lévinas, Jürgen Habermas, Paul Ricoeur, Alasdair MacIntyre, Susan Okin, Robert Goodin, Leon Kass, and Judith Shklar. In their respective ways, each find that human weaknesses and fragilities play a key role in what it is to be human and the subsequent responsibilities and virtues that must be taken on in order to best operate in a just society.[224] As previously noted, such opinions hold with Roman Catholic principles, even though the personal religious or philosophical beliefs of each bioethicist are not necessarily Catholic, Christian, or even theistic in nature. For example, Leon Kass places a special value on the natural human cycle of birth, procreation and health, and views our fragility and mortality as a blessing threatened by lack of standards and technological imperatives aimed at altering our norms.[225] Many

[224] See Levinas (1969); Goodin (1985); Shklar & Luchash (1986); Okin (1989); Habermas (1990); Ricoeur (1992); MacIntyre (1999); Rendtorff (2002).
[225] Indeed, Roman Catholic theologian and Senior Fellow of the Ethics and Public Policy Center, George Weigel has dubbed Kass "A National Treasure" (2002, ¶1); See Kass & Wilson (1998); Kass (2001).

contemporary moral philosophers now believe that the connection between human vulnerability and concepts such as autonomy, justice and social duty is so fundamental that it has become a cornerstone to bioethical problems and meta-ethical theory. Reich explains that the principle of vulnerability now belongs as an essential principle in bioethics (and biolaw) and he echoes MacIntyre's belief that "due to the thinness of the abstract principle of nonmaleficence and beneficence in contemporary analytic bioethics, these principle should be replaced with a more richly responsive virtue of concerned care" (Reich, 1978, 185). Indeed data from surveyed physicians indicates that approximately one-third agreed with the statement that "[u]sing medicine for enhancement is wrong because some human suffering has value", even though a majority of respondents believed that "[t]he ultimate goal of medicine is to eliminate human suffering" and "…medicine for enhancement reduces human suffering" (Hotze et al., 6).

Roman Catholic definitions of good health encompass more than the measure of pre-defined set-points of normality and include characteristics of human relationships. Under this rubric, human health is different from merely vegetative or animal health because it involves personality and the sharing of intellectual and spiritual goods (Maryvale, n.d., Unit 2-2.A.1). Thus a Roman Catholic perspective assumes that health care must serve the totality of a human person, not only their biological functioning, and that all ethical decisions should respect the innate and cultural needs of the human person. Traditionally, the Roman Catholic Church has advocated for the rights of the physically and mentally disabled as part of its mandate to protect all life despite age, form, or qualified levels of biological normalcy. Since vulnerabilities define the individual as a unique entity within the wider community, they are seen as a common thread, a necessary force in shaping character and life. Even though they are often debilitating or destructive,

they are also the cause for compassionate care and social cohesion. It has been rightly argued that people may lead very fulfilled and valuable lives despite serious physical defects. Catholic bioethical approaches similarly emphasize that physical perfection is no guarantee against social and spiritual sickness (Maryvale, Unit 2-2.A.1). Thus, by embracing human vulnerability as part of the complete human experience, the Roman Catholic tradition runs counter to philosophies which isolate and quantify life on levels of functionality, minimizing the relational value of persons regardless of ability. From a Catholic perspective such a reductionism diminishes human dignity; it segregates and marks vulnerable persons as lower in value. As D.M. Thomas explains,

> The technological mentality tends to approach the human as object, number, an element of a process, a mere part of a material whole. If the human subject is reduced to the lesser proportions of object, if the sacred dignity of each person is judged worthwhile only to the extent that it contributes to some desired goal, then something God-given and essential is lost. (2003, 788)

Ultimately, vulnerability must lead to the end of life, and in terms of fundamental Catholic doctrine, any technology (or philosophy) that would seek to immortalize the human condition would be at odds with principles regarding our essential purpose. As we shall outline in Chapter 6, there are various groups calling for enhancement technologies (from genetic eugenics to cybernetic and nanotechnological body modification) to eradicate all human vulnerability. From a Roman Catholic perspective, such groups seek to end the very limitation of death. Several Catholic moral philosophers speak to the fundamental importance of human mortality and warn that health care should not be focused on endeavors which seek unrealistic concepts of human existence. While the Roman Catholic Church shares the valid call to halt human

suffering, it does not support ideas which seek the elimination of death itself; such ideas are incongruent with its basic view about the basic nature of life and the promise of eternal life after death. Traditionally, Catholic opinions on the limits of human mortality are expressed in conjunction with end-of-life issues, focusing on extraordinary interventions and the limits of health care services. Roman Catholic policy regarding such issues has been well articulated. They include the general policy of not requiring 'extraordinary' measures in cases of disthanasia (defined in Catholic medical-ethics programs as the practice of artificial prolongation of life as far as is physically possible), not taking into account the patient's suffering, and the often burdensome nature of treatment.[226] These are efforts at staving off the moment of death, "refusing to let nature take its course in a patient whose death is imminent and inevitable…a prolongation of the process of dying rather than a prolongation of life" (Maryvale, Unit 2-7.A.2). 'Extraordinary' measures typically apply to end-of-life scenarios wherein Catholic bioethical approaches reject exorbitant means to maintain a diminished capacity of life, but the spirit of the term can in fact be applied to excessive measures to eliminate all vulnerability in the quest for bodily perfection. As stated by the CCC #2289,

> If morality requires respect for the life of the body, it does not make it an absolute value. It rejects a neo-pagan notion that tends to promote the cult of the body, to sacrifice everything for its sake, to idolize physical perfection and success at

[226] See Pius XII (1957), *ASS 49*, 1030; CDF (1980) *Declaration on Euthanasia*; *CCC* #2276-2279; *Gaudium et Spes*, #27; Ashley & O'Rourke (1997).

> sports. By its selective preference of the strong over the weak, such a conception can lead to the perversion of human relationships.[227]

Indeed, the emphasis on mortality is not only found in magisterial sources; theologians such as Rahner concentrate on death as an active consummation, a maturing self-realization that embodies what each person has made of himself or herself during life (Maryvale, Unit 6-1). Again, this is not exclusively a Catholic position. Kass, for example, argues that biotechnology that can be employed to produce "superior performance" and "ageless bodies" may be substitutes for authentic virtue (2003). Similarly, Catholic theologian William May echoes the futility in seeking forms of perfection via health care: "No matter how ingeniously devised, [health care] cannot gratify all wants, tamp down all worries, or remove the mark of mortality from our frame. It is a cliché to say that physicians ought not to play God. Neither, should a healthcare system indulge an aspiration to immortality" (2003, 161).

iii. Social and distributive justice

More so than non-enhancing (mostly decorative) body modifications, cybernetic and nanotechnological options elicit a number of problematic social issues. Along with the aforementioned problems with human vulnerability and commodification, Catholic commentators such as Hook warn that the increased abilities derived from enhancing implants will cause social fragmentation, economic disparity, and possibly tyrannies.[228] In a Roman Catholic bioethical approach, such problems fall within the scope of social justice, and, as such, it is important to address cybernetic and nanotechnological body

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[227] Here the *CCC* equates the quest for physical perfection as a neo-pagan idea; although given the general spiritual and non-material patterns of the majority of modern pagan movements a more contemporary and accurate identifier may be Transhuman.

[228] See Hook (2002) (2004).

modifications from this perspective. To do so, we shall briefly elaborate (drawing on previous discussion in Chapter 4) on social justice as a source of Roman Catholic bioethics. We shall then outline the major social justice issues that ethicists within, and outside of, the Church attribute to enhancement technologies. Such issues include: increased social division by way of unenhanced versus enhanced individuals; distributive and economic inequalities in medical care, and a corruption of the role of physicians; and risks to individual personalities, mental processes, and consciousness by way of addiction and manipulation.

Christopher Kaczor, professor of philosophy at Loyola Marymount University, explains that "Catholic social teaching… is difficult to summarize …. [T]here is ongoing development of doctrine on social questions, as seen in the writings of various pontiffs, from Pope Leo XII's charter of Catholic social thought *Rerum Novarum,* through Blessed Pope John XXIII's *Pacem in Terris* and Pope John Paul II's *Centesimus Annus,* to the second part of Pope Benedict XVI's *Deus Caritas Est.* Catholic social teaching is complex, linked with changing social conditions and deepening understandings of both the work of God in history and ethical principles" (2013, ¶3). As a result of this social teaching, an overarching theme of social justice permeates Roman Catholic bioethics, emphasizing the importance of living justly in community. A corollary to the Roman Catholic emphasis on human frailty and the limits of human life is the need for social caring and moral responsibility towards others, as basic reciprocity if nothing else. As Daniels-Sykes notes, Roman Catholic social teaching can be seen in papal encyclicals, instructions, pastoral letters, formal addresses or decrees that resonate with what Joseph Cardinal Bernadine called a consistent ethic of life; its principles include

human dignity, respect for life, the common good, the preferential option for the poor, responsibility and participation, social justice, and social solidarity (2007, 106).[229]

Jesuit theologian Bernard Lonergan suggests in *Insight* that freedom is always exercised in a matrix of human relationship, in community, because human beings have a primordial sympathy for one another—we do not live with one another as in an ant hill but in relationship with feelings and commitments (Creamer, 1996, 84). Indeed, Lonergan explains that human progress is essentially and prominently a healing/creating process—on personal and social levels. To this end, the social teaching of the Catholic Church insists that the human community, including its government, must be actively concerned in promoting the health and welfare of every one of its members so that each member can contribute to the common good of all (Ascension Health, 2004, ¶1). Such a teaching is encapsulated in the principle of the common good and requires respect for persons, social welfare, and amity. In his 1963 encyclical *Pacem in Teris*, Pope John XXIII defined the common good as "the sum total of social conditions which allow people, either as groups or as individuals, to reach their fulfillment more fully and more easily" *(*55). Increasingly emphasized after Vatican Council II, the Church calls upon people to go beyond selfish interests and attend to others in a spirit of cooperation and love; or as explained in *Gaudium et Spes*, "…when the order of values is jumbled and bad is mixed with the good, individuals and groups pay heed solely to their own interests, and not to those of others. Thus it happens that the world ceases to be a place of true brotherhood" (#37). Kaczor identifies the common good as more than "simply the common desires or interests of the multitude" but that which is authentically good for people, "the social conditions that enable human flourishing" (¶15). In turn, human

[229] See Gallardetz (2005).

flourishing includes the physical and mental dimensions of good health, as well as intellectual and moral dimensions which help us to avoid vice and cultivate virtue (Kaczor, ¶16). Hook refers to these same dimensions when calling into question the safety of cybernetic technologies (both implantable and wearable) (2004, 534). For Hook, writing as a Roman Catholic physician, each of the dimensions which make up the common good are in danger from cybernetic modification technologies: the physical by way of the inherent risks to human health; the intellectual by way of their potential for corruption, their addictive-like dependence, and their unforeseen impacts upon our rational abilities and personalities; and lastly, the moral and ethical dimension by way of technology's propensity to isolate individuals, ruining relationships and offering an array of temptations (2004, 535).

Many of Hook's concerns for the potential physical dangers of cybernetic and nanotechnological body modifications are addressed in the guidelines on stewardship and risk to health outlined in our previous chapter. As noted in our synthesis of Roman Catholic guidelines to non-enhancing body modifications, the first consideration is the importance of human health, the safeguarding of bodily functions (with emphasis on reproductive purpose), and a mindfulness of medical risks. More so than non-enhancing modification, additional problems with enhancing body modifications appear to stem from possible violations of the third dimension of the common good, or as Hook notes, their potential to isolate individuals and fragment society.

Within Roman Catholic social justice, the good of the body refers to the good of the whole person—not found in splendid isolation but in relationship and communion with others. This is reflected in *CCC* #2288, which defines life and physical health as precious gifts entrusted by God and extends responsibility for both beyond the

individual, taking into account the needs of others and the common good. Concern for the health of its citizens requires that society help in the attainment of living-conditions that allow them to grow and reach maturity: food and clothing, housing, health care, basic education, employment, and social assistance (*CCC* #2288). As explained in 2004 by the Pontifical Council for Justice and Peace, in the *Compendium of the Social Doctrine of the Church,* "Participation is a duty to be fulfilled consciously by all, with responsibility and with a view to the common good" (189). In analyzing Roman Catholic applications of social justice, Daniels-Sykes notes that the principles of social solidarity, social justice, and economic justice embody a universal moral truth (128). As with the common good, participation and solidarity are fundamental principles of Catholic social thought (Kaczor, ¶18). Indeed, Pope John Paul II describes solidarity with others as a virtue—the interdependence of each other in the contemporary world, "not a feeling of vague compassion or shallow distress at the misfortunes of so many people, both near and far. On the contrary, it is a firm and persevering determination to commit oneself to the common good; that is to say to the good of all and of each individual, because we are all really responsible for all" (*SRS* #38). The destruction of this virtue of solidarity is an underlying fear of those critical of enhancement technologies.[230] In defining the social problems of technological enhancements, Hook fears that some members of society will become "incrementally enhanced and plugged into cybernetic communities, these individuals will share less and less in common with the unenhanced, fragmenting society; potentially generating decreasingly compatible, or even competing, separate societies: (2004, 535). Similar concerns have been given by

[230] Yet, as outlined, there are cybernetic implants which allow for the sharing of feelings and communications on a non-verbal level, giving pause to a critic that isolation stems from increased technological interaction.

Maguire and McGee (1999), Parens (1995), and Merkel et al., (2007), who fear that while technologies like neural implants can help restore function to the disabled, the same implants "could potentially lead to the formation of elites and considerable social bias" (Merkel et al., 155). These fears have been noted by proponents of enhancement technologies (as we shall see in Chapter 6), who counter that the "human race already commands a range of simple and efficient means to control and manipulate people" and that social divisions are not a product of technology as much as the result of human enmity and fear (Hansson 2005).

A difference between Hook's concerns and those of Maguire, McGee, Parens, and Merkel is the theological component of sin. For Hook, social division and tyranny through enhancement technology are near inevitabilities because of humanity's fallen state and the power to "corrupt our thoughts, our judgments, and our desires" (2002, 59). Although Hook does not elaborate on specific Roman Catholic dogmas regarding sin and their possible link to cybernetic implants, it is reasonable to assume that sin, as given by *CCC* #1872 would best fit his concerns—"Sin is an act contrary to reason. It wounds man's nature and injures human solidarity."

Mirroring the above concerns of Parens, Hook raises a further social concern about cybernetic and nanotechnological body modifications by contending that aspects of the practice of medicine are endangered by enhancement technologies. Apart from unscrupulous doctors peddling enhancement technology, Hook fears that a fundamental change in the profession may occur, "from a group committed to healing (with a dominant ethos of beneficence in trust and nonmaleficence) to individuals skilled in surgical technique who are merely technicians" (2004, 535). But the problem is not limited to a shift away from compassionate medicine to mere mechanics; it also causes

an increase in demands from medicine. Hook views these demands as immoral in two respects: by encouraging unjust resource allocation and unaffordability, and by corrupting the healer-patient relationship.

First, linked to the pressures of distributive justice and commodification, it is feared that medical resources may be squandered on frivolous requests for upgrades, implants and technological abilities, instead of reaching the truly needy, the poor, and the underdeveloped.[231] Roman Catholic directives for health care services mandate working to ensure health care delivery systems provides adequate health care for the poor, with particular attention given to the health care needs of the uninsured and the underinsured (USCCB, 2009, 10). If enhancement technologies cause further limitations to the delivery of health services, distributive justice is violated. Some, such as Hansson, dismiss the potential of enhancements to cause economic distributive issues since "the severity of the problem is determined by the price of the intervention rather than whether or not it involves an implantation" (2005, 521). Yet, writing as part of the Nanotechnology and Society Research Group at Northeastern University, Tamara Garcia and Ronald Sandle point out, "because enhancement technologies are, by definition, non-therapeutic, they are not likely to be covered by health insurance companies, which tend to cover only therapeutic (or, in some cases, preventative) care" (2008, 6). Worldwide, 2.7 billion people live on less than $2 per day and 1.1 billion on less than $1 per day; given this, it is impossible to assume equal access to enhancement technologies between those struggling in the least developed nations and those who are

[231] See Hook (2004); Garcia & Sandle (2008); Michell et al., (2007).

not (Garcia & Sandle, 10).[232] Addressing the issue of distributive justice, the Church encourages (and occasionally demands) a number of practices aimed at removing the immense economic inequalities, which now exist and in many cases are growing, and which are connected with individual and social discrimination (*Gaudium et Spes* #66). The Church's stance on such economic inequalities must also incorporate its longstanding tradition of the preferential option for the poor—that "special form of primacy in the exercise of Christian charity, [affecting] the life of each Christian inasmuch as he or she seeks to imitate the life of Christ, [and applying] equally to our social responsibilities and hence to our manner of living, and to the logical decisions to be made concerning the ownership and use of goods" (*SRS* #6). Indeed, Jesuit theologian Thomas Massaro asserts that "entire tradition of Catholic social teaching…can be interpreted as a unified effort on the part of church leaders to encourage a more humane society where the most vulnerable members are better protected from harm" (2000, 161). In practice, the Catholic Health Association of Canada incorporates distributive justice and a preferential option for those who are poor in their fundamental guidelines for all Canadian Catholic healthcare facilities.[233] In order to act as "careful stewards of God's gifts" the CHAC fulfills a responsibility of just resource allocation with concern for specials needs of the most disadvantages and to make limited resources available to more people (1991, 23). Further, as noted in Benedict XVI's response to commodification, according to Roman Catholic social

[232] In their analysis, Garcia and Sandle calculate that over 40 million individuals in the United States alone would be without means or access to human enhancement technologies given economic considerations and significant racial disparities (2008, 7).
[233] See CHAC (1991).

teaching health care is not a commodity best regulated by a free market economy;[234] "[r]ather it is a social good that is considered to be a basic right. If health care is a basic right, then the fact that tens of millions in this country and billions around the world lack access to it must be viewed as a grave injustice. The Catholic social tradition stresses that the antidote to this injustice is solidarity and dedication to the common good" (Nairn, 2007, 385).

Hook's second concern regarding enhancement technologies and the field of medicine applies to the nature of the relationship between physician and patient. Hook believes that this relationship may become skewed. According to the USCCB *Ethical and Religious Directives for Catholic Health Care Services*, the Church's moral teaching on health care nurtures a truly interpersonal professional-patient relationship that fully respect the dignity of the person and the relationship with the health care professional (2009, 19).[235] The nature of the relationship between physician and patient is intended to be more than simply requests for personal betterment and the placation of such requests. Like Hook, Pellegrino notes on the importance of such medical relationships:

> A healing relationship cannot be like that of the mechanic to one's automobile, or of the biologist to his subject of study, or of the technician to her machinery. The only morally viable model would be the covenantal model. This is the special relationship of a sacred promise and trust between one who is ill and in need of help and one who offers himself or herself as a healer. The Christian healer—and indeed any true healer—is one who is committed primarily to the welfare of the sick person rather than to his own. (Pellegrino, 1999, 122)

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[234] See CNS (2012).
[235] See too John Paul II, *Sollicitudo Rei Socialis*, #43.

Both Hook and Pellegrino fear that the truly interpersonal professional-patient relationship (something the Church mandates through its *Ethical and Religious Directives for Catholic Health Care Services*) will suffer with the introduction of enhancement technologies. As the USCCB outlines, a professional-patient relationship is never separated from the Catholic identity of the health care institution (2009, 19). Furthermore, to be in accord with the Church's principles on the dignity of the person, the "well-being of the whole person must be taken into account in deciding about any therapeutic intervention or use of technology. Therapeutic procedures that are likely to cause harm or undesirable side-effects can be justified only by a proportionate benefit to the patient" (USCCB, 2009, 21).

A final area of social concern that has garnered much attention from ethicists and philosophers is the impact of cybernetic and nanotechnological implants on the brain. As noted by Merkel et al., the manipulation of the human mind raises the ethical stakes (155). In 2005, the European Group on Ethics stated that implantation should be excluded if less invasive and risky ways to achieve the same goal were available (Hermerén et al., 2005). Apart from health risks, one of the most important factors in the group's assessment was the potential for neural enhancements to alter an individual's state of consciousness, or personality, post-implantation. Other mental health issues include the potential addiction to neural implants and unknown consequences of introducing new electronic stimuli for direct brain-to-brain communication. The fears over personality change, addiction, and control are not without foundations. Documented cases of personality changes and the loss of personal identity have stemmed from the introduction of foreign (biological or technical) material into the brain, tumours and from the surgical removal of brain tissue (Hansson, 523). As outlined in Chapter 3,

the cybernetic implants of Kevin Warwick allow for a form of techlepathy, and raise a number of concerns as set out in Table 1. Merkel notes that "similar interfaces working in the opposite direction can be installed to evoke feelings and thoughts in human being by electrical stimulation. They could also be established as commodity devices e.g., to instill pleasure or—in abuse—to control the mood and the emotions of the recipient" (Merkel et al., 156).[236] Analyzing the military uses of microsystems and implants, J. Altmann similarly warns that social control becomes an option if electrical stimulation of the brain's happiness centers causes people to become addicted to implants, or if other types of stimulation could be used to alter their perceptions of reality.[237] Addiction for personal pleasure or for social control will have differing specific ethical responses, yet as both rely on a fundamental involuntary dependency they may be addressed by current Roman Catholic directives on addiction and substance abuse.

A Roman Catholic ethical approach views addiction to any substance (most often assumed to be alcohol or drugs) as unhealthy for both the body and the soul. According to the *CCC,* the use of drugs inflicts very grave damage on human health and life. Their use, except on strictly therapeutic grounds, is a grave offense (#2291). Never straying too far from the underlying sources of Roman Catholic bioethics, the *CCC* also refers to the virtue of temperance in the matter of addictions, which "disposes us to avoid every kind of excess: the abuse of food, alcohol, tobacco, or medicine" (# 2290). Additionally, as previously noted per the principle of mutilation, substances or practices which alter human reason are considered mutilative (Lynch, 146). The dangers of addiction were

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[236] Interestingly, Hansson points out that because neural implants have an ability to alter personality we must reconsider our criteria for personal identity (523). In his estimation, "the criteria of personal identity is the key role that personhood and personal identity have in several other ethical discussions" and as such will impact upon such issues as abortion, end of life decisions, and advanced directives (523).

[237] See Altmann (2001).

further outlined by the Pontifical Council for Health Care Workers. The Council outlined the difference between pleasure as a legitimate function in our lives and pleasure obtained through addiction, noting that addiction causes immediate satisfaction but bypasses the use of our capacities of intelligence and willpower that should regulate our lives (Zenit, 2001, ¶7). If, as the Council notes, it is a serious error "to think that our desires for peace, happiness and personal satisfaction will be automatically fulfilled by means ingesting some type of chemical cocktail," (Zenit, 2001, ¶7) it is reasonable to extend this error of addiction to an enhancing neural implant as well.

According to our observations for Table 1, the category of privacy must be a consideration when gauging an implant's ethical efficacy. To avoid the potential for violations of mental privacy and types of mind control, Hook warns that cybernetic devices must be equipped with "reliable means of filtering incoming information, especially against information that might be designed for repetitive or subliminal influence" (2004, 536). The general concern with social control via neural implants is, in fact, the fear of tyranny through technology. In terms of Roman Catholic ethics, a tyrant by oppression (*tyrannus in regimine*) is a supreme ruler who uses his power arbitrarily and oppressively.[238] J.V. Schall outlines historic moral principles and methods of recognizing tyranny, but it is his modern definition of tyranny as a constitutional problem involving the regular and legal designation of who is to rule, for how long, and with what limits, which best illustrates a Catholic approach to such governments (2003, 257). To be legitimate, rulers must rule in accordance with the public interest (Schall, 257). If privacy and control are violated by way of technological implants, a Roman Catholic response requires persons to work for the abolition of such tyranny (*CCC* #2298). As the

[238] See Harty (1912).

CCC says, "cruel practices [are] neither necessary for public order, nor in conformity with the legitimate rights of the human person. On the contrary, these practices led to ones even more degrading" (# 2298). In a broader context, the potential problems of addiction and control may both be labeled as a violation of one's freedom—something the Church views as linked with one's own responsibility and as the force for growth and maturity in truth and goodness (*CCC* #1731).

C. Summary of Roman Catholic guidelines for enhancement technologies

The use of technology as an enhancing tool does not in itself constitute a bioethical or moral concern for the Roman Catholic tradition; nor is the aspiration for human self-improvement or creative self-transformation. Using technology for such ends is simply an application of artificial constructs which are, in themselves, morally neutral. For a clearer definition of how we apply the artificial in everyday life, we may turn to the contrasting opinions of Fletcher and McCormick, who consider the moral implications of processes and technologies we judge as artificial. Fletcher notes that "[m]an is a maker and a selector and a designer and the more rationally contrived and deliberate anything is, the more *human* it is" (Fletcher, 1979, 87). For Fletcher, it would appear that nothing, finally, is artificial; all devices emanate from human design and are therefore natural. Indeed, in *The Bioethics of Regenerative Medicine,* Ping-Cheung Lo labels Fletcher as "an apostle to the faith of technology" by virtue of Fletcher's endorsement of chimeras, cyborgs, and other artificial possibilities (59). However, it is important to note that his comments are situated in the debate over the use of artificial devices and procedures in human reproduction. Much of the Roman Catholic bioethical reflection on artificiality is positioned within debates over reproductive technologies. Speaking about cloning,

McCormick differs with Fletcher's universal acceptance of artificial technology, raising concerns about future definitions of 'human' and the authenticity of applying artificial technologies to improve life. McCormick asks,

> Will reproductive [technological] interventions, even if they provide certain short-term remedies or advantages, actually improve the over-all quality of human life? If so, how is the improvement to be specified? What is the notion of the human that functions in the description of an 'improvement'? And who decides this? If the development and application of such technology are likely to be humanely destructive, why will they be such? (1981a, 334)

Written decades before the advent of cybernetic or nanotechnological enhancement technologies, these questions regarding reproductive technologies are directly applicable to any type of technology aimed at human improvement. McCormick's questions are aimed, in part, at authenticity—whether the quality of life will truly improve with a technological intervention. This thesis shall address this aspect of the debate as we compare the Roman Catholic approach with our second interlocutor, the philosophy of Transhumanism, in Chapter 7.

As discussed in Chapter 3, the applications of cybernetic and nanotechnological modifications can offer increases in physical and mental function. Similar to non-enhancing modifications, assuming a minimal risk to health and an option to reverse the applications of enhancement if needed, it is unlikely a Roman Catholic bioethical approach would fault cybernetic and nanotechnological implants. However, a problem remains in their potential to interrupt just levels of social equality. As well, while physical and mental function can increase with enhancement, there are no easy methods to enhance the human characteristics which the Church stresses are more valuable to

persons: the virtues. Although (as we shall outline in the next chapter) proponents of enhancement technologies speculate that they may actually be used to improve our moral character, "to alter biology to make people predisposed to be more moral by promoting empathy, imagination, sympathy, fairness, and honesty" (Savulescu, 2007, 7), there is no evidence to support such hopes. To date, no enhancement has been developed to increase one's level of compassion, one's solidarity with others, or one's moral compass. As such, according to a Roman Catholic bioethical approach, cybernetic and nanotechnological enhancement technologies appear aimed at the lesser qualities of people, qualities which the tradition does not necessarily even define as requirements for life and its protection. This holds with the importance that the Church places on authentic human development, as "[social] development cannot occur unless individual men and their associations cultivate in themselves the moral and social virtues, and promote them in society; thus, with the needed help of divine grace men who are truly new and artisans of a new humanity can be forthcoming" (*Gaudium et Spes* #30). Along with the Roman Catholic guidelines for non-enhancing body modifications outlined in the previous chapter, we may now offer additions to form a more complete set for enhancing body modifications:

1. In keeping with the principle of stewardship and proportionality, an enhancement technology must not cause excessive risk to human health or the ability to return individual body parts to a state of natural function. This includes risks in altering the existing consciousness of the individual and electronic methods of control by way of neural enhancement.

2. In keeping with a spirit of authenticity and the virtue of honesty, an individual's intent to enhance must not stem from immoral motives, deceit, or frivolity.

3. In keeping with social justice, the economic burden of an enhancement technology must be weighed against the greater needs for one's self and the community.

4. In keeping with a spirit of human dignity, an enhancement technology must never reduce the body to levels of commercialization or commodification. The inherent worth a body's function (even enhanced function) cannot be equated to the value of personhood.

5. In keeping with principles of solidarity and the common good, an enhancement technology must not detach an individual from the greater community, nor should it allow for a violation of other's privacy.

6. In keeping with the principle of the sacred gift of life, an enhancement technology must not interfere with the natural course of human reproduction, nor be applied in any form to alter the natural genetic makeup of a person, nor attempt to thwart a natural end to life.

Given these collected guidelines, many of the concerns of Hook and others who see a variety of deep social issues with cybernetic and nanotechnological body modifications may be mollified, if not abated.

In our next chapter we are able to outline the positions of the Transhumanists, a loose confederation of individuals who hold strong convictions regarding the positive impact of cybernetics and nanotechnology, as well as non-enhancing body modifications. Whereas our outlined Roman Catholic bioethical approach would place limits upon all

types of body modification technologies, a Transhumanist approach will view such limits as incongruent with human rights and the evolution of our species.

Chapter 6—Transhumanist approaches to enhancing body modifications

Transhumanists embrace a post-modern philosophy with deeply ingrained positions regarding body modification technologies.[239] Transhumanists do not represent a major force in current medical practice or research, and because their published post-modern opinions are relatively new they offer little by way of a historic bioethical tradition or an evaluative methodology when approaching bioethical questions. Yet Transhumanists provide an example of a philosophy that embraces the plasticity of the body, valuing function over form, and maintain a belief that individuals and communities can reach higher moral, intellectual, and physical levels through Transhuman ideals. Transhumanists address bioethical issues raised by human enhancement on similar levels to the Roman Catholic bioethical tradition, but with differing outcomes. Since Transhumanists promote all modifications whereas Roman Catholicism would have reservations about or place restrictions on some modifications, Transhumanism is an appropriate interlocutor for the purposes of this thesis. Before examining Transhuman beliefs about body modifications, we shall provide an introduction to Transhumanism, a movement some have branded as naïvely futuristic and others as the only logical choice for a free and better humanity.[240] We shall describe the approach of Transhumanists to the human condition, the nature of the movement and its organizations, and the self-characterization of its members.

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[239] Post-modernism is here understood to be characterized by relativism, interpretive pluralism, and a critical stance toward meta-narratives; see Lyotard (1986); Brann (1992).

[240] For the former view, see Dublin (1992), Fukuyama (2002), and Stock (2002); for the latter, see Hughes (2004), More (1994) (1997) (2004), and Blackford (2003).

A. The philosophy of Transhumanism

Transhumanism may best be characterized as a loose confederation of similar-minded individuals and groups working towards ideals of human betterment through technological progress. Etymologically, the term 'Transhuman' is traced to F.M. Estfandiary (also known as FM-2030), futurist and author, who combined the words 'transitional' and 'human' in his 1989 book, *Are You a Transhuman?* FM-2030 maintained that signs of 'transhumanity' included prostheses, plastic surgery, telecommunications, androgyny, artificial reproduction, atheism, world-travel, and rejections of traditional family values.[241] Adherents of Transhumanism reject definitions which limit human change, both in form and function, advocating technological means to eventually move beyond what most would describe as 'human' to a posthuman condition (Bostrom, 2003a, ¶2).

Hayles explains the assumption underlying the definition of posthuman as individuals who privilege information patterns over material form. In posthumanism, having a biological form is seen as an accident of history rather than an inevitability of life. The view considers consciousness a mere product of biology. Thus extending or replacing the body with other prostheses becomes a continuation of a process begun before we were born; it also configures the human so that we can become interchangeable with intelligent machinery (Hayles, 1999, 2). Seemingly in anticipation of such an approach to body ethics, Csordas noted over two decades ago that some have deemed the body most 'human' when it is most completely manipulated, controlled,

[241] See FM-2030 (1989); H+ (2012).

transformed or created by human agency (Csordas, 1998, 84).[242] Transhumanist philosophy is a kind of renaissance of reductionism by equating the body with a prosthetic, something to manipulate and which in turn can be manipulated.[243] Consequently, Hook (2003) summarizes Transhumanism as viewing consciousness as an epiphenomenon, believing there is no immaterial soul, and regarding the replacing of body with other prostheses as a natural extension of our fundamental relationship with our begotten bodies (2518).[244]

Transhumans actively embrace Enlightenment empiricism by elevating human reason over all, for by the use of reason technological means of solving problems in the human condition become available. Transhumanists view their own research and promotions as an extension of Enlightenment philosophy, which introduced social and technological changes through the primacy of human reason, new forms of governance, and the refutation of traditional supernatural-based authority. Accordingly, Transhumanist author and AI researcher Eliezer Yudkowsky concludes that religion, having been displaced by science as humanity's most reliable means of gaining knowledge of reality, is no longer relevant for contemporary human problems (jeanninemariedymphna, 2011, ¶8).[245] Thus, in his 2010 introduction to the ethical technology of Transhumanism, former director of the World Transhumanist Association, J. Hughes associates the belief that technology can transcend the limitations of the human body and brain, as well as techno-utopianism, with the family of Enlightenment philosophies (Hughes, 2010b, ¶3).

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[242] See for example, Fletcher (1979).
[243] See Hayles (1999).
[244] Clarifying his thoughts, Hook has labelled Transhumanism and posthumanism as "the demon child of the marriage of the worst elements of modern and post-modern thought" (2002, 60).
[245] See http://yudkowsky.net/

Several separate yet philosophically-similar international Transhumanist organizations exist, such as the Extropy Institute and the World Transhumanist Association (recently amalgamated into Humanity+). The Extropy Institute was founded as a non-profit multidisciplinary research institute promoting human advancement at all levels. It advocates for continual ethical, intellectual, and physical self-improvement through critical and creative thinking, perpetual learning, personal responsibility, proactivity and experimentation: "Using technology—in the widest sense to seek physiological and neurological augmentation along with emotional and psychological refinement" (More, 2003, ¶2). Extropians challenge the inevitability of aging and death, and seek continuing enhancements to human intellectual abilities, physical capacities, and emotional development. They believe humanity is in a transitory stage in evolutionary development and advocate using science to accelerate our move from a human to a Transhuman or posthuman condition. As Extropian advocate Freeman Dyson explains, "Humanity looks to me like a magnificent beginning but not the final word" (More, 2003, ¶1). Similarly, the now defunct World Transhumanist Association (WTA) was also a nonprofit membership organization which worked to promote discussion of the possibilities for radical improvement of human capacities using genetic, cybernetic and nanotechnology (WTA, 2004, ¶1).

Such groups are international, with discussion forums and meeting places commonly listed in city directories. No single Transhumanist group or spokesperson holds a position of authority or governance over this eclectic movement. However, over a two-year period from 2006-2008 Transhumanists from the Extropian Institute and the WTA, as well as other subgroups with similar philosophies, merged under the name Humanity+ and adopted both the WTA Declarations and The Transhumanist FAQ—a

joint effort between members of Extropy Institute, World Transhumanist Association, and other Transhumanist groups worldwide (Blackford, 2008, ¶1).[246]

Transhumanists maintain organized ties by means of conferences, online discussion groups, open-subscription internet mailing lists, personal blogs, and dedicated websites.[247] Since Transhumanism is overwhelmingly naturalistic in its thinking, it does not endorse any metaphysical view of human or even cosmic origins. Nevertheless, the great majority of people affiliated with the movement are non-theists. An internal 2007 study by Humanity+ indicated that 93% of members believed human accomplishments rather than divine intervention, grace, or redemption contributed to human progress; 90% denied that humans are bound by "divinely-set" limits; and 90% affirmed that they did not find divine revelation to be a source for the meaning of life (Hughes, 2010b, ¶7). This holds with Richard Cimino's report on Transhumanism and secular spirituality in *Religioscope*, which noted 72-85% of self-described 'futurists' identifying as atheists or agnostics (2011, ¶3). The predominance of non-theists within Transhumanism is further explored by Hughes, who adds a further specific classification of 'New Atheist' to characterize many within the community, although the definition is itself internally debated (Hughes, 2010a, ¶10).[248]

Hughes posits 'New Atheism' as a term to describe belief in the transcendent power of intelligence and technology itself—a naturalistic theology as it were. It is important to note that Hughes does not use the term 'New Atheism' in the way that it is

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[246] Humanity+ now holds 6000 members from more than 100 countries and are (as described by BM. Daly (2004)) mostly male engineers, philosophers, computer scientists, nanotechnologists, research scientists and other technological enthusiasts. See H+ (2012).

[247] For example, Humanity+ maintains a contact list with over 40 Transhumanist chapters across the globe, 12 international mailing lists, conference at Polytechnic University in Hong Kong, Parsons: The New School for Design in New York City, California Technology Institute, and Harvard University, as well as an "H+TV" series for online discussion and debate. See H+ (2012).

[248] See Gribbin (2011).

currently applied to the contemporary works of atheist apologists such as Richard Dawkins, Daniel Dennett, Sam Harris, and Christopher Hitchens. In fact, Transhumanist Giulio Prisco defends the naturalistic religiosity of Transhumanism and describes these apologists as "intolerant and aggressive atheist fundamentalists who wish to force[s] others not to believe" (2010, ¶4). If we accept, however, Hughes' usage of the term, four categories may be used to classify religious affiliation (or lack thereof) within Transhumanism: atheist, new atheist, deist (as inherited from Enlightenment sources), and theists. Indeed, when surveyed about religious affiliations, two-thirds of the members identified as atheist, agnostic, secular-humanist, or non-theist while the remainder self-identified from a variety of traditional religious backgrounds including Christian (8%), Buddhist (4%), Pagan (2%), Jewish (1%), Muslim (1%), and other groups of 1% or less (Hughes, 2010b, ¶8). Two additional statistics are most interesting, perhaps, for the purposes of our examination. First, 1% of members consider Transhumanism to be their official religion. Prisco explains that the Transhumanists religion addresses persons with spiritual sensibilities and needs while at the same time remains grounded in a materialist, not supernatural, worldview (2011, ¶5).[249] Secondly, 4% identify as Roman Catholic (Hughes, 2010, ¶8).

B. The Transhumanist bioethical approach

Transhumanism adopts a classical western paradigm that a person can and should strive for betterment, something Jean-Pierre Vernant traces to an Ancient Greek belief of wholeness and morphology: "divine bodies were complete and human bodies

[249] Prisco further outlines the cornerstones of a Transhumanists religion as mind uploading, the use of time-scanning for resurrections, and synthetic realities (2011, ¶8).

incomplete…" (Csordas, 2004, 331).[250] But Transhumanists differ from other views of betterment in that they rely on artificial components to enhance mind, body, and spirit. For Transhumanists, it is for the benefit of the whole body that individual parts be sacrificed and replaced with parts that have the ability to outlive and outperform their biological predecessors.[251] In this manner, organs or limbs not susceptible to infections, aging, or decomposition can be upgraded with future models and advancements, allowing the body to continually develop into higher functionality. Nor is it just the body that can be so enhanced. Transhumanists believe that educational improvements alone are insufficient to advance human reasoning; artificial means for enhancing intelligence are required. At present, various Transhumanist groups advocate extending human capabilities through such means as genetic engineering, memory-enhancing drugs, collaborative information-filtering, smart agents, intelligence amplification, wearable computers, and increased internet access (Pearce, 2001, ¶1). Overall, long-term goals for both physical and intellectual capabilities include technological developments such as superhuman artificial intelligence and the use of nanotechnology in the hopes of abolishing disease, eliminating aging, enriching human reward-centers (those areas of the brain which give pleasure and eliminate pain), and the gradual replacement of human bodies with synthetic enhancements (Pearce, 2001, ¶8).

This philosophy is summarized in *The Transhumanist Declaration*, the 'creed' of Transhumanism:

> (1) Humanity will be radically changed by technology in the future. We foresee the feasibility of redesigning the human condition, including such parameters as

[250] See Vernant (1989).
[251] See Ettinger (1964) (1972); Spierer (2012); More (1994).

the inevitability of aging, limitations on human and artificial intellects, un-chosen psychology, suffering, and our confinement to the planet earth.

(2) Systematic research should be put into understanding these coming developments and their long-term consequences.

(3) Transhumanists think that by being generally open and embracing of new technology we have a better chance of turning it to our advantage than if we try to ban or prohibit it.

(4) Transhumanists advocate the moral right for those who so wish to use technology to extend their mental and physical (including reproductive) capacities and to improve their control over their own lives. We seek personal growth beyond our current biological limitations.

(5) In planning for the future, it is mandatory to take into account the prospect of dramatic progress in technological capabilities. It would be tragic if the potential benefits failed to materialize because of technophobia and unnecessary prohibitions. On the other hand, it would also be tragic if intelligent life went extinct because of some disaster or war involving advanced technologies.

(6) We need to create forums where people can rationally debate what needs to be done and a social order where responsible decisions can be implemented.

(7) Transhumanism advocates the well-being of all sentience (whether in artificial intellects, humans, post-humans, or non-human animals) and encompasses many principles of modern humanism. Transhumanism does not support any particular party, politician or political platform.[252] (Hughes, 2002, ¶1)

[252] Subsequent to the formation of Humanity+ declarations 3, 5 & 6 were altered in form (but not substance), merging into: "We recognize that humanity faces serious risks, especially from the misuse of

Before we consider Transhuman approaches to bioethical questions, we shall discuss key principles or beliefs of the philosophy as expressed in these declarations. Although different Transhuman subgroups may emphasize specific elements of the philosophy, the following principles are common to all: a) betterment (both individual and social) through technology and an accompanying optimism for the future; b) a spirit of libertarianism; c) relatively unrestricted scientific research and experimentation; d) environmental and human safety; and e) an emphasis on human reason. These five principles can be found in other philosophical traditions, but differ in their application within Transhumanism. They are often still debated with Transhumanism itself.

i. Betterment

Individual and social betterment through technology is obviously a central principle of Transhumanism. Transhumanism views all instrumentally useful objects and systems that have been deliberately created as technological developments as "humanity's most glorious achievement" (n.d., ¶33). Declaration One envisions a future when technology is capable of human-machine interface on a cellular-level, a process which depends upon cybernetic and nanotechnological input. A corollary of this principle is a rejection of the fundamental distinction between natural things and artifacts as in the classical Greek and Western tradition[253] and the acceptance of Francis Bacon's appreciation for human creativity and technology and his philosophical reflections on

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new technologies. There are possible realistic scenarios that lead to the loss of most, or even all, of what we hold valuable. Some of these scenarios are drastic, others are subtle. Although all progress is change, not all change is progress. Research effort needs to be invested into understanding these prospects. We need to carefully deliberate how best to reduce risks and expedite beneficial applications. We also need forums where people can constructively discuss what should be done, and a social order where responsible decisions can be implemented. Reduction of existential risks, and development of means for the preservation of life and health, alleviation of rave suffering, and the improvement of human foresight and wisdom should be pursued as urgent priorities, and heavily funded" (Hughes, 2010d, 5).

[253] See Aristotle, *Physics* II.1; Hayles (1999); Franssen et al., (2010).

technology's positive social impact.[254] Such a view significantly differs from a modern philosopher such as Martin Heidegger, who sees technology's paramount position in society as a symptom of a wrongheaded attitude toward Being, or Jacques Ellul, who holds that technology is the sum total of rational action but that it is also deplorably taking modern society into a narrowed-down criterion of rationality: maximum efficiency (Franssen et al., 2010, ¶15).[255]

Declaration One is futuristic and optimistic in what it believes to be achievable through technology. Although some of its anticipated outcomes, such as confinement to planet Earth, have already been overcome by a select few, others, such as the redesign of un-chosen psychology and suffering, are far from being achieved.[256] Many of the conditions listed in the first Declaration, such as the inevitability of aging and limitations on human and artificial intellects, have generally come no further since Transhumanism began, yet adherents of the philosophy strongly believe in their inevitability. This optimistic futurism and technoutopianism of Transhumanism—which we consider a central characteristic of the movement—have been called *technoprogressivism* by its exponents, a term created to distinguish the movement's aspirations from apocalyptic fatalism or fixation on techno-fixes for all human problems (Hughes, 2010d, 6).

The amelioration of social problems through differing types of social reorganization with an emphasis on the merits of technology is not a new endeavor. It is, for example, seen in the works of Fourier, Saint-Simon, and Marx; such theories often

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[254] See Bacon, *New Atlantis* (1627); Franssen et al., (2010).
[255] See Ellul (1964).
[256] 'Un-chosen psychology' refers to humanity's naturally-born, or, genetic mental predispositions as contrasted against chosen states of psychology which could be, for example, achieved through pharmaceuticals. Transhuman discussions of suffering are generally placed on a global-scale and include the tribulations of poverty, malnutrition, lack of education, etc.

endorsed communalism and a rethinking of traditional religious systems.[257] However, while Transhuman technoprogressivism continues in this utopian tradition, there is contradiction within the movement over the inevitability of progress "because the Enlightenment tradition is conflicted between teleological expectations of unstoppable progress… and rational scientific awareness of the indeterminacy of the future" (Hughes, 2010a, ¶13). Technoprogressivism is dismissive of, "humanity's unexplained but inescapable tendency to pervert and destroy even its best achievements" something theologians such as Cole-Turner associate with sin (2011, 195). In turn, critics dismiss Transhumanist faith in technoprogressivism as lacking any "realistic attitude about how well and, at the same time, how badly things will go as we make 'progress' toward improving our lives and our species" (Cole-Turner, 2011, 195).[258] Ultimately, Transhumanists such as Hughes view a realistic implementation of technoprogressivism being "wedded to" and dependent on political progress, and as such not inevitable (2010d, 4).

ii. Libertarianism

Within Transhumanism, the belief in technological betterment is accompanied by an overwhelming emphasis on personal autonomy or, as we have phrased it, a spirit of libertarianism.[259] This principle allows for an individual's right to change any aspect of themselves without interference or limitations from political or social institutions. In addition, Transhuman libertarianism is seen in the Transhumanists support for economic models which have minimal governmental interference, allow for individual free-market

[257] See Bimber (1990); Buber (1996); Berlin (2002); Segal (2005).
[258] See too Peters (2003) (2005).
[259] See Hughes (2010f).

choices based upon supply and demand, and espouse the value of production.[260] Indeed the value of production is emphasized through the application of cybernetic and nanotechnological assistance to the human form, for in this way individual function and output may be radically increased and so too the global economy.[261] Indebted to the founders of political, economic, and moral libertarianism such as John Locke, John Trenchard, Thomas Gordon, Thomas Hobbes, David Hume, Charles-Louis de Secondat, Adam Smith, Jeremy Bentham and John Stuart Mill, Transhumanism is nonetheless more focused on *biolibertarianism* (the application of individual freedom by use of reason and will to achieve the posthuman conditions of enhancement and well-being) than political or economic libertarianism.[262] Indeed, other libertarians allege that, by advocating government programs and initiatives aimed at technological innovations, Transhumanism abandons the principle of limited government interference with personal freedoms (IgnoranceIsntBliss, 2010, ¶12).

However, if critics of Transhuman libertarianism charge it with ideological wavering by supporting government intrusion to advance technology, the same cannot be said of Transhumanism's emphasis on individual autonomy, which entails both rights and responsibilities, to adopt technology. Transhumanism extends autonomy to all sentient creatures, including purely artificial intelligences and cybernetic enhanced creatures. Transhumanists consider technology by itself a morally neutral object; consequently, as exact definitions regarding what constitutes human nature vary widely, it has been argued that detractors cannot claim that essential humanness is threatened by

[260] See More (1997).
[261] See Hanson Hughes (2004); (2007) (2008).
[262] See Bailey (2005).

technologies (Hogle, 709).[263] This conceptualization of technology as morally neutral has been severely critiqued in the twentieth century by philosophers from the Frankfurt School such as Theodor Adorno, Max Horkheimer, Herbert Marcuse, and Jürgen Habermas, as well as Martin Heidegger and Jacques Ellul (Franssen et al., ¶41). Indeed, many contemporary philosophers of technology agree that moral neutrality is impossible because technology, its development, and its use are goal-oriented processes with determined functions.[264] Nevertheless, Transhumanists claim opportunities for human enhancement cannot be bound by institutions or denied to willing individuals: Declaration Four speaks to the moral rights of those who endeavor to go beyond our species-based norms to a posthuman condition. As we shall see in the next chapter, this includes freedom to extend reproductive capacities, a point on which Transhumanists differ from Roman Catholic approaches to technological enhancements.

iii. Research and experimentation

The spirit of libertarianism contributes to the Transhumanist principle of relatively unrestricted scientific research and experimentation. Although Transhumanists are aware of and indebted to the methodological and epistemological analyses of experimentation outlined by John Stuart Mill, Ernst Mach, and Claude Bernard, their emphasis on unrestricted experimentation applies to practical legal codes and policies rather than the theoretical analysis of methods and processes.[265] Transhumanism is characterized by a disdain for what it calls technophobia or, in a broader context, "bioconservatism". Transhumanism views bans on specific types of scientific research

[263] See Caplan & Elliott (2004)
[264] See Latour (1992); Verbeek (2005). Although, as Franssen et al., note, "Typically, the authors who claim that technologies (can) have moral agency often redefine the notion of agency, and its connection to human will and freedom" (¶59).
[265] See Radder (2009) for a review of the philosophy of experimentation.

as not only contrary to liberty but as an attack on progress. Thus, Transhumanism views proponents of restraint in research within the fields of robotics, genetic engineering, and nanotechnology, such as Bill Joy and Jeremy Rifkin, or declarations against specific experimentation, such as the 2005 United Nations Declaration on Human Cloning, as poorly informed and misguided.[266] The social spectrum of biopolitics, as given by the Transhumanist Institute for Ethics & Emerging Technologies (IEET), has Libertarian Transhumanists (such as the Extropians) and Technoprogressives (such as the IEET) holding to left-of-center positions, while left-wing Bioconservatives (such as the Centre for Responsible Genetics) and right-wing Bioconservatives (such as the Centre for Bioethics and Human Dignity) are regarded as right-of-center, along with Luddism (IEEE, 2012, ¶1).[267] Rather than blanket bans on technological experimentation, Transhumanism prefers differential technological development "in which we would seek to influence the sequence in which technologies developed" (H+, 2012, ¶55). In this manner harmful technologies may be isolated and protections developed, although exact timing is not crucial. As the H+ FAQ 3.0 states, "In light of how superabundant the human benefits of technology can ultimately be, it matters less that we obtain all of these benefits in their precisely most optimal form, and more that we obtain them at all" (2012, ¶56).

iv. Risk

Further mitigating the principle of unrestricted research is Transhumanism's recognition of risk in the endeavor towards technoprogressivism. Thus environmental

[266] See Joy (2000); Rifkin (1984). On March 8th 2005 the UN General Assembly resolution 59/280, containing the *United Nations Declaration on Human Cloning,* passed by a recorded vote of 84 in favour, 34 against and 37 abstentions.

[267] Luddism defined as a philosophy resistant to, or actively hostile to, technological progress; the term was originally ascribed to the early nineteenth-century British groups of rioters who destroyed innovative textile machinery. See Randall (1986).

and human safety is commonly highlighted in Transhuman predictions and plans. Transhumanist philosophy may promote free reign of scientific experimentation towards technological advancement, but it does not advocate the limitation or scarring of environmental well-being in order to achieve this. The movement is not anti-nature.[268] Along with differential technological development, Transhumanism posits technologies such as genetic modification, nanotechnology, and increased human reason as ways to remedy current environmental damage. For Transhumanists, human enhancement will "boost our collective and individual intelligence, but with life extension we shall all feel more responsibility for the consequences of our ecological behavior" (H+, 2008, ¶3). This linking of technology and increased reason to ameliorate the environment is a central theme in technogaiaism, appropriated from the writings of Michael Rosenzweig's *Win-Win Ecology*, Walter Truett Anderson's *To Govern Evolution,* and Bruce Sterling's "Viridian" manifesto.[269] Technogaianism does not share conventional environmentalists' views that increased levels of technology degrade the natural environment. Rather, technogaianism advocates for ever-cleaner more efficient technologies. It has closer ties to recent environmental movements such as Alex Steffen's "bright green" environmentalism than to traditional schools of ecology or even "deep green" movements such as 'Earth First!'.[270] In this regard, technogaianism and Transhumanism have much in common. The concern to avoid catastrophic risks is

[268] Transhuman environmental concerns do not advocate a return to the utopian myth of a "noble-savage" society. It does, however, parallel such notions in essence with a vision of a "noble-cyborg."
[269] See H+ (2008).
[270] See Steffen (2004); Merle (1994); Jensen, McBay & Keith (2011).

intimated in Declaration Five and stated more strongly in the reworded Humanity+ version.[271]

v. Reason

The Transhuman emphasis on human reason and its improvement is expressed in several Declarations: Two, Four, Six and Seven. This emphasis is two-fold in that human reason is the foundation to Transhuman philosophy and methodology as well as a characteristic that can be enhanced both qualitatively and quantitatively. Examining the latter usage first, its emphasis is due to simple circular reasoning: by expanding our intelligence we shall be better able to solve social problems and enhance human function towards greater levels of intelligence. It is noteworthy that in advocating for political neutrality and the well-being of sentient life, Declaration Seven includes artificial life and all types of posthumans. Well-being thus extends to anything (regardless of form) that is equivalent to or exceeds human reason. Using Moore's Law of ever-increasing computer power per dollar spent, with a doubling-time between 18 months and two years, Transhumanism envisions a geometric progression towards superintelligent artificial life-forms and superintelligent enhanced humans (H+, 2012, ¶48, ¶56, ¶107).[272] As stated in the H+ FAQ 3.0, "Many Transhumanists would like to become superintelligent themselves….through uploading and subsequent enhancement or through the gradual augmentation of our biological brains, by means of future nootropics (cognitive enhancement drugs), cognitive techniques, IT tools (e.g., wearable computers, smart agents, information filtering systems, visualization software, etc.), neural-computer interfaces, or brain implants" (2012, ¶118).

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[271] See Hughes (2010d).
[272] See Moore (1965).

As it regards reason as the foundation of its philosophy and methodology, Transhumanism echoes Immanuel Kant's theories which ground natural and moral laws within human reason (with the concomitant necessity of autonomy).[273] In other words, reason is the foundation of morality for Transhumanists. Transhumanism also echoes certain tenets of Ayn Rand's objectivism, particularly the reliance on concept formation and inductive logic to come to knowledge and a moral purpose of rational self-interest (Transhuman principles devoted to increased government funding for technological research are, however, incompatible with Rand).[274] Transhumanists similarly recognize that their normative and epistemological first principles are historically situated in empiricism and utilitarianism (Hughes, 2010c, ¶19), but they acknowledge that the adoption of a philosophy of reason is not self-legitimating. As Hughes explains, Transhuman advocacy of reason is an existential choice; while some within the movement "fetishize" reason, others maintain that reason must be treated as a tool. According to Hughes, Transhumans should recognize that "values and moral codes are not grounded in Reason—or else [they] will lose many more people to the forces of irrationality in the future" (Hughes, 2010c, ¶20). But other Transhumanists, such as More, maintain that reason alone does ground morality and appeal to *pancritical* rationalism (an evolutionary epistemology based on the work on Karl Popper, William W. Bartley, and Donald Campell) to counter charges that rationalism itself depends on a fundamental assumption that must be taken on faith (Extropy, 2003, 6.6). Pancritical rationalism does away with justification and grounds rationalism in a combination of

[273] See Kant's Critique of Pure Reason (1781), Groundwork of the Metaphysics of Morals (1785) and Critique of Practical Reason (1788).
[274] See Thomas (2012).

conjecture and criticism.[275] Whether this internal debate concerning reason and morality crystalizes in forms such as morally-constrained maximization as in Gauthier, or Harsanyi's ethical consequentialism constrained by impartiality, or indeed a more spiritually-oriented narrative, is yet to be determined.[276]

Despite their appeal to and confidence in rationality, Transhumanists recognize that their philosophy is not persuasive for many people, despite the use that people make of technology in their daily lives. Although Transhumanists have success per their Sixth Declaration, the call for forums of debate, particularly through their online presence with clear ties to members and databases of information, avowed members are limited.[277] To date, there has been little impetus in medicine to go beyond species-based norms, and scientific breakthroughs which are deemed to conflict with traditional roles of the body often encounter great restriction. For example, human cloning has been universally banned and medical practitioners mostly display unsympathetic and fragmented opinions regarding human enhancement.[278] The potential detrimental social consequences of new technologies provoke rapid and pronounced concern by a number of ethicists and philosophers alike.[279] Transhumanists recognize that medical science advance typically adopts new technology with the aim of repairing humans rather than enhancing them (Miah, 2003, 3). As Transhumanist A. Miah, lecturer in Media, Bioethics, and Cyberculture at the University of Paisley at Ayr, notes,

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[275] See Popper (1960); Bartley (1962); More (1994b); Artigas (1999); Burch (2001).
[276] For Gauthier moral constraints, imposed on the direct pursuit of individual utility, can be justified by economic rationality and enlightened self-interest; see Gauthier (1986). Harsanyi argues for ethical consequentialism by the combining a requirement of maximization with a constraint of impartiality and accounting for the impact out actions produce on all sentient creatures; See Harsanyi (1982).
[277] See H+ (2012).
[278] See Annas (2000); Callahan (1973) (1990) (2003); Hotze et al., (2011); Delaney & Martin (2011).
[279] Such critics of technology include Nikolas Kompridis, Francis Fukuyama, Jürgen Habermas, William Joy, Michael Sandel, Herbert Marcuse, John Zerzan, Martin Heidegger, and Hubert Dreyfus.

> Medicine has been premised upon restoration, rather than the creation of new levels of human capability through such repair. Thus, the main part of medical history has been only partially Transhuman, since it has been limited by the narrow reasons for which it makes use of technology. Indeed, one might even question the degree to which medical technologies are at all Transhuman, since the concept of making well does not seem, necessarily, to encompass making a person *more* than well (as would be the ambition of Transhumanist technologies). (Miah, 2003, ¶8)

This observation confirms what Hughes observed above, that values are at play in debates about the enhancement technologies that Transhumanists embrace. Contentions surrounding enhancement technologies lead a majority of physicians to question their ethical use, and yet, according to Hotze et al., the majority also agreed that "[They] have no problem with medical enhancement as long as it is safe for the individual receiving it" (6).

C. Transhumanist perspectives on issues raised by enhancement technologies

When addressing bioethical issues, Transhumans reflect on many of the same ethical categories used by many traditional religious groups (such as Roman Catholics): human limitations and moral obligations, justice, and dignity. But their interpretation of these categories is, evidently, shaped by their philosophical stance. One can, in fact, distill from their philosophical stance several principles that direct their response to bioethical issues. Although specific Transhuman sub-groups may differ in their positions or emphasis on particular issues, Transhumans appears to adhere to the following principles when addressing bioethical issues:

a) A naturalistic and empirical approach to decision-making.

b) The application of technology to advance the human condition.

c) The moral obligation to embrace technology.

d) Individual autonomy in pursuit of personal betterment and/or the common good.

e) Resistance to policies that curb technological progress.

We shall now consider Transhuman perspectives on the concepts and issues we have already examined from a Roman Catholic perspective. We shall identify how Transhumanism differs from Roman Catholicism, but also discuss where it converges with Roman Catholicism. As we shall see, the two perspectives are not mutually exclusive. There are points where, despite fundamental philosophical differences, they may be able to find common ground.

It should come as no surprise that a Transhumanist idea of stewardship is quite different from a Roman Catholic one. Quoting a maxim of Aristotle,[280] the bioethicists Ashley and O'Rourke note that modern medicine has challenged traditional views on stewardship:

> A basic axiom of medicine has always been the Greek dictum, *art perfects nature*, which implies that human persons can be healed (or patched up) and helped to develop to maturity, but they cannot be essentially remade. Today, however, the situation has changed. We must face the questions: Is it right for persons to become their own creators? Can and should human nature be remade? . . . . Francoeur (1972) has answered that because 'we can, we must' and calls this the 'technological imperative.' (1997, 316)

[280] "Art imitates nature"(Aristotle, *Physics*, II, c.2, 194a 22)

Transhumanists would side with Francoeur: nature does not determine the limits of the remaking of the human. As Transhumanist Nick Bostrom quips, "Had Mother Nature been a real parent, she would have been in jail for child abuse and murder" (Bostrom, 2003b, ¶23). Stewardship, as viewed in Transhumanist approaches to body function and human evolution, is a work in progress. This is to say that in a Transhumanist philosophy the human body may be seen as a 'temple'—a Transhumanist expression—but one that is still in the process of creation—fluid in form and in need of alterations. Using such metaphors Transhumanism calls individuals to become self-sculpting temple architects rather than a creator's model. This is consistent with Transhumanism's emphasis on individual freedom and Transhumanism's predominately non-theist orientation.[281] Transhumanism does not weigh into discussions on the body from a theological position based on accounts of creation or from a concept of the body as a fixed image; rather, it understands the person to be in total control of their own body and all its constituents. It thus takes the body to be an entity to be used, altered, augmented, or discarded as one desires.

The idea that humans should be in control of their own self-creation is not unique to a Transhuman perspective. Roman Catholic theologians Ashley and O'Rourke observe how technological advances in medicine have changed the role that some now assign to human beings. Modern technology allows for unprecedented dominion over nature, and the ethical implication of these discoveries is that humans will no longer be 'stewards of creation' but creators (Ashley & O'Rourke, 45), a shift in ethical perspective congenial

[281] As Garner notes in his analysis of technological metaphors and Christianity, metaphors that capture the creative impulse found in technological culture include God as a technologist—a hacker—which incorporates into it the concept of playfulness, defined as being creative and enjoying it (2005, 2, 8). Similarly he explains that "we hack—create technological novelty—because we are made in the image of a God who hacks" (Garner, 11). For body as a temple metaphor see Hicks (2012); Sirius (October 20, 2010).

to the Transhumanist perspective. Furthermore, Ashley and O'Rourke argue that the metaphor of co-worker fits into theological perspectives:

> First, since theologians generally accept the view that the Creator produced the human race by an evolutionary process, they have to take into account the fact that human beings are not finished masterpieces but rather a work in progress. Thus, it is no insult to God's creative wisdom for people to suppose that they can further perfect the world and even their own bodies. Indeed, it is to God's praise that he has generously called them to be co-workers with him in his creative task. (38)

Similarly, theologian Philip Hefner has utilized the metaphor of humans as *created co-creators*, arguing that God's purposes become embodied through technology (2003, 79). Likewise, Peters (2003) upholds the idea of humans as created co-creators placed into a position of *creation continua* (15), as does Teilhard de Chardin in *Christianity and Evolution*. Indeed Teilhard explains, "…creation is not a period intrusion of the First Cause: It is an act co-extensive with the whole duration of the universe" (1971, 23). However, Ashley, O'Rourke, Hefner, Peters, and Teilhard situate the creative ability of humanity within ethical limitations based upon theological principles, whereas Transhumanist philosophy rejects all boundaries save those which may lead to extinction. From a Transhumanist perspective, stewardship is a state of continuous creation which includes the body, society, and the environment, but the origin-point of creation is neither extraordinary nor attributed to the divine. This removes certain traditional religiously based limits from stewardship such as prohibitions with regard to body form or surpassing species-based norms.

Concepts of social justice and human dignity also figure in Transhumanist discussions of the ethics of human enhancements. Transhumanists recognize that enhancing body modifications raise concerns about potential social inequalities that might result from technological inequalities. Indeed, in a 2005 survey of Transhumanists, 41% of respondents were unsure that "humans and posthumans will be able to coexist in one society and polity," with a further 12% denying it would be possible (Hughes, 2010e, 3). Some critics assert that posthumans will inevitably carry out genocide against the rest of society or insist upon greater control over the non-transformed by virtue of increased abilities and function.[282] However, as stated in Declaration Five, Transhumanists argue that any social inequalities resulting from technological advances must be addressed by social remedies rather than by suppressing technological innovation and application. Transhumanists stress that modern, peaceful societies have large numbers of people with diminished physical or mental capacities along with many other people who may be exceptionally strong or healthy physically or intellectually talented in various ways (Bostrom, 2003b, ¶15). Thus Transhumanists such as Bostrom argue that persons with technologically enhanced capacities will serve to broaden social diversity and aid the common good rather than "rip society apart or trigger to genocide or enslavement" (2003b, ¶15). Social problems such as inequity, discrimination, and stigmatization, whether perpetuated against or by enhanced humans, call for social remedies such as education and promotion of tolerance. Transhumanism argues that such problems have plagued communities throughout history. Rather than "painting alarmist pictures of the threat from future technologically modified people, or hurling preemptive condemnations of their necessarily debased nature", acceptance

[282] See Annas (2005); Buchanan (2009).

towards those who are different from ourselves will be the key to a common good (Bostrom, 2003b, ¶15).

Transhuman philosophy holds that social justice cannot be valid without individual justice. According to Transhumanism, measures which may limit augmentation or enhancement perpetuate injustice on multiple levels: against the individual whose right it is to alter the self, and against society which would potentially benefit from the increased levels of productivity, intellect and creativity. Indeed, in *Citizen Cyborg*, Hughes argues that the capacities and rights of all—the enhanced and the unenhanced—could be protected with systems of licensure; enhanced persons with advanced cognitive or physical abilities would be required to apply for a regulated license in the same way that people currently require a license to use firearms or motor-vehicles (Hughes, 2010e). However, such a suggestion presents a paradox, perhaps a reflection of the newness and diversity of the movement: given Transhumanism's libertarian roots, suggestions of government regulations and de facto monitoring of enhanced persons clash with the principle of individual autonomy. To ensure justice for enhanced persons without compromising Transhuman principles, a balance of bureaucracy and individual freedoms will have to develop or, as with problems in social inequality, social remedies will have to be applied.

Responding to critics who view enhancing body modifications as a violation of human dignity, Transhumanists counter that the concept should be seen on various levels and extended to all. Indeed, Bostrom links dignity with justice and argues for an expanding circle of inclusion that respects the enhanced without disrespecting the unenhanced:

Human dignity is sometimes invoked as a polemical substitute for clear ideas. This is not to say that there are no important moral issues relating to dignity, but it does mean that there is a need to define what one has in mind when one uses the term. Here, we shall consider two different senses of dignity:

- Dignity as moral status, in particular the inalienable right to be treated with a basic level of respect.
- Dignity as the quality of being worthy or honorable; worthiness, worth, nobleness, excellence. (The Oxford English Dictionary)

On both these definitions, dignity is something that a posthuman could possess. What appears to worry bioconservatives is that introducing new kinds of enhanced person into the world might cause some individuals (perhaps infants, or the mentally handicapped, or unenhanced humans in general) to lose some of the moral status that they currently possess, and that a fundamental precondition of liberal democracy, the principle of equal dignity for all, would be zapped. The underlying intuition seems to be that instead of the famed "expanding moral circle", what we have is more like an oval, whose shape we can change but whose area must remain constant. Thankfully, this purported conservation law of moral recognition lacks empirical support. The set of individuals accorded full moral status by Western societies has actually increased, to include men without property or noble descent, women, and non-white peoples. It would seem feasible to extend this set further to include future posthumans, or, for that matter, some

> of the higher primates or human-animal chimaeras, should such be created. (Bostrom, 2003b, ¶18)[283]

Within each of these points of social justice, we note that the Transhuman response typically extends existing concepts to enhanced persons under the rubric of Western law and assumed social acceptance. This, then, is a further aspect of Transhuman bioethics—confidence that existing laws and social approval will expand based upon human reason and precedent.

D. Application and assessment of enhancement technologies

Given the view that human stewardship is to be understood through our ability to self-create and enhance, and the position that such actions are not only moral but imperative for our growth, what types of enhancements should be pursued according to Transhumanists? As previously noted, while a variety of body modifications are available, the enhancing of human intelligence remains a priority for Transhumanism.[284] Transhumanists believe that the benefits of this application of technology serve the common as well as individual good, since cognitive enhancement, assistive artificial intelligence, and improved levels of electronic communication would better allow citizens to know and pursue individual interests and social government, including an increasingly efficient democracy.[285] As Transhumanist writer Mark Walker explains, "[S]ince some grand architect has not fixed our intelligence, we may also ask where it might evolve… there are other means that will allow us to alter *Homo sapiens* in ways in

[283] See too Bostrom (2005a).
[284] See More (2003); Bostrom (n.d.) (1998) (2005a); Hughes (2002) (2010c); H+ (2012).
[285] See Hughes (2004) (2010f).

which it would take natural selection hundreds of thousands if not millions of years to duplicate" (2002, ¶5).

Transhumanists point to three general methods for advancing human intelligence: 1) genetic manipulation of existing brain cells to further growth, 2) new techniques for eugenic programs to breed greater intelligence into subsequent generations, and 3) the use of computer technologies such as memory storage and calculation speed to provide a boost to human intellect and function. We have already discussed general concerns about the first two methods—not directly related to this thesis—in Chapter 2. Here we shall focus on the third method as it represents technological body modification using cybernetic and nanotechnological implants which clearly seek to enhance the species-based norms. As Transhumanists seek a posthuman condition, multiple devices and technologies are envisioned to achieve mental enhancements such as conscious hormonal control, conscious bone and muscle development, muting emotions and instincts, programmable hibernation capacities, and mind uploading.[286]

As noted, Transhumanists (particularly the Extropian subgroup) encourage the use of technologies incorporated into the body, both as implants and as wearable computers (see Chapter 3), and promote the use of these types of technologies in artistic, decorative, or cosmetic body modifications. Connecting electronic devices to the human brain for purposes of enhancement is not a new idea; in its early formulation it was often associated with visions of space colonization.[287] Central nervous system stimulation by way of brain-implants has produced a variety of controls and actions, from motor

[286] See Primo Posthuman (2005).
[287] See Bernal (1969).

responses and specific emotions to memory improvement.[288] Mitchell correctly envisioned many of these modifications only a few years before the first official human-machine implantations under Warwick and Project Cyborg 1.0 and 2.0:

> Electronic organs, as they become ever smaller and more intimately connected to you, will lose their traditional hard plastic carapaces. They will become more like items of clothing, soft wearables that conform to the contours of your body; you will have them fitted like shoes, gloves, contact lenses, or hearing aids. Circuits may be woven into cloth. Micro-devices may even be implanted surgically…it is certainly not hard to imagine electronic ear studs, nose rings, or tattoos. Some chips are tiny enough to be injectable and have already been used for tagging and tracking wildlife and identifying pets. Once you break the bounds of your bag of skin in this way, you will also begin to blend into the architecture. In other words, some of your electronic organs may be built into your surroundings. (Mitchell, 1997, ¶4)

Brain interface devices (either wearables or implants) are the primary examples of cybernetic modification to increase human reasoning. Neural implants offer considerable advantages as compared to wearable devices because of their continuous use, hidden nature, and simple uninterrupted ability to be recharged (Merkel et al., 141). Devices such as a prosthetic hippocampus, in the form of a microchip, may be designed to recreate memory processing.[289] As Hoag (2003) notes, military researchers at Defense Advanced Research Projects Agency (DARPA) are testing such chips to replace the hippocampus or to relay patterned messages—about 10% of the DARPA budget is

[288] See Delgado (1969) (1977); Delgado et al., (1973); Merkel (2007).
[289] See Gholmieh et al., (2001) (2006); Berger et al., (2001); Merkel et al., (2007).

devoted to the Brain-Machine Interface Program (Hogle, 708). Brain interface devices may also be tailored to increase other brain functions such as reaction-time and decision-making.[290] However, while auditory and visual neural implants have improved considerably in the last decade, there are still no artificial implants capable of restoring or enhancing the sense of smell or taste; enhancements to touch are still limited; and (to date) no neural implant designed to increase memory has been successfully integrated (Merkel, et. al., 141, 148). Further, limitations with contemporary neural implants include difficulties in direct neuron contact points involved in sensory pathways, problems in peripheral nerve-death caused by rapid degeneration after initial traumas, neural tissue rejection, and uncontrolled interference with neighbouring systems in what is termed 'synaptic spread' (Merkel et al., 142, 150, 151).[291]

To assess these proposed brain-machine devices, we turn to the criteria we developed in Chapter 3 (see Table 1). The criteria of implantability, permanency and power necessarily apply to devices that are to be embedded into brain tissue. Public interaction is the only criterion that may not apply, as the devices may be innocuous to all but the end-user and not specifically designed to monitor surroundings. Nonetheless, given that three or four of the criteria come into consideration, brain-machine devices appear to warrant caution. At the same time, wearable devices could lower the risk assessment, since they would not be implanted and permanent. Our assessment of brain-machine devices is thus not definitive. But the assessment of the power of these devices

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[290] See Gray (2001); Talbot (2002).

[291] As Merkel et al., note, previous uses of implants have stimulated non-targeted neural systems as a side effect, such as "users of an Auditory Brainstem Implant (ABI) who have reported sensations of vibrations of their whole body, tingling in the legs and vertigo when their implants were switched on for the first time." Among the risks of neural implants are: interference with higher nervous functions by close proximity to brain centres responsible for memory, social behaviour, language processing and spatial orientation, possible hormonal system activation and gross changes in the emotional and mental status of a person (150).

is complicated by the brain's considered importance as a seat of consciousness and locus of selfhood.[292] Indeed, according to Farah and Wolpe (2004), neurological interventions must be held to a higher standard and have different ethical implications as compared with other body parts.[293]

While the goal of cybernetic or bionic brain enhancements have progressed to the stage of accessible and wearable devices, other Transhuman goals require far more advanced levels of technology. An example of this is presented in *The Journal of Evolution and Technology* (a WTA publication): a single, complex nano-robot to duplicate all essential thermal and biochemical transport functions of human blood, including circulation of respiratory gases, glucose, hormones, cytokines, waste products, and all necessary cellular components—the vasculoid. As outlined:

> The device would conform to the shape of existing blood vessels. Ideally, it would replace natural blood so thoroughly that the rest of the body would remain, at least physio-chemically, essentially unaffected, but sustained in a cardioplegic state. It is, in effect, a mechanically engineered redesign of the human circulatory system that attempts to integrate itself as an intimate personal appliance with minimal adaptation on the part of the host human body. A robotic device that replaces and extends the human vascular system is properly called a "vasculoid," a vascular-like machine. But the vasculoid is more than just an artificial vascular system. Rather, it is a member of a class of space—or volume—filling nanomedical augmentation devices whose function applies to the human vascular tree. The device is extremely complex, having ~500 trillion independent

[292] See Hogle (2005); Farah & Wolpe (2004).
[293] Farah and Wolpe echo the previously noted Merkel et al., in that the manipulation of the human mind raises the ethical stakes (155).

> cooperating nanorobots. In simplest terms, the vasculoid is a watertight coating of nanomachinery distributed across the luminal surface of the entire human vascular tree. This nanomachinery uses a ciliary array to transport important nutrients and biological cells to the tissues, containerized either in "tankers" (for molecules) or "boxcars" (for cells). The basic device weighs ~2 kg and releases ~30 watts of waste heat at a basal activity level and a maximum of ~200 watts of power at peak (e.g., Olympic sprint) activity level…The power dissipation of the human body ranges from ~100 watts (basal) to ~1600 watts (peak), so the device presents no adverse thermogenic consequences to the user. The appliance is powered by glucose and oxygen, as may be common in medical nanorobotic systems. (Freitas & Phoenix, 2002, ¶4)

If we apply the criteria of Chapter 3 (Table 1) to the vasculoid, we again find that implantability, permanency and power come under consideration; public interaction may be minimal. Unlike changes to human reason by way of brain implants, a vasculoid construct would not *per se* alter patterns of consciousness or mental processes. However, by virtue of its design, overall potential risk to health remains extremely high.

Transhumanism recognizes that enhancement presents risks to the individual and society. However, all Transhuman groups believe in the value of these human advances. Despite their differences, all groups share a core conviction that human enhancement is "doable and good" and that "techno-fixes for social problems" are perfectly possible and morally justifiable (Prisco, 2010, ¶1). Apart from reason (as a motive for pursuing enhancements), Transhumans believe specific moral values call for an overall agenda of human enhancement. Compassion and justice are two such values. They are cited in a variety of Transhuman social policies, particularly with regard to the currently disabled

and all persons living with infirmities. As the WTA explains, the disabled "are the most technologically dependent humans ever known, and are aggressive in their insistence on their rights to be technologically assisted in fully participating in society" (H+, 2008a, ¶1). Transhumanism considers it unjust and uncompassionate to leave the disabled in conditions which restrict their abilities and rights. Such altruism is common to many philosophies, but a notable feature of the Transhuman approach to all social issues is an over-arching emphasis on rights currently established in conventions and law, and autonomy.

Included in the WTA statement on the physically disabled are the rights of parents "to choose to have non-disabled children" and "[j]ust as we should have the choice to get rid of a disability, we should also have the right to choose not to be 'fixed,' and to choose to live with bodies that aren't 'normal'" (2008a, ¶4).[294] As previously discussed, the value of autonomy within Transhumanism supersedes nearly all others, and, as implied in the WTA statement on the physically disabled, this translates into Transhumanism's pro-choice stand on reproductive rights, contraceptive use, and germinal choice technologies.[295] Transhuman policies towards the cognitively and mentally disabled are similar to their policies towards the physically disabled in that technological means of providing cures are considered the best solution. Indeed, Transhumanists charge that bioconservatives display "little sympathy" for conditions of mental disability by denying the possibility of enhancement technologies (H+, 2008d, ¶1). Hughes insists that, "Although few disabled people and Transhumanists realize it yet, we are allies in fighting for technological empowerment" (2004b, ¶8). Such advocacy is critiqued by

[294] See Wolbring (2003).
[295] See Bostrom (2003c); H+ (2008c).

University of Calgary professor of community rehabilitation and disability studies Gregor Wolbring, who dismisses the Transhumanist idea that traditionally disabled people would welcome enhancement technologies and share a challenge of enhancement with other unenhanced people (2006, ¶14). Rather, Wolbring expects further marginalization of the disabled as enhancement resources "would never be 'wasted' on people who are below the traditional norm" (¶14).

Such Transhumanism beliefs have been further criticized as forms of positivism and scientism, as neither practical nor relevant to the global poor, and neither just nor reasonable in terms of environmental impact.[296] Transhumanists counter that emerging technologies improve the quality of life throughout the world, if they are safe, accessible, and sustainable.[297] Unlike the Roman Catholic approach to bioethics, Transhumanism rejects using natural law as a social standard. This is reflected in Transhuman policies (in combination with autonomy and rights), as shown in Transhuman advocacy for gay, lesbian, bisexual and transgendered persons.[298] Transhumanists believe that values are not based upon religious precepts. They recognize that they hold a generally naturalistic outlook towards social problems, and identify with secular humanism. However, despite claiming that "Transhumanism is a philosophical and cultural movement, not a religion… [and, that] Transhumanism does not offer answers about the ultimate purpose and nature of existence" (H+, 2008f, ¶2) there are a number of similarities with, and

[296] See Borsook (1996) (2000); Barbrook & Cameron (2000); Szeman (2007).
[297] See H+ (2008e).
[298] See H+ (2008e).

advocates within Transhumanism for, religiously-oriented beliefs.[299] We shall discuss these in the next chapter.

To summarize, a Transhumanism approach to body modification incorporates guidelines promoting non-enhancing and enhancing technologies with emphasis on the merits of enhancement options such as cybernetic and nanotechnological modifications. Although specific Transhuman groups may stress differing aspects of technological enhancement, and refinements in the philosophy's principles continue, we would describe the follow guidelines as representative of a current Transhuman approach:

1) In keeping with a spirit of autonomy and freedom of choice, individuals must have full control and options to all body modifications aimed at betterment.
2) In keeping with standards of safety, research into body modification technology must be continual, thereby ensuring minimal environmental and medical risk.
3) To promote rapid individual and social improvement, enhancement technologies must include a focus on the human brain, with specific expansion of memory and reasoning.
4) To protect the rights of all persons, unenhanced and enhanced, standards of non-discrimination must be applied equally, and privacy maintained.
5) In keeping with the moral obligation to improve society, enhancement technologies must be made widely available and accessible to all.

[299] Indeed Jeanninemariedymphna applies Charles Taylor to the Transhumanist secular narrative and claims it is not as independent from religious heritage as we might think (2011, ¶7); see too Taylor's discussions on transcendence and modernity (2007).

Chapter 7—Guidelines on enhancement technologies

Having completed an analysis of emerging enhancement technologies and the corresponding ethical approaches of Roman Catholicism and Transhumanism, we are in a position to consider the implications of our analysis for public policy regarding cybernetic and nanotechnological modification technologies. If recommendations to Canadian health policy regarding the use of enhancement technologies are to be of value in a broadly diverse society, they must be grounded in enough common elements between all parties as to facilitate dialogue and allow for basic agreements upon key principles. Bioethical arguments may be grounded through varying approaches: religious, utilitarian, virtue-based, rights-based, fairness, or even civics.[300] Each of the approaches we have focused on in this thesis—Roman Catholicism and Transhumanism—has aspects which will not be acceptable to the other and, indeed, in a broader context. But commonalities between the two approaches exist, particularly between a certain strand of Roman Catholic bioethics and a minority position within Transhumanism. As a conclusion to this thesis we shall examine this minority position and additional ways in which the two approaches may come to a closer consensus on body modification technologies. It may be that between our two presented approaches, a religious/philosophical parting of the ways over body modification technologies will be inevitable. However, though seemingly contrary, it can be argued that a significant number of similarities exist between Roman Catholicism and Transhumanism—enough to justify their comparison and to act as an initial guide to incorporating a wider view which may satisfy key elements of both.

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[300] See Marcin (2004).

A. Rationales and comparisons between responses

Varied bioethical approaches are unsurprising given that, as Catholic law-professor Raymond Marcin observes, we live in an age of ideological pluralism (2004, 1). But this does not exclude the possibility of a comparative analysis. On the simplest level, both the Roman Catholics and Transhumanists articulate beliefs regarding a variety of bioethical issues which allow for comparison and contrast. Furthermore, they employ similar categories of analysis and even some common language, though the meaning of the language varies. Indeed, the Transhumanist Florida-based Teresem organization and the Transhumanist Society for Universal Immortalism have been noted by fellow Transhumanists as using spiritual language to describe ideas that go beyond science (Cimino, 2011, ¶2). Others note this type of growing confluence between technological secularism and religion, for "[w]hat computer technology has done is create new possibilities for otherwise secular people to express their spiritual longing" (Stahl, 2002, 12). Both Transhumanism and Roman Catholicism integrate moral judgments into their suggested policies and, although theistically divergent, both address the same subject: humanity—its purpose, direction, and ultimate end. Indeed, while not a traditional organized religion, Transhumanism displays specific elemental characteristics analogous to faith-based models. Theologians and ethicists such as Cole-Turner, Waters, Daly, Grumett, Burdett, Garner, and McKenny note that the yearnings of the Transhumanists—if not their technological methods—find deep affinities in Christian belief.[301] Within Transhumanism three areas of discourse display roots, appropriations, or parallels to

[301] See the contributions of these authors to Cole-Turner (2011).

Christian thought: eschatological theories of human evolution, the influence of Teilhard de Chardin, and a focus on human conversion or transcendence.

i. Eschatology

Transhumanist eschatology espouses theories that are similar to traditional Christian beliefs. These theories often act as a foundation for sub-groups within Transhumanism who overtly claim the philosophy as a religious practice. Transhumanist eschatology centers on the future state of an enhanced humanity and on utopian scenarios. As eschatological beliefs are common to many theological and philosophical traditions—Catholicism included—its presence within Transhumanism is not, in itself, distinctive. However, unique to Transhumanism's eschatology are the wide range of technologically-oriented utopian possibilities and a faith in the "inevitability of conjoined scientific and political progress," a point Hughes notes as something which few groups hold and is traceable to Transhumanism's Enlightenment roots (2010d, 3).

Transhuman teleological scenarios are as eclectic as its membership, ranging from the nihilism of universal expansion and dissipation into heat death, to theories that hold more in common with traditional Christian beliefs and theological language. One such comparable Transhuman scenario is the belief that advanced technologies and exponential growth in human abilities will eventually reach inconceivable and mysterious levels as compared to current species-based norms, levels that can only be classified as supernatural or even divine in nature.[302] Some Transhumanists believe that human intelligence will reach levels that can only be dubbed as *super-intelligent*, granting posthumans the ability to create simulated civilizations, indistinguishable from

[302] See Kurzweil (1999); Bostrom (2003b); Gardner (2007); Order of Cosmic Engineers (2009); Lanza & Berman (2009); Hughes (2010b); Geraci (2010).

reality and everlasting.[303] Some Transhumanists dub this the coming of the 'technological singularity' (jeanninemariedymphna, 2011, ¶3). This hypothesis feeds into the 'New Atheism' that Hughes regards as in fact expressive of the "religion" of Transhumanism because, within such simulations, "the naturalistic God [a super-intelligent enhanced-human creator] may perform miracles, reward and punish behavior, and grant an afterlife or reincarnation" (2010b, 3). Some Transhumanist groups, such as the Order of Cosmic Engineers, view a human telos in super-intelligence itself: a key to divinity that brings omniscience and omnipotence.[304] This condition is to be achieved through enhanced human bodies, cybernetics, nanotechnology, or even through the merger of human-machine artificial intelligences.[305] Other Transhumanists retain end-of-time scenarios which incorporate a collapsing universe and a reversal of the big-bang. This reversal allows for the opportunity to reanimate the dead and incorporate our consciousness's into new or existing universes—a blending of Transhuman ideas (and some futuristic speculation) of Fedorov, Tipler, Kurzweil, Perry, and Clarke.[306] Alternatively, Frank Tipler argues that in a Big Crunch scenario every intelligent creature and living thing could be brought back with "eternal supercomputation" within the accretion disc of a black hole (2010b, 3). Tipler's vision assumes a universal collapse, or, Big Crunch—the opposite of a Big Bang—carefully controlled by the enhanced humans of the future or their robotic descendants. After this, "[l]ife then converges on what the French Jesuit Pierre Teilhard de Chardin called the Omega Point. Tipler associates the Omega Point, as did Teilhard, with God. Being the ultimate form

[303] See Hughes (2010b); Bostrom (2003b).
[304] See Gardner (2007); Order of Cosmic Engineers (2009); Lanza & Berman (2009); Hughes (2010b); Geraci (2010).
[305] See Kurzweil (2006).
[306] See Prisco (2007).

of power and knowledge, the Omega Point would also be the ultimate in Love. Loving us, it would proceed to resurrect all humans who ever lived… This is accomplished by means of a perfect computer simulation, what Tipler calls an emulation" (Stenger, 1995, 55).

Of course, Transhumanism's embrace of technological utopianism is not without critics.[307] Sociologist Imre Szeman argues such a narrative as illogical and naïve, since examples of technological injury to individuals and society abound, including our incapacity to act properly with the knowledge we have (2007, 805). However, an analysis of Transhumanism's specific eschatological scenarios goes beyond the scope of this thesis. As a basic point of comparison, groups of Transhumanists believe in models which feature an end-of-time, resurrection (a term some Transhumanists use; see Prisco, 2009, ¶5), and eternal bliss; it may be argued that such specific Transhuman visions are just as logical as those which are based on traditional religious doctrine.

ii. Teilhard de Chardin

As noted above, an interesting connection within Transhuman end-of-time scenarios can be found in their appropriation of Catholic paleontologist, geologist, and philosopher Pierre Teilhard de Chardin and his idea of the Omega Point.[308] For Teilhard, the Omega Point is the ultimate goal and the maximum level of our complexity and consciousness, brought about by humanity's social unification—social unification necessitated by means of limited global resources and space, requiring mutual cooperation and respect (2004, 226). Teilhard's evolution of humanity is directional, drawn towards the Omega Point via God's love. For Teilhard, human consciousness is a

[307] See such groups and philosophies such as Singularitarianism and The Venus Project.
[308] See de Chardin (1965) (1971) (2004); Steinhart (2008); Smart (2008); Cole-Turner (2011).

reflection of a self-aware universe.[309] As Grumett notes, Teilhard envisioned technology as a major force in this human evolution because technology and consciousness are in a symbiotic relationship wherein technology "represents the external counterpart which consciousness relies upon for its own propagation" (2011, 30). Through technology we are able to free ourselves of "mundane tasks" and concentrate on spiritual and social evolution (Grumett, 2011, 30). As Teilhard explains in *Future of Man*, greater advancement in our technologies allows for increased human faculties which in turn allow humanity enhanced knowledge of the universe (2004, 228). As we come together in the journey towards the Omega Point, individuals evolve in personal consciousness and in relation to others.

Eric Steinhart's study of Teilhard's influence and application to Transhumanism outlines how the Omega Point theory was adopted by Barrow and Tipler (1986), Tipler alone (1988 and 1995), Moravec (1988 and 2000), Dewdney (1998), and Kurzweil (2006).[310] Moravec, Dewdney, Kurzweil and Bostrom point to Teilhard's work in evolution, teleology, and humanity's transformation as a precursor to current Transhuman ideas. However, as noted by Grumett, Cole-Turner, and Burdett, Transhumanism's appropriation overlooks much of the Catholic spirituality and incarnationalism in Teilhard's work. According to Grumett, Transhumanists tend to regard materiality negatively, rather than as intrinsic to incarnation. They give insufficient consideration to the role of ethical and spiritual principles in shaping human life and wrongly view death as able to be overcome by human ingenuity rather than by

[309] See de Chardin (1971) (2004).
[310] See Stienhart (2008).

the work of God alone.[311] He further clarifies that Teilhard "places greater value on measures that will increase human socialization, such as improvements in global communications and reflective capacity," rather than valuing technology simply for its own sake (2011, 44). For Teilhard, "[p]rogress does not consist in simply any technological novelty or expansion of humans' power over their material or social environment. Rather, progress is the enlargement of reflective and moral capacity" (Grumett, 44).[312] Similarly, the American Teilhard Association (ATA) demarcates the Transhuman use of de Chardin by declaring that Teilhard abides in a quite different "cosmic gestation" of rising biological intricacy, knowing sentience, and most of all creative union via love energy (ATA, 2012, 11). Indeed Teilhard scholar Ilia Delio rejects the characterization of Teilhard as an early Transhumanist. She dubs him an *ultrahumanist,* who deepens the evolutionary processes through the human person but more broadly than by means of increased human brain power or the use of technology to eradicate disease—a "cosmic vision, an evolution of religious spirit towards the fullness of love" (2012, 153). Despite such differences, Transhumanists such as Steinhart believe Teilhard's approach to human evolution and Christian philosophy creates space for a *Christian Transhumanism* (2008, 1).

The Transhumanist appropriation of Teilhard is most divergent in their approach to eschatology and death. Teilhard's synthesis is based upon spiritual principles and a belief in immortality through the transformative act of death which is necessary to animate human action (1964, 334). Grumett summarizes the Transhuman position as primarily viewing death "as an obstacle to be overcome by ever-advancing ingenuity.

[311] See Grumett (2011).
[312] See de Chardin (1978).

Teilhard, in contrast, sees death as bearing transformative value, and even as giving human life its ultimate meaning. Indeed, death is spiritualization. Only by dying may humans escape universal entropy and enter a realm of assured convergence, synthesis, and unification" (46). The majority within Transhumanism takes Teilhard's thesis on human transformation to a mechanical and material point, but no further. This is somewhat of a paradox to Transhuman philosophy, for it illustrates that there are limits to Transhuman faith. Transhumanism has a faith in the power of technology to better the human condition, despite criticisms and histories marking technology as unhealthy and frequently ruinous. Transhumanism also has a faith in eschatological scenarios which project human intellect and capabilities into the realm of what is now commonly considered "divine," despite no current scientific evidence that such models are feasible. Finally, Transhumanism has a faith in its own rationalism to justify actions which promote a path to enhancement, despite internal and external critics. Despite such faith and the use of Teilhard's reasoning of human evolution, Transhumanism has no faith in death as a positive rather than a negative event. Yet, as Prisco points out, while "most Transhumanists don't like the concept of resurrection at all, and most religious people don't like the idea of resurrection as something that will be achieved by engineering, [I] think this meme has a very strong potential to bridge the gap between Transhumanism and religion" (2009, ¶5).

Transhuman eschatology is based upon prediction using scientific laws and current models extrapolated into possible end-time scenarios. It is the most fideistic branch of Transhumanism's mostly secular philosophical ruminations in that absolute proofs and feasibility of the possibilities are generally unavailable and proposals are formed from personal beliefs and faith more than observable phenomena. This apparent contradiction

between holding such expectations while also espousing modern empirical naturalism is recognized within the movement. As Hughes notes, "Transhumanists need to acknowledge their own historical situatedness and defend their normative and epistemological first principles as existential choices instead of empirical absolutes somehow derived from reason" (2010c, 3). It may be that, as Ronald Cole-Turner suggested, Transhuman is better historically situated in a traditional Christian vision of the future, secularized now through technology as the new pathway to what lies ahead (2011, 15).

iii. Conversion

Apart from eschatological theory, the Transhuman emphasis on a new paradigm for humanity's future, one that rejects the assumption that human nature cannot be changed, is not without parallels in Christian models (Daly, 2004, ¶3). Such an idea is not exclusive to Transhumanism, nor is it particularly radical. Catholicism (as well as a wide variety of other traditions) holds that individuals are able to, and often should, seek personal conversion through a belief in the divine and greater good. Cole-Turner calls attention to the classic Christian assertion that in the incarnation God becomes like us so that we might be made like God (2011, 5),[313] which was first articulated by Irenaeus of Lyon and later echoed in the writings of Athanasius of Alexandria, Gregory of Nazianzus, and Gregory of Nyssa. According to Cole-Turner, "it shows the centrality and depth of the theme of human transformation in Christianity" (2011, 5). Thus a further point of convergence between Roman Catholics and Transhumanists is a drive

[313] Cole-Turner further illustrates how Christianity and Transhumanism share the notion that the self is being transformed to the point where it will no longer be the same self by way of Paul's theology: "Paul's theology is full of the paradox of transforming grace, whereby the "old self " is put to death and the "new self," the new identity of the Christian "in Christ," comes into existence, yet without the disappearance of the old body or the total negation of the old behavior, at least not until the final resurrection" (2011, 10).

towards transformation. This drive is constitutive of Catholic and Transhumanist goals, though Roman Catholics and Transhumanists differ on the meaning and purpose of transformation. In Roman Catholic moral teaching, transformation is spiritual in form but manifested in physical action. Transhumanism seeks transformation on a physical level in order to help achieve a better moral—dare we posit spiritual— level. As Cole-Turner puts it, "For Christianity, it is to put the old self to death in order to be like Christ in his resurrection and glorification; for Transhumanism and for the advocates of technological enhancement, the goal is to bring the old self to a higher life while worrying about whether it will remain the same" (2011, 10). Clearly however, divergent paths of transformation towards betterment may be judged as erroneous by groups with fundamentally opposite beliefs. In his analysis of Transhuman transcendence, McKenny reminds us not to "confuse a Christian conception of transcendence with a Transhumanist one" (177). He notes Taylor's account that modernity has not rejected transcendence; rather "aspirations to transcendence" have taken on new forms (178). Indeed, the majority of Transhumanists would not wish their understanding of transcendence to be perceived as re-affirmation of Christian principles. For example, Bostrom situates transcendence as a universal characteristic of humanity, identifiable throughout history in stories such as the Epic of Gilgamesh and the Fountain of Youth, from Greek mythology to various schools of esoteric Taoism in China (2005b, 1).

This leads to questions of authenticity—a subject examined by divergent theologies and philosophies to an extent beyond the scope of our evaluation—within a Roman Catholic approach true authenticity always looks beyond the material or economic goods, discerned in the light of faith, to better one's relationship to the whole human race as a reflection of God's unity and grace. Suffice to say, with regard to body

modifications ethicists ask, do such modifications create an authentic self or one invented by altering biology to suit imagined levels of beauty, health, and power (Hogle, 702)?[314] On a professional level, when asked if medicine should be used for enhancement purposes, physicians overwhelmingly agreed that such interventions "pose a threat to the essence of what is means to be human" and are "a threat to the value of human achievement and discipline" (Hotze et al., 6). Indeed, some note that the use of enhancement technologies not only changes human faculties, it changes the authentic self. As Susan Schneider explains in *Future Minds*, "knowingly embarking upon a path that trades away one or more of your essential properties would be tantamount to suicide—that is, to your intentionally causing yourself to cease to exist" (2008, 5). As cybernetic or nanotechnological enhancements are currently rare, ethicists often turn to psychopharmaceuticals or similar drugs as examples when assessing authenticity in conjunction with enhancement technologies.[315] Individuals seeking a change in identity, personal transformation, and enhanced senses may turn to illegal pharmaceuticals because they seek authenticity.[316] As noted in Chapter 5, Hook posits the use of cybernetic and nanotechnological modifications in similar ways, warning that enhancement technologies may serve to obscure authentic personality, cause addiction, or degrade what it is to be human. Transhumanists counter that "[t]he important thing is not to be human but to be humane"; that the measure for being authentically human does not come from biological normalcy, but rather from the qualities of being humane such as compassion, curiosity, and a desire for betterment.[317] Additionally, as a reminder that

[314] See Elliott (2003); Kass (2003).
[315] See Kramer (1993); Elliott (2003); Hogle (2005).
[316] See Kramer (1993); Elliott (2003); Hogle (2005).
[317] See H+ (2012).

Transhumanism does not endorse technologies aimed at addiction or control, Transhumanist author Dale Carrico explains, "It is important to note that *both* bioconservatism and tech-progressivism, in their mainstream expressions, *share* an opposition to unsafe, unfair, undemocratic, undeliberative forms of technological development, and *both* recognize that such developmental modes can facilitate unacceptable recklessness and exploitation, exacerbate injustice and incubate dangerous social discontent" (2004, ¶9).

From a Roman Catholic view, a path which renders a person unhealthily dependent (technologically enhancing or not) would ultimately lead to disappointment, as authenticity has never yet been manufactured. The prevailing Roman Catholic view is expressed in papal and magisterial documents such as *CCC*'s category of respecting health and encyclicals emphasizing social justice issues; an application of several virtues put forward by patristic and medieval church scholars; discussions by experts within the fields of medicine, theology and ethics; and the use of selected biblical passages and precepts of natural law. Specific concerns for health and the virtue of temperance are found in *CCC* #2290 and #2291 wherein the faithful are directed to avoid every kind of excess; from abusing foods, alcohol, or medicines, to endangering their own safety by risky behaviours. Such directives warn of idolizing a state of euphoria or using narcotics beyond therapeutic grounds and label such actions as a grave sin contrary to moral law.[318] Similarly, Catholic interpretations of social justice decry the poverty, violence, wasted resources, violation of human rights, and culture of death associated with illegal drug-use. We see this in recent papal encyclicals and in the works of authors such as

[318] See Paul's warning in Galatians 5:19-21, that people who engage in a variety of excesses will not inherit the kingdom of God.

Javier Hervada (former chair in Canon Law and Professor of the Philosophy of Law and of Natural Law at the University of Navarre) and Frank McCorry (Chair of the Washington Circle Group and substance abuse managed-care specialist).[319] As noted, beyond the damage to society and personal health, the Roman Catholic approach highlights the idolization of excess. As previously discussed, these behaviours violate virtues and produce actions inauthentic to Catholic goals for human life. Thus, authenticity as truth and as a measure of human evolution can never stem from an excess of the artificial. In evaluating enhancement technologies, authenticity is further judged by motives. Intentions which consider harmonious outcomes and respect for the common criteria that from a Roman Catholic perspective, in the quest for betterment, upgrades solely in support of scientific research agendas, or those which serve economic advantages, pose risks to authenticity. So too do enhancement technologies which control and design the body as a unit of biology rather than in pursuit of perfection.[320]

On a basic level, Transhumanists and Roman Catholics differ greatly when interpreting the value of being human as part of authenticity. The mainstream of each group remain far apart on the issue. As such, this is contested terrain in any Catholic-Transhuman dialogue but, as shown in our next section, a minority position exists which attempts to straddle principles of both groups.

B. Catholic-Transhumanism?

Despite the ways in which Transhumanists may draw on the language and even the aspirations of Christian tradition, that tradition, and Roman Catholicism in particular,

[319] See Hervada (1983); McCorry (1990); John Paul II *Centesimus Annus* (1991); Benedict XVI *Deus caritas est* (2005) & *Caritas in Veritate* (2009).
[320] See Hogle (2003) (2005).

remains fundamentally critical not only of the objectives but also of the means of Transhumanism. For its part, Transhumanists would reject the negative characterization of its objectives and means, as well as, the assumptions on which such a characterization is based. So there seems little likelihood of a significant convergence between the two approaches. And yet, there is in fact a minority group of Transhuman-Catholics who aim precisely to reconcile the two approaches. We turn now to an examination of these minority Transhuman-Catholics, hoping to identify principles which can be used in a broader approach to enhancements. We shall include a critique of current ideas offered by this minority of Transhumanists as a bridge between their philosophy and more traditional religious ethical approaches. Following this, we shall offer a different path to contribute to the development of a Transhuman-Catholic position: selected concepts from Canadian Jesuit theologian Bernard Lonergan. Lonergan's highly developed work into human insight, rationality, relational-evolution, judgment, and authenticity offers further opportunities for Transhumanism to connect with Catholic theology. As with Teilhard, Lonergan's work as a modern Catholic thinker is ultimately grounded in God's love for humanity. While a majority Transhuman position rejects traditional divine-based doctrines, Lonergan's emphasis on method in his explication of understanding and reasonable judgement resonate with Transhuman goals and may be more similar than not.

As Transhumanism and Roman Catholicism hold little in common about the origin and limitations of human beings, can one claim adherence to both systems simultaneously? Catholic journalist Bernard Daly notes that, during the Transvision Conference, research engineer, nanotechnologist, and Transhumanist Tihamer Toth-Fejel identified himself as Catholic. Toth-Fejel may be illustrative of the extent to which

Roman Catholicism could embrace Transhumanist ideals. On the one hand, he echoes traditional Roman Catholic concerns and, arguably, misrepresents a majority of Transhumanists: "Transhumanism is somewhat a product of secular humanism, which blindly rejects God, dehumanizes us into animals, claims that no objective statements can be made about morality, and ignores that we are intrinsically valuable because we are made in the image and likeness of God" (2004, ¶12).[321] Mainstream Transhumanists would reject this characterisation of their project as dehumanizing and amoral but, interestingly, Toth-Fejel wants to identify as a Transhumanist well as a Catholic.

In the *National Catholic Bioethics Quarterly* (2004), Toth-Fejel warned that while significant opportunities made possible by nanotechnology may seem good, they could actually be harmful to our existence as persons. According to Toth-Fejel, enhancements which degrade our humanity are not good for us because they contradict who we are. As such, they should be discouraged. Of course, the real difficulty is in *recognizing* which enhancements are degrading and *resisting* the alluring promises they make (Daly, ¶13). Such a position, as noted by Cole-Turner, "leaves the decision about what counts as an enhancement up to the modified individual" and, if accepted, would minimize conflict. "For the Christian, however, the decision about what counts as an enhancement is not based on personal preference but on accepting the truth that our lives are already being transformed in what must be called 'salvation'" (197).[322] Toth-Fejel locates a key to a joint Catholic-Transhuman position in the recognition that technology itself is morally neutral and argues that only in choices which avoid human degradation can we truly

[321] Toth-Fejel further self-identifies as a "Catholic Extropian" on his personal website. See http://www.islandone.org/MMSG/ttf/realbio.htm

[322] Cole-Turner notes that this is further complicated in that theology today "is not as clear as it should be about how to understand salvation" and that appeals to foundations other than salvation must be found by Christians to address enhancements (197).

better ourselves. This position does not necessarily exclude research into human enhancement, but it does call for an individual mandate to examine the purpose of a specific enhancement and our motivations for its application. Toth-Fejel brings forward a Catholic position in rejecting technologies which degrade humanity, while simultaneously supporting a Transhuman position of autonomy wherein individuals judge which technologies should be rejected. This type of blending of Catholicism and Transhumanism entails a certain tension; since it claims that decisions should be left to an individual's conscience, while this is not necessarily the full position of the magisterium. This is not to say that Roman Catholicism does not leave room for individual choice, following one's conscious and responsibility. But it often brings about a type of 'catch-twenty-two' situation, as Catholic historian and author Peter De Rosa calls it. As De Rosa explains in his analysis of the propensity of the Roman Catholic laity to ignore Church regulations on contraceptive use as given in Paul VI's *Humane Vitae*, "The person must follow [their] conscience, because you obviously can't go against your conscience. The only twist in the argument is that Catholic bishops would assume your conscience is in accord with what the pope says" (French & Iles, 1992). Nevertheless, the minority of Catholic-Transhumanists would agree with a prediction by Hughes: that "in about 400 years there will be people with green skin and four eyes who are devout Roman Catholics" (Daly, ¶17). To return to Toth-Fejel, the problem lies in the determination of what is "degrading" to "humanity"; both terms are contested and their diverging interpretations—as well as their use in discourse—may in fact preclude the very space that someone like Toth-Fejel is trying to create.

Similar to Toth-Fejel's Catholic Transhumanism is fellow Transhumanist Patrick D. Hopkins's distinction between what he terms 'Low' and 'High' Transhumanism. For

Hopkins, both versions seek salvation from the human condition of suffering, but they differ in their views about transcendence (2011, ¶5). Low Transhumanism is associated with overcoming the problems of the human condition though technology and achieving "superhuman abilities"; something Hopkins regards as at best shallowly religious (Hopkins, ¶6). High Transhumanism is described as more indistinct in character—more imaginative, speculative, and perfectionist— pursuing transformation "aimed at a more abstract moral perfection and experiential enlightenment" (Hopkins, ¶8). To this end, Hopkins proposes a theology of Transhumanism that is not simply a "theological tradition that dwells on some Transhumanist thought, nor a psychological version of religion that ascribes the essence of religion to an ultimate concern or attitude toward self and universe" (¶26). Instead, he proposes appropriating much from thinkers such as Teilhard de Chardin and Alfred North Whitehead: to be part of the creation of the ultimate consciousness through technology and design (¶25). He notes "that God does not have to be seen as a pre-existent or eternal perfection that we must struggle to understand or serve, but rather a being that develops and grows alongside us, a being whose actualization our actions and technologies can participate in, a being that is the culmination and the preservation of the world" (¶21).[323] With such ideas as a foundation, High Transhumanism holds more in common with Catholicism than does Low Transhumanism.

If the heart of Transhumanism lies in the idea of critiquing "the fixedness of the human condition," then it may be argued that Transhuman technologies do not wish to

[323] As well as Teilhard and Whitehead, Hopkins includes Ludwig Feuerbach as an influence pointing towards a theology of Transhumanism. Specifically, Feuerbach held "that God is not a silly, childish superstition but is a high expression of human moral and physical ideals instead, motivating in its psychology and noble in its content" (¶18).

"go beyond humanity; they might simply alter it" (Miah, 3). This is a subtle yet important difference: the desire towards enhancement (going beyond human biological norms) and alteration (changing the human condition while holding to human limits) are distinct endeavors, but both fall within a Transhuman agenda.[324] The latter represents a moderate Transhuman vision, one which does not necessarily conflict with theistic principles or a common global desire for the betterment of humanity.

Miah contends that any technology which would facilitate an alteration to the human condition would "first [have to be] enculturated within significant human practices before any change…can take place" and, second, would "not necessarily entail a shift in beliefs about the sanctity of the human body" (2003, 3). This is not an exclusively Transhuman position, for while enhancements may not be natural by origin or definition, they can be considered a cultural phenomenon (Hogle, 703). Cosmetic surgeries and decorative body modifications such as tattooing or piercings are used by Transhumanists as examples of the gradual social acceptance of a change to the human form. Use of cosmetics, in particular, may be viewed as an enhancement rather than a repair in that allows us to exceed our strictly natural forms when not applied for restorative purposes (Miah, 6). As noted in Chapter 4, arguing from the categories of stewardship and human dignity, some Roman Catholics claim that body decorative arts are too much an extension of human dominion and therefore contrary to the designs of the divine. Others would see such attempts to improve on human beings as an insult to the work of the creator, whose masterpiece is humankind; or at least as a fatal temptation to pride (Ashley & O'Rourke, 318). Yet Transhumanism does not classify such alterations as an insult; rather, they are a necessary part of humanity. Moreover, if we

[324] See Miah (2003).

were to apply the criteria presented in Table 1—Gauges of Bioethical Instability of Technologies, cosmetics today entail negligible risk. This does not mean that all cosmetic or decorative arts would rate negligibly on Table 1. For example, body-artist and self-described posthumanist Stelarc's use of cosmetic surgery in conjunction with electronic implants to graft an additional ear onto his arm or face would entail serious consideration.[325] However, Roman Catholic positions regarding cosmetics have clearly developed through the mid twentieth-century and generally realize few problems with its applications today. In this regard it appears that cosmetic body modification technology is indeed an example of Miah's gradual social acceptance. Beyond decorative body arts, gradual social acceptability can be seen in specific implant technologies; for example artificial hearts.[326] As Joel Anderson, ethicist at Washington University, St. Louis, notes, "Initially people thought heart transplants were an abomination because they assumed that having the heart you were born with was an important part of who you are" (Graham-Rowe, 2003, ¶15). Both cosmetic surgeries and current medical-implants are examples of once-disparaged technologies gaining social acceptance. Yet, as traditional religious principles may sway against secular social acceptance, there can be no universal application of such reasoning.

The integration of new technologies based upon a shifting idea of what is normal may seem moderate (even appealing to a joint Catholic-Transhuman perspective), but the reality of its application hinges on the moral legitimacy of each technology—a

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[325] See Miah (7); Stelarc, the Cypriot-Australian performance artist whose work included extreme body modifications, flesh suspension, grafting artificial ears and robotic arms, and using remote-controlled electronic muscle stimulators. See Smith (2007).

[326] As Canadian futurist, author, and Transhumanist, George Dvorsky reported in 2007, it was a sad day for the Transhumanist community when Peter Houghton, the first man in the world to be fitted with a permanent artificial heart, died at the age of 68. "Houghton, a devout Catholic, frequently talked about how his artificial heart gave him a second lease on life…He never blushed at the labels 'cyborg,' 'bionic' or 'robotic'" (Dvorsky, ¶1).

judgement which may simply never change. For example, Miah marks in vitro fertilization (*IVF*) as a technology which seemed unnatural in the 1960's but is now (for some) a supportive technology that does not challenge humanness in any way (6). Yet, within contemporary Catholic moral theology, *IVF* remains as unnatural today as it did when first introduced. While social conventions regarding its application may have changed, the Church's position has not.[327] Even apart from specific Roman Catholic qualms regarding Miah's example of *IVF*, Hotze et al., conclude that disagreements regarding the ethical validity of an enhancement are likely to persist even when they reach levels of routine practice and regardless of legal status or availability (11). This is further evident in the shifting definitions of medical normalcy, which (as previously noted) largely depend on social values and yet are not universally accepted. For example, Hansson (2005) points out that conditions previously regarded as diseases (such as homosexuality) are now thought of as normal states of the mind or body and others (such as attention deficit hyperactivity disorder) once viewed as normal are today regarded as diseases (522). Yet while the Roman Catholic magisterium agrees that homosexuality is not a disease, it does not accept its normalcy compared to heterosexual behaviour.[328] Thus an argument which presumes a legitimacy of a technology through its social normalization cannot assume universal acceptance. Neither can it be assumed that all technological innovations necessarily improve the human condition, a fact recognized by Transhumanists (Bostrom, 2009). Of note regarding such specific Roman Catholic objections to technologies or definitions which have gained general social acceptance, is the underlying theme of reproductive or sexual ethics. As we have already

[327] See *Donum Vitae* (1987); *Dignitas personae* (2008); *CCC* #2377; Hass (n.d.).
[328] See *CCC* #2357.

observed, within Roman Catholic bioethics the two areas of the body which are accorded the most ethical sensitivity and receive the most protection (or restriction) are human reason (the brain) and reproductive systems.

Apart from these differences in the evaluation of practices or states that have come to be socially accepted, a further challenge to any joint Catholic-Transhuman perspective is their respective interpretations and emphasis on the concept of human dignity, specifically the correlative value of vulnerability and even death. The challenge over human dignity is more than an argument about defining the moment of death and deficiencies. It is a moral dispute about the boundaries of normal and abnormal, as well as the social significance of creating such boundaries (Hogle, 697).[329] As outlined, a Roman Catholic understanding of human dignity embraces frailty and vulnerability, and upholds an appreciation for death as part of the fundamental Christian message of salvation. Yet Transhumans believe that a bioconservatives' defense of illness and death is inconsistent with the value of humanity.[330] Transhumanists would assess technologies which can redefine human limits such as aging, degenerative disorders, and even death, on the basis of their utility to remedy those vulnerabilities.[331]

While not writing as Transhumanists, ethicists such as Macklin and Pinker hold with Libertarian Transhumanist positions. They question the very need for applications of human dignity to matters of bioethics, regarding it as a "useless concept" which adds nothing to bioethical guidelines. Their argument is that personal autonomy trumps all, from informed consent to specific case studies.[332] Indeed, Pinker has charged

[329] See Lock (2000).
[330] See Agar (2007).
[331] See Post & Binstock (2004).
[332] See Macklin (2003); Pinker (2008).

bioconservatives such as Kass with promoting a "Catholic flavoured" concept of dignity as a basis on which to build an obstructionist bioethics by promoting Catholic positions on the U.S. President's Council on Bioethics. According to Pinker, "[t]he Catholic Church, with its long tradition of scholarship and its rock-solid moral precepts, became the natural home for this movement [i.e., obstructionist bioethics]… [and] now provides the intellectual muscle behind a movement that embraces socially conservative Jewish and Protestant intellectuals as well" (Pinker, 2008, ¶14 & 17). While Pinker's observations may lend credence to our observations in Chapter 1 regarding the influence of Roman Catholic positions in current bioethics, imputations of human dignity as obsolete when compared to autonomy appear to many as unfounded and even trivial.[333]

Reporting on Transvision (the 2004 Transhumanist conference held at the University of Toronto), Daly characterized Transhumanism as a challenge to every faith community that believes a human being is more than just one more biological product (2004, ¶1). But that is not the end of the conversation. Indeed, concern for social justice, specifically respecting human rights and distributive economic justice, has been suggested as a basis for dialogue between Transhumanists and Roman Catholics.[334] Both groups emphasize the importance of human rights; both are concerned with models of distributive justice, particularly the economic problems which enhancement technologies may bring to unequal segments of society, medical insurance models, individual budgets devoted to upgrades, maintenance, and repairs; and both hold public and private safety as fundamentally important. It may be that, pragmatically, provided human rights are respected and upheld by both groups as the foundation to a better

[333] See Disputations (2009); Beckwith (2010).
[334] See Daly (2004); Hughes (2009); and collected discussions on Catholicism and Transhuman dialogue at the ExI-chat list (part of the Extropian mailing list).

humanity, their origins become secondary. Transhumanists, as "partisans of the Enlightenment, cannot defend moral universalisms by re-asserting that rights are God-given, natural, or self-evident….rather, rights are social agreements," shifting daily and with limits which are bound to our current perspective (Hughes, 2010e, 5).[335] In addition, while overwhelmingly civil libertarians, Transhumanists promote juridical equality and justice to secure human rights, though not necessarily democratic governments as the best model to advance Transhuman values.[336] Catholics follow the spirit of Vatican Council II and the magisterial, papal, and social teachings which accept the origin and respect of human rights as outlined in dogmatic constitutions.[337]

Nevertheless, some believe that with rights as the starting point, consensus about novel biotechnologies and their effects on individuals and society can be rooted in fundamental and inalienable civil liberties such as health, safety, and peace. This is not necessarily the same application of rights as put forward by ethicists such as Fukuyama (2002), who argues for a return to an ethics based upon natural rights. Fukuyama's arguments with Transhuman positions have been longstanding, stemming from differing interpretations of how enhancements threaten the essence of what it is to be human, and hence threaten sanctity (Hogle, 710). Rather, this application of rights is based upon common ground, accepted legal standings held by both groups which may then serve as a foundation for dialogue. So legally founded human rights claims that are accepted by both groups may be a point of departure for discussions about enhancement technologies.

There are, however, some basic problems to framing Roman Catholic and Transhuman dialogue within human rights. An initial problem is that the scope of claims

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[335] See Corradetti (2009).
[336] See Hughes (2004) (2010f); More (2004); Thiel (2008).
[337] See too John XXIII's *Pacem in Terris* (1963).

that can be made on the basis of human rights is not common between Catholicism and Transhumanism. The Roman Catholic position on rights is always bounded by its understanding of religious stewardship and limited autonomy, whereas Transhumanism situates human rights in rational cooperation and freedom of choice. Exactly what those rights are and what scope is granted to individuals and groups advancing claims based on those rights remains disputed. Thus one would expect Transhumanists and Roman Catholics to differ in claims related to human gender and reproduction. A second problem is similar to Miah's contention that modification technologies are acceptable based upon social standards. The assumption that consensus can be reached by simply following existing laws or decisions on human rights negates the need for bioethical reflection and places any standards of enhancement technologies in the hands of those who frame rights. As Pellegrino argues, ethics is not simply a matter of polls and plebiscites (2003, 11). A further problem arises when we realize that the question of what a specific right means is a matter of deliberation, not a matter of convention; it is how the convention is recognized in all its details that will vary between groups with no guarantee of consensus. Even within Transhumanism, appeals to rights as a method of universalization have been dismissed:

> Adding a new capability to the human body is not like buying a new car; it is like acquiring a new right. This is because such capabilities become innate to the person once acquired; they are not external objects like tools that can be laid down and picked up by someone else….With that in mind, translate the Transhumanist credo: "If I want to improve myself (acquire a new right), I should be able to, and that doesn't affect you if you choose not to do the same (don't

> want the right)." You can talk about choice all you want, but at the end of the day we have one person with more rights than others. (Schroeder, 1999, ¶5)

Along with sympathies regarding human rights, the social aspect of distributive justice has been forwarded as a means for dialogue. The 2011 physician's survey on enhancement technologies (by Hotze et al.) gives data indicating the importance of social justice in relation to human enhancements. The survey shows that physicians strongly believe all persons should have equal access to legal enhancement interventions (only 25% of physicians surveyed disagreed wholly or in part with this statement), indicative of a paradigm devoted to uniform levels of care and equal opportunity for all to benefit from technological aids despite social disparity (Hotze et al., 6). The same survey shows that a majority of physicians believed it was "important for society to prevent individual economic advantages from turning into biological advantages" (Hotze et al., 6), indicative of the trepidation caused by enhancement technologies and marketplace economics which inherently allow access to goods and services for selective segments of society and not others. The second finding of the survey fits with a Roman Catholic emphasis on the preferential option for the poor, but less so with general Transhuman beliefs regarding autonomy. The first finding, however, may hold more promise, as both adhere to a notion of equal opportunity in health care regardless of economic class. Interestingly, Hotze et al., point out that, within the survey results, physicians indicated support for potential enhancements which could produce discrete competitive advantages such as increased height or speed in children (7), believing such technologies should be allowed but not promoted in terms of insurance coverage. Yet such reasoning may be contradictory "[g]iven that for many patients, 'equal access' is only financially possible if an intervention is covered by insurance" (Hotze et al., 8). Given this inconsistency,

group dialogue on equal access and economics becomes valuable not just in terms of ethical reflection but also practically, as religious medical institutions (as noted in Chapter 1) often form and influence health policy with special focus on the underprivileged.[338]

While it is true that Roman Catholics and Transhumanists seek economic justice and access for the poor, dialogue based on such commonalities faces problems with *how* and *when*. Transhumanists see this problem solved in the future, relying on a pattern with new technologies—that they become cheaper as time goes by. As the H+ FAQ states, "In the medical field, for example, experimental procedures are usually available only to research subjects and the very rich. As these procedures become routine, costs fall and more people can afford them. Even in the poorest countries, millions of people have benefited from vaccines and penicillin. In the field of consumer electronics, the price of computers and other devices that were cutting-edge only a couple of years ago drops precipitously as new models are introduced" (2012). Additionally, Transhumanists believe that problems in distribution can be solved by progressive taxation and the provision of community-funded services such as education, IT access in public libraries, or enhancements covered by social security.[339] In contrast, Roman Catholic approaches to distributive justice urge immediacy and decry society's lack of focus on the poorest of the world. Thus, in her analysis of Transhumanism and the poor for *Ignition Insight*, Amanda Clark notes that distributive justice suffers when we no longer recognize what is human; as Benedict XVI explains, "While the poor of the world continue knocking on the doors of the rich, the world of affluence runs the risk of no longer hearing those

[338] A recommendation also made by Hotze et al., (11).
[339] See H+ (2012).

knocks, on account of a conscience that can no longer distinguish what is human" (par. 75). This phrase—'on account of a conscience that can no longer distinguish what is *human*'—can be applied to far more than economics" (Clark, 2010, ¶14).

More so than the above, an appropriation of the methodology and insight from Jesuit scholar Bernard Lonergan may serve as basis for Roman Catholic and Transhuman dialogue.[340] Because Lonergan's conclusions are developed from philosophy and reason rather than theology and Catholic dogmas, his methodology and analysis of authentic human development has been applied to diverse fields. For example, Daniels-Sykes offers Lonergan's theories on cognition, and intellectual, moral, and religious conversion as part of his critique of Roman Catholic and secular bioethics approaches to fetal tissue research and vulnerable populations.[341] Economics, theology, philosophy, art and literature are all examples of genres that have recognized Lonergan's work as important to understanding the very processes of thinking that shape the results of their study.[342] As his method is not fixed to religion it has found more appeal in secular dialogues. For example, in *Social Transformation, and Sustainable Human Development* Joseph Ogbonnaya argues for an integral approach to development by engaging Lonergan's philosophical anthropology with contemporary development discourse.[343]

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[340] Considered by many intellectuals to be the finest philosophic thinker of the twentieth century, Lonergan received 19 honorary doctorates, and a number of other honours, including: Companion of the Order of Canada, Corresponding Fellow of the British Academy. He was named by Pope Paul VI one of the original members of the International Theological Commission. The Lonergan Research Institute in Toronto, in cooperation with the University of Toronto Press, is in the process of editing the *Collected Works of Bernard Lonergan* in twenty-five volumes. See Chingcuanco (2012).
[341] See Daniels-Sykes (2007).
[342] See Donahue (1993); Braithwaite, Koning & Ormerod (2011).
[343] See Ogbonnaya (2013).

There is an intrinsic simplicity in Lonergan's model of human knowing in his breakdown of Experiencing, Understanding, and Judging.[344] At first glance it is a very linear pattern, leading to a greater realization of oneself and all the influences that make up life. There is of course much interaction between the levels characteristic of Lonergan's insight into human knowing, with qualities like 'affect' binding and influencing all levels. As Daniels-Sykes explains, "Roman Catholic social bioethics grounded in the natural law tradition reflected in Lonergan's moral realism moves from the data or facts (what is) to values (what ought to be done), which differs from secular bioethical thinking which maintains that an 'ought' cannot be derived from an 'is'" (163).

An initial contribution to Transhuman-Catholic relations could be an application of Lonergan's theory of knowing. For Lonergan, knowing is a relational process derived from the combination and interaction of all the levels (experiencing, understanding, judging, deciding) (1985, 207). However, Lonergan's theory of authentic development and knowing involves more than scientific rationalization; it requires common sense and the realization that knowledge is a part of human living (1990b, 86). This real knowing is more than the process of seeing, more than just experiencing; it is a larger process that takes the time to reflect upon each stage and only culminates in deciding. The pursuit of knowledge must have purpose. It is not sought solely for its own sake or as an end in itself but in order to obtain data upon which to make decisions about how to live (1990b, 86). Additionally, and similar to a majority of Transhumanists, for Lonergan, autonomy in the knowing and decision-making process is an absolute. To properly know, an

[344] For Lonergan, after this the process includes Deciding, and Loving. See Lonergan (1992); Crowe (1992).

individual must realize that they alone have to choose what to make of experienced data and be responsible in applying judgments to their decisions by ultimately choosing moral positions. This is a shift from a method of coming to judgements by being told what to decide and how to interpret data. In Lonergan's method, the process of knowing that leads to moral decisions cannot be imposed—by religious dogma or any source outside of one's own experiences. This type of inclusive knowing offers a way to allay some of the previously noted fears regarding Transhuman principles and enhancement technologies.

From a Roman Catholic perspective, as noted in Chapter 5, many of the social problems associated with cybernetic and nanotechnological enhancement technologies are seen as inevitabilities by virtue of humanity's propensity to sin. We would suggest that an underlying cause of trepidation is not an unavoidable abuse of the technology due to human sin, but rather a general alarm over the loss of the *sense* of sin. For example, Hook warns against humanity taking elements of modernism and post-modern such as a blind-faith in inevitable progress, radical autonomy, and misguided attempts at bodily perfection (2002, 60); this reflects a concern over a loss of individuals and society to grasp the gravity of potentially immoral actions. In his Post-synodal Apostolic Exhortations, Pope John Paul II explained the loss of the sense of sin by a number of factors including: the rise of social secularism, heady enthusiasm of consumerism and pleasure seeking, refusal ever to admit any shortcoming and guilt, avoidance of responsibility, and historical relativism (1998, 291-293). With this in mind, from a Roman Catholic approach, an important addition to any bioethical guidelines should include a realization that the loss of a sense of sin is an underlying problem which can foster unethical consequences by way of relativism and short-sightedness. Lonergan's

more complete method of knowing incorporates a sense of sin in that only by understanding and judging can one decide. In this way of complete knowing, we cannot move from experiencing to judging without pausing to understand the consequences of actions. Within the minority positions of Catholic-Transhumanism and High-Transhumanism, a rejection of extreme enhancement technologies or those previously noted as incompatible with human dignity appear to have appropriated this more complete method of knowing and a sense of sin. Thus Lonergan's method of knowing is reflected in Toth-Fejel's joint Catholic-Transhuman position; in his judging, and based on a weighing of the evidence in his deciding whether a body modification technology is morally acceptable before promoting its use.

Lonergan's second contribution is found in his discussions on the conversion experience. Lonergan's definition of conversion labels it an experience of self-transcendence, an 'about-face' from one manner of being to another, and an often painful but liberating experience pushing one out of the confines of one's own horizon (Streeter, 2009, ¶16). Lonergan's discussions on conversion explain that it is a movement away from inauthenticity toward authenticity. Three specific levels of conversion are detailed in Lonergan's work:

1. Intellectual conversion, where one is awareness of one's own conscious processes of knowing—experiencing, understanding, and judging. In intellectual conversion, one moves beyond seeing the world as immediate, and realizes that the real world we live in is constituted by acts of meaning.
2. Moral conversion, where one shifts away from what merely satisfies to what is truly good and truly valuable.

> 3. Religious conversion (later called spiritual or affective conversion) involves an expansion of one's love and concern toward ultimate meaning. It is the experience of being grasped by ultimate concern. The later affective meaning denotes openness to repressed, unconscious feelings.[345]

Of course, like Teilhard, Lonergan's work ultimately centers on the love of God. For Lonergan, religious conversion is the gift of God's love which is not isolated to the individual, but only found in a plurality of persons that disclose their love to one another (Streeter, ¶14). Applied to Transhumanism's empirical, rational, and naturalistic foundations, Lonergan's intellectual conversion is reasonable and developed.

We have already noted how Transhumanism takes pride in its method of understanding the human condition bound to human reason and a philosophy of intellectual development through self-enhancement. Moral conversion also falls within Transhuman philosophy, as the movement outlines moral imperatives behind their goals, providing justification beyond bare rationalization. In relation to Transhumanism, Lonergan's affective conversion may appear as a challenge because (like Teilhard) Lonergan ultimately grounds such an experience in love and God. However, this affective conversion is commensurate with newer Transhuman religious expressions (such as Teresem and the Society for Universal Immortalism), High Transhumanism, and the minority Catholic-Transhumanist position. At a fundamental level, an affective conversion calls for concern towards ultimate meaning and an openness to unconscious feelings. This is displayed in Transhuman eschatology and may even be a starting point of dialogue in the promotion of technologies aimed at emotive, unconscious thinking, such as techlepathy.

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[345] See Streeter (1999).

Lastly, Lonergan's third contribution comes from his analysis of authentic development through self-reflection and realization. As Lonergan writes in *The Subject*, neglected subjects do not really know themselves, truncated subjects not only do not know themselves but also are unaware of their ignorance and so, in one way or another, conclude that what they do not know does not exist (1968, 8). The authentic subject recognizes bias, the relational nature of experiencing, understanding, judging, deciding, and the reciprocal processes inherent in Lonergan's method of knowing.[346] Authenticity and unbiased true development occurs only in conjunction with others. [347] To this end Lonergan splits authenticity into major and minor streams. Minor authenticity occurs on a level where an individual is concerned with their philosophical or religious tradition in relation to themselves; limited self-exploration and a failure to truly strive to meet the challenges of one's own tradition leads to a distorted sense of authenticity, a false authenticity and false understanding one's own tradition (Lonergan, 1990, 80). Major authenticity has to do with the integration of one's tradition. Here, Lonergan explains that a responsible and reasonable individual must justify or condemn their own tradition based upon its history and form a judgement as to how they will choose to live their life (1985, 121). If there is to be a joint Catholic-Transhuman approach to body modification technologies all parties involved will have to come to a level of major authenticity,

[346] For Lonergan, bias is rooted in our failure to allow free reign to our drive to understand. Within every human consciousness, the drive to understand impels us to progress. However, bias undercuts this process native to human intelligence by censoring the spontaneous questions that lead us to make correct judgments. He identifies four levels of bias: bias of the unconscious (what he calls the dramatic bias); individual bias (which manifests itself in egoism); group bias (being individual bias writ large); and general bias (a deeper, more pervasive bias the corrective or reversal of which is in no way guaranteed). See *Insight* (1992), 191-226.
[347] Morelli & Morelli (1997).

realizing more than what they once knew and accepting the possibility of something new.[348]

C. Conclusions

There are points of convergence between Roman Catholic and Transhuman approaches to body modification technologies, but there are also profound differences in fundamental beliefs and practical claims of the majority positions on either side. Currently, it is realistic to assume that little between the two perspectives might be acceptable to a broader method of assessing a cybernetic or nanotechnological enhancement. As a conclusion to this thesis, we turn to situating the two approaches within Canadian health policy. We shall briefly outline the current system of technology assessment used by the Canadian healthcare system and locate within that system aspects of cybernetic and nanotechnological body modification deemed acceptable by both Roman Catholicism and Transhumanism. Subsequently we shall anticipate likely issues of concern for Roman Catholicism and Transhumanism within the established Canadian criteria of health assessment.

Throughout this thesis we have encountered a number of important issues raised by enhancement technologies. How we answer these issues will affect how we respond in terms of policy. Given the potential benefits of enhancements, it has been noted that there is "clearly going to be an attraction for those who are well to enhance themselves for a competitive edge via cybernetics, or to increase such things as longevity via nanotechnology" (Hook, 2002, 59). As Daniel Brock observes, a number of policy

[348] Interestingly, Daly feels that Transhuman-Catholic discussion represents a type of interfaith dialogue—the kind John Paul II addresses in *Pastores Gregis* (#68)—a dialogue in these times when people belonging to different religions work and live together in the same areas, cities and spaces (¶18).

options are available for controlling enhancement technologies apart from the law: technologies can be regulated by governmental bodies, promoted through funding incentives, discouraged through taxation, or regulated less formally through professional bodies such as the Canadian Medical Association (1996). In their analysis of the process of health technology assessment in Canada, Devidas Menon and Tania Stafinski explain that the Canadian healthcare system includes an office of technology assessment, now called the Canadian Agency for Drugs and Technologies in Health (CADTH),[349] which has developed over the last two decades to serve the thirteen separate provincial and territorial health insurance plans (2009, 14):

> a joint committee representing the federal, provincial, and territorial ministries of health…announced the creation of a national, independent HTA [health technology assessment] body called the Canadian Coordinating Office of Health Technology Assessment (renamed the Canadian Agency for Drugs and Technologies in Health (CADTH) in 2006). Funded by the provincial, territorial, and federal governments, its mandate is to provide impartial, evidence-based information on the clinical and economic implications of drugs and other health technologies (including devices, procedures, and systems) to the 13 public insurance plans. Since then, HTA has played an increasingly important role in technology coverage policy in Canada. (Menon & Stafinski, 14)

Although "guided by common values (e.g., equity and solidarity)," the decentralization of Canada's system means that decisions regarding the implementation of new technologies rest with individual provinces and territories (Menon & Stafinski, 14). The

[349] For the history of the Canadian Agency for Drugs and Technologies in Health (CADTH), see http://www.cadth.ca/en/cadth/history.

federal government "remains primarily limited to premarket approval…price regulation [and is] responsibility for providing services to limited populations, such as veterans, the military, first nations, and inmates" (Menon & Stafinski, 14). Nevertheless, because the CADTH has been viewed by many as a "gatekeeper" for the health-care system, it has also become recognized as an enabler for the introduction of promising new technologies (Menon & Stafinski, 17).

To assess a technology the CADTH relies on a great number of factors, but the following categories are primary in any consideration: a) a technology's relative therapeutic value versus relative efficacy; b) the incorporation of values-based data;[350] c) economic costs and impact; and d) an application of real-world data.[351] As Menon & Stafinski explain, because models often fall short of capturing important aspects of a new technology, "HTA review committees charged with developing recommendations are reluctant to place much weight on their results" (16). Rather, HTA attempts to weigh therapeutic value to patients, payers, and the broader public (Menon & Stafinski, 16). To

[350] The CADTH use of 'values-based' here does not correspond to a moral or ethical sense; rather it is the quantifiable measure of assistance or gain for patient well-being as recorded in Health Canada studies. See note 347.

[351] To assess these categories Wolbring notes that the following measuring tools are used within HTA: WHOQOL-100; WHOQOL-BREF; Multi-attribute utility instruments such as Expanded Disability Status Scale (EDSS) EQ-5D; SF-6D Medical Outcomes Study Short Form 36; Nottingham Health Profile (NHP); the Sickness Impact Profile (SIP); EuroQol instrument (EQ-5D); the Quality of Being Scale QWB); AQOL Health Utilities Index (HUI); Health Utilities Index Mark III; Health-related quality of life (HRQoL); Calvert-Henderson Quality of Life Indicators; Quality of Life indicator of the Quality of Life Research Unit within the Centre for Health Promotion in the Department of Public Health Sciences, University of Toronto; The DALY; Comprehensive QoL Scale; General Health Questionnaire; Goteborg QoL Instrument; Health Measurement Questionnaire; Lancashire QoL Profile; Lehman's QoL Interview; Life-as-a-Whole Index; Life Experiences Checklist; Life Satisfaction Index; MOS Short Form 36; Multifaceted Lifestyle Satisfaction Scale; Nottingham Health Profile; QoL in Depression Scale; QoL Enjoyment & Satisfaction Questionnaire; QoL Index; QoL Index for Mental Health; QoL Interview Schedule; QoL Inventory; QoL Initiative #23 December 2005 56 Questionnaire (Shalock); QoL Questionnaire/Interview (Bigelow); QoL Scale; QoL Self-Assessment Inventory; QoL Systemic Inventory; Quality of Well-Being Scale Satisfaction With Life Scale; Schedule for the Eval of Individual QoL; Sickness Impact Profile; SmithKline Beecham QoL Scale; performance indicators for the Health System according to the 2003 First Ministers' Accord on Health Care Renewal; Public Health Agency of Canada Determinants of Health; and Comparable Health and Health System Performance Indicators for Canada, the Provinces and Territories, November 2004. See Wolbring (2005).

more meaningfully describe the value of a technology, HTA relies on values-based data from studies on patients measuring health-related quality of life. "This information is then input into cost-utility analyses, which offer a means of establishing the value of a technology as seen by the payer" (Menon & Stafinski, 16). To further assess a new technology, Canadian costing information (primarily from administrative databases) is used. "In the case of new technologies for which no Canadian data are available, costs are generally extracted from sources that most closely reflect the Canadian context (i.e., public health-care system in a westernized country) and then converted into Canadian dollars" (Menon & Stafinski, 16). Finally, field evaluations of a technology are also a mechanism to collect real-world data and "support decision-making through primary research on the effectiveness of promising new technologies for which no 'real-world' data exist, while meeting the care needs of patients who may benefit" (Menon & Stafinski, 16).

With such criteria, Canadian HTA is a blend of considerations of economic impact and quality of life. We see this in various CADTH technology reports, for example, the report on "Robot-Assisted Surgery Compared with Open Surgery and Laparoscopic Surgery: Clinical Effectiveness and Economic Analyses." In assessing robot-assisted surgery, the CADTH concluded that the quality-of-life value for patients was better in terms of length of hospital stay; robotic surgeons appear to lessen recovery times, reduce blood loss and post-surgical complications.[352] However, operating time and economic comparisons showed problems with robotic-assistance surgery when compared to traditional methods, thus resulting in a need to maximize caseloads and use the robot for

[352] See Ho et al., (2011).

longer periods of time to maintain cost effectiveness.[353] It should be noted, however, that while such criteria are included in the conceptual framework and development outline of Canada's HTA, according to Menon and Stafinski "little is known about how these criteria are actually used to guide decisions (e.g., is one criterion weighed more heavily than another?)" (15). With this warning in mind, we shall proceed to locate aspects of the Roman Catholic and Transhuman guidelines that we have derived for cybernetic and nanotechnological body modifications within the HTA system.

Of the Roman Catholic and Transhuman guidelines that we have outlined, there are two that would be supported by the current mainstream in each group. First, both Roman Catholics and Transhumanists agree on basic principles of safety to human health and mitigation of excessive risk to the body and mind when applying or experimenting with such technologies. Second, an enhancement technology should not violate principles of privacy and control. These basic parameters stem from similar categories of comparison and yet are derived from differing interpretations. For example, Transhumanism's advocacy of privacy and safeguards against devices employed for unauthorized neural control stem from its value of human autonomy and reason, whereas Roman Catholicism's stems from solidarity and common good. Similarly, Roman Catholicism's advocacy of minimal risks to health stems from its concept of stewardship wherein persons are mandated by the Creator to care for their body; Transhumanism also uses stewardship but with a mandate of continual healthy betterment through technology with the right to health safeguarded by social policy. Together, these positions generally fall under the HTA categories of judging a technology's relative therapeutic value against its

[353] See Ho et al., (2011).

relative efficacy using values-based data from studies on patients measuring health-related quality of life.

Although we have been able to demonstrate a minority position within Transhumanism and Roman Catholicism which accepts (or tries to integrate) more principles from each group, consensus between the mainstreams of these two groups regarding the other guidelines we derived is unlikely. A Transhuman emphasis on autonomy is not compatible with a Roman Catholic prohibition on enhancement technologies aimed at human reproduction or detaching an individual from the greater community. Likewise, a Roman Catholic interpretation of distributive justice would have difficulties with Transhumanism's advocacy of widespread use of enhancement technologies to bring down costs and ensure equal access. The two positions are also unlikely to agree on a common understanding to the value of personhood or acceptable levels of body commodification, and, although both groups lament suffering and vulnerability as part of the human condition, they have different understandings of its value. Finally, to complicate matters further, the criteria of the CADTH do not easily accommodate either Roman Catholic or Transhuman preoccupations. For example, neither a Roman Catholic nor Transhuman approach to distributive justice and economic issues would fit within the cost-benefit analysis models employed in HTA. Similar problems would arise with specific Roman Catholic prohibitions on reproductive technologies and Transhuman promotion of individual autonomy.

With this assessment of the positions of Roman Catholicism and Transhumanism on cybernetic and nanotechnological modifications, and given the criteria by which HTA operates, we can anticipate how each group may seek to expand, advocate for, or even test the limits of a technology or its assessment. Indeed, in "The triangle of enhancement

medicine, disabled people, and the concept of health: a new challenge for HTA, health research, and health policy," Wolbring notes that "despite concern for the ethical implications of technological development, it is difficult to find a rigorous acceptable model of ethical implications in [Canada's] HTA studies" (2005, 51). For Transhumanists, HTA's inclusion of an application of real-world data is an avenue for testing enhancing body modification technologies. Little "real-world" data currently exists for many enhancement technologies, and the field evaluations of HTA to test the effectiveness of promising new technologies would be strongly advocated by Transhumanists as a step towards patient (and social) betterment. Anticipating cybernetic and nanotechnologies, Wolbring asks how concepts such as Transhumanism will "play themselves out with the ethical framework that the HTA profession might choose" (52). The same question can be asked using Roman Catholic concepts. For Roman Catholicism, a HTA's incorporation of values-based data offers an area where a patient's quality of life is measured. Here, a Roman Catholic position would argue that certain technological enhancements detract from a patient's health, as in fact Wolbring does:

> Health loses its endpoint measure of normative, species-typical boundaries because of the ability of science and technology products to improve and modify the human body beyond species-typical boundaries, leading to the endpoint where the human body in general is seen as defective and in need of improvement. This endpoint changes the meaning of the term 'healthy' and the scope of action implied with the term 'staying healthy'. (3)

One of Wolbring's conclusions is that Canadian HTA "seems not so far to have covered how emerging science and technology products and applications lead to certain societal

developments and societal and individualistic desires (medicalization of the human body in general) and vice versa, how social well-being influences the desire for medical interventions, and how these dynamics impact healthcare costs (i.e. increase in drug costs due to increased use) and the definition of health and disease" (4-5). While a detailed response to such a conclusion is outside the scope of our thesis, we shall suggest that such a task is not the sole responsibility of the Canadian HTA system. Such an endeavor requires the input of all those who fall under the care of the health system, and as such requires the input of bioethical reflection from religious and secular groups alike.

As a final word to this thesis, we shall note that when looking back into history there have always been social trends towards a modified version of the body, be it head-shaping practices in Central African tribal societies or the corsetry of seventeenth-century Europe (Brain, 1979, 92). Such practices are often the purview of historians, sociologists, anthropologists, and psychologists, yet applications of body modification technologies (be they enhancing or not) are addressed by relatively few religious perspectives beyond general scriptural guidelines and standards of modesty. Indeed, Hogle laments the weakness of bioethics writings on body modifications in general and the extrapolation of individual cases to universal social standards (700). Arguably, body is at the heart of Christian experience, not only due to the traditional narratives of the divine made flesh in Christ and the constant emphasis on Eucharistic ceremonies (with the apologue of body and blood transformed in a community), but because the body is the image to which humanity can best relate. By examining Roman Catholic bioethical approaches to body modification technologies, and drawing out both points of convergence as well as fundamental differences with advocates of these technologies, we have attempted to fill in a small part of this missing dialogue.

Appendix–Decorative Body Modification Images

Figure A. Common modification: Tattoo

Figure B. Common modification: Tattoo

Figure C. Common modification: Tattoo

Figure D. Common modification: Tattoo

Figure E. Common modification: Tattoo

Figure F. Common modification: Tattoo

Figure G. Common modification: Tattoo

Figure H. Common modification: Tattoo

Figure I. Common modification: Tattoo

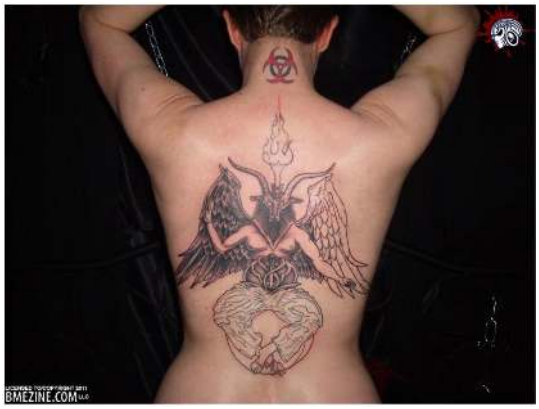

Figure J. Common modification: Tattoo

Figure K. Common modification: Tattoo

Figure L. Common modification: Tattoo

Figure M. Common modification: Tattoo

Figure N. Common modification: Piercing

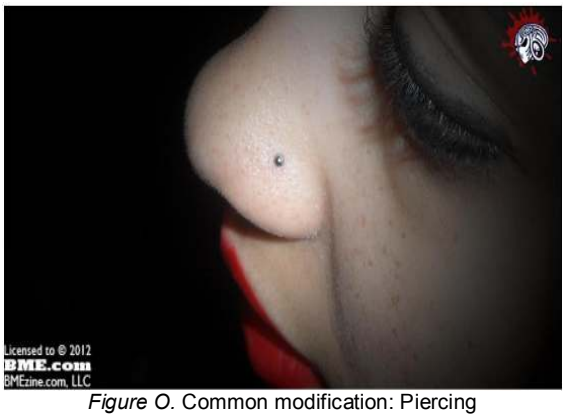

Figure O. Common modification: Piercing

Figure P. Common modification: Piercing

Figure Q. Common modification: Piercing

Figure R. Uncommon modification: Extreme piercing

Figure S. Uncommon modification: Extreme piercing

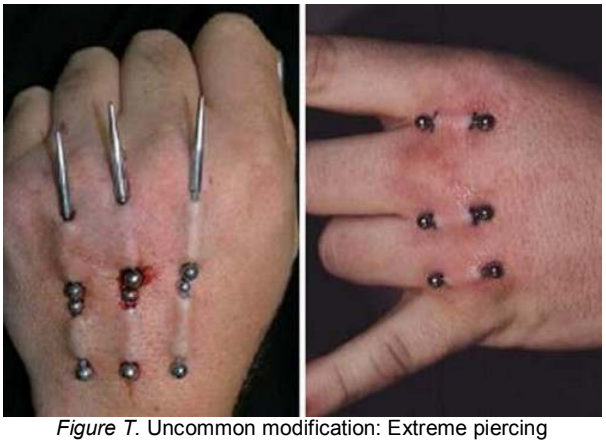

Figure T. Uncommon modification: Extreme piercing

Figure U. Uncommon modification: Extreme piercing

Figure V. Uncommon modification: Extreme piercing

Figure W. Uncommon modification: Branding

Figure X. Uncommon modification: Branding

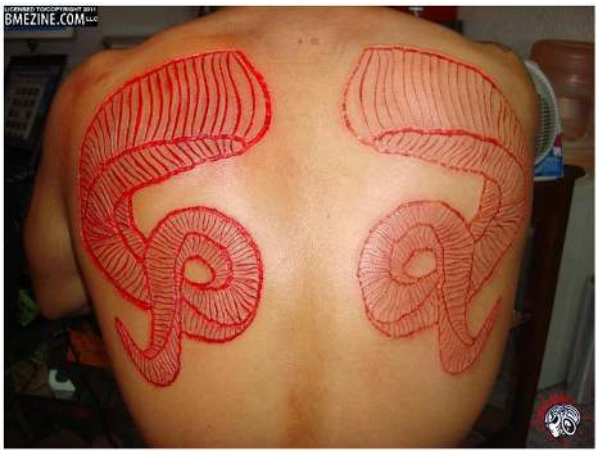

Figure Y. Uncommon modification: Scarification/Flesh Removal

Figure Z. Uncommon modification: Scarification/Flesh Removal

Figure Z1. Uncommon modification: Body sculpting

Figure Z2. Uncommon modification: Body sculpting

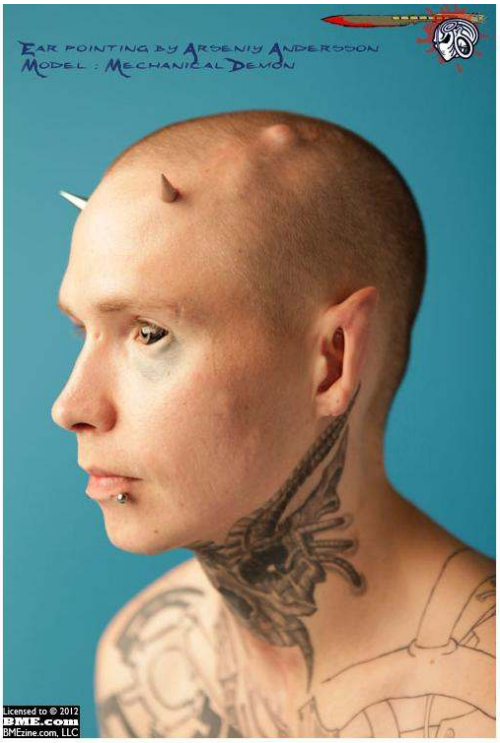

Figure Z3. Uncommon modification: Body sculpting

Bibliography

Agar, N. (2004). *Liberal Eugenics: In Defence of Human Enhancement*. Oxford, U.K.: Blackwell.

Agar, N. (2007). Where to Transhumanism? The Literature Reaches a Critical Mass. *Hastings Center Report*, *37*(3), 12-17.

Al-Hibri, A.Y., Elshtain, J.B., & Haynes, C.C. (2001). *Religion in American Public Life: Living with Our Deepest Differences*. New York, NY: W.W. Norton and Company Inc.

Altmann J. (2001). Military uses of microsystem technologies: Dangers and preventive arms control. Münster: Agenda Verlag.

American Teilhard Association. (2012). Teilhard and the Interbeing of Cosmology and Community. *Teilhard Perspective*, *45*(2), 1-15.

Anderson, W.T. (1987). *To Govern Evolution: Further Adventures of the Political Animal*. USA: Harcourt.

Annas, G.J. (2000). The man on the moon, immortality, and other millennial myths: the prospects and perils of human genetic engineering. *Emory Law Journal*, *49*(3), 753-82.

Annas, G.J. (2005). *American Bioethics: Crossing Human Rights and Health Law Boundaries*. Oxford, UK: Oxford University Press.

Aquinas, T. (1947). *Summa Theologica*. (Fathers of the English Dominican Province Trans.). Retrieved June 9, 2006 from http://www.newadvent.org/summa/

Aquinas, T. (1991). Summa Theologiae: Of the Natural Law. In Charles E. Curran and Richard A. McCormick (Eds.), *Readings in Moral Theology No.7*, *Natural Law and Theology* (pp. 101-113). New York, NY: Paulist Press.

Armitage J. (1999). Machinic Modulations: New Cultural Theory & Technopolitics. *Angelaki: Journal of Theoretical Humanities*, *4*(2), 1-16.

Armitage, J. (Ed.). (2000a). *Paul Virilio: From Modernism to Hypermodernism and Beyond*. London: Sage.

Armitage, J. (2000b). *Beyond Postmodernism? Paul Virilo's Hypermodern Cultural Theory*. Retrieved October 10, 2010 from http://www.ctheory.net/articles.aspx?id=133

Artigas, M. (1999). *The Ethical Nature of Karl Popper's Theory of Knowledge: Including Popper's Unpublished Comments on Bartley and Critical Rationalism*. Ann Arbor, MI: Peter Lang.

ASAPS. (2002, July 25). *Phony Doctors, Illegal Drugs, Botched Procedures*. Retrieved October 8, 2010 from http://www.surgery.org/media/news-releases/phony-doctors-illegal-drugs-botched-procedures

ASAPS. (2012). Cosmetic Surgical National Data Bank: Statistics 2012. *American Society for Aesthetic Plastic Surgery*. Retrieved October 1, 2012 from http://www.surgery.org/sites/default/files/ASAPS-2012-Stats.pdf

Asad, T. (2003). *Formations of the Secular: Christianity, Islam, Modernity*. Stanford, CA: Stanford University Press.

Ashley, B.M., & O'Rourke, K.D. (1997). *Health Care Ethics, Fourth Edition: Health Care Ethics: A Theological Analysis.* USA: Georgetown University Press.

Athletic Business. (2012). Cell Phones and Locker Rooms. *Athletic Business Media*. Retrieved October 1, 2012 from http://www.athleticbusiness.com/how-to/readers/question.aspx?qid=5

Atkinson, M. (2003). *Tattooed—The Sociogenesis of a Body Art*. Toronto, ON: University of Toronto Press.

Balkany, T., Hodges, A.V., & Goodman, K.W. (1996, June). Ethics of Cochlear Implantation in Young Children. *Journal of Otolaryngology—Head and NeckSurgery*, *114*(6), 748-755

Bailey, Ronald (2005). *Liberation Biology: The Scientific and Moral Case for the Biotech Revolution*. Ann Arbor, MI: Prometheus Books.

Barbour, I. (1996). *Ethics in an Age of Technology, The Gifford Lectures: 1989-1991,* Vol. 2. San Francisco, CA: Harpers.

Barbrook, R. & Cameron, A. (2000). The California Ideology. *The Hypermedia Research Centre*. Retrieved October 1, 2010 from http://www.hrc.wmin.ac.uk/theory-californianideology.html

Barmann, L. & Hill, H. (Eds.). (2002). *Personal Faith and Institutional Commitments: Roman Catholic Modernist and Anti-Modernist Autobiography*. Scranton, PA: University of Scranton Press.

Bartley, W.W. (1962). *The Retreat to Commitment*. Ann Arbor, MI: Knopf.

Barrow, J. & Tipler, F. (1986). *The Anthropic Cosmological Principle*. New York, NY: Oxford University Press.

Beauchamp, T. (1999). *Frontiers of Biomedical Ethics*. Tokyo, JP: Kojinsha.

Beauchamp, T. (2003). The Origins, Goals, and Core Commitments of the Belmont Report and Principles of Biomedical Ethics. In Jennifer Walter & Eran Klein (Eds.), *The Story of Bioethics: From Seminal Works to Contemporary Explorations* (pp. 17-46). Washington, D.C.: Georgetown University Press.

Beauchamp, T., Childress, J. (2001). *The Principles of Biomedical Ethics* (5th ed.). New York, NY: Oxford University Press.

Beauchamp, T., Walters, L., Kahn, J., Mastroianni, A.C. (2007). *Contemporary Issues in Bioethics* (7th ed.). Belmont, CA: Wadsworth Publishing.

Beaudin, L.C. (2002). *Bernard Lonergan's Notions of Authenticity and Technology Integration*. Calgary, AB: University of Calgary Press.

Beckwith, F. (2010). Dignity never been photographed: Scientific materialism, enlightenment Liberalism, and Steven Pinker. *Ethics & Medicine: An International Journal of Bioethics*, *26*(2), 93-110.

Bell, D. (1973). *The Coming of Post-Industrial Society*. New York, NY: Basic Books.

Bellis, M. (2013). *The History of Prosthetics*. Retrieved June 16, 2008 from http://inventors.about.com/library/inventors/blprosthetic.htm

Benedict XVI. (December 22, 2008). *The Holy Spirit Gives Us Joy, and He Is Joy Pope's Christmas Address to Curia.* Retrieved October 1, 2010 from http://www.zenit.org/article-24682?l=english

Benedict XVI. (2005). *Deus caritas est*. Retrieved October 1, 2010 from http://www.vatican.va/holy_father/benedict_xvi/encyclicals/documents/hf_ben-xvi_enc_20051225_deus-caritas-est_en.html

Benedict XVI. (2009). *Caritas in Veritate*. Retrieved October 1, 2010 from http://www.vatican.va/holy_father/benedict_xvi/encyclicals/documents/hf_ben-xvi_enc_20090629_caritas-in-veritate_en.html

Benedict, A.M. & O'Rourke, K.D. (1997). *Health Care Ethics: A Theological Analysis*. 4th ed. Washington, DC: Georgetown University Press.

Benedict, A.M., O'Rourke, K.D., & Pellegrino, E.D. (1994). *Ethics of Health Care*. Washington, DC: Georgetown University Press.

Bender, L. (1962). Mutilation. In Francesco Roberti & Pietro Palazzini (Eds.), *Dictionary of Moral Theology* (Vol. 3, pp. 804-806). Westminster, MD: The Newman Press.

Berger, T.W., Baudry, M., Brinton, R.D., Liaw, J.S., Marmarelis, V.Z., Park, A.Y., Sheu, B.J., Tanguay, A.R. (2001). Brain-implantable biomimetic electronics as the next era in neuralprosthetics. *Proceedings of the IEEE*, *89*(7), 993-1012.

Berger, J.T. (2005). The Ethics of Deactivating Implanted Cardioverter Defibrillators. *Annals of Internal Medicine*, *142*(8), 631-634.

Bergson, H. (1998). *Creative Evolution* (Unabridged ed.). UK: Dover Publications.

Bergstrom, L.S., & Lynoe, N. (2008). Enhancing concentration, mood and memory in healthy individuals: An empirical study of attitudes among general practitioners and the general population. *Scandinavian Journal of Public Health, 36*(5), 532-537.

Berlin, I. (2002). *Freedom and Its Betrayal*. Princeton, NJ: Princeton University Press.

Bernadine, J. (1983). Call for a Consistent Ethic of Life. *Origins*, *13*(29), 491-94.

Bernal, J.D. (1969). *The World, the Flesh & the Devil: An Enquiry into the Future of the Three Enemies of the Rational Soul* (2nd ed.). USA: Indiana University Press.

Berne, R.W. (2004). *IEEE Circuits & Devices Magazine*, May/June, 11.

Berry, T. (1999). *The Great Work: Our way into the Future*. New York, NY: Bell Tower.

Bimber, B. (1990). Karl Marx and the three faces of technological determinism. *Social Studies of Science*, *20*(2), 333–351.

Blackford, R. (2008). *WTA changes its Image*. Retrieved December 18, 2008 from http://metamagician3000.blogspot.ca/2008/07/wta-changes-its-image.html

Bloch, E. (1986). *Natural Law and Human Dignity*. (D.J. Schmidt, Trans.). Cambridge, MA: The MIT Press.

Blum, S. (2009). *The Artificial Ear: Cochlear Implants and the Culture of Deafness*. Piscataway, NJ: Rutgers University Press.

Bmezine.com. (2002). *Scarification FAQ Version: 2.00*. Retrieved June 9, 2006 from http://www.bmezine.com/scar/scar-faq.html

Bmezine.com. (2010). *Gay*. Retrieved June 11, 2011 from http://wiki.bmezine.com/index.php/Gay

Bmezine.com. (2011). *Coptic Tattoos*. Retrieved June 11, 2011 from http://wiki.bmezine.com/index.php/Coptic_Tattoos

Bone, A., Ncube, F., Nichols, T., & Noah, N.D. (2008). Body Piercing in England: a Survey of Piercing at Sites Other than Earlobe. *British Medical Journal*, *336* (336), 1426–1428.

Borsook, P. (1996). Cyberselfishness. *Mother Jones*. Retrieved November 1, 2012, from http://www.motherjones.com/politics/1996/07/cyberselfish

Borsook, P. (2000). *Cyberselfish: A Critical Romp Through the Terribly Libertarian Culture of High-Tech*. Cambridge, MA: Public Affairs.

Bostrom, N. (n.d.). *Transhumanist Values*. Retrieved November 1, 2012, from http://www.nickbostrom.com/ethics/values.html

Bostrom, N. (1998). How Long Before Superintelligence? *International Journal of Futures Studies*. Vol. 2. Reprinted in 2006, *Linguistic and Philosophical Investigations*, *5*(1), 11-30.

Bostrom, N. (2003). *The Transhumanist FAQ Version 2.0*, Retrieved November 1, 2003, from http://transhumanism.org/resources/faq.html

Bostrom, N. (2003b). Are you living in a Computer Simulation? *Philosophical Quarterly*, *53*(211), 243-255.

Bostrom, N. (2003c). Human Genetic Enhancements: A Transhumanist Perspective. *Journal of Value Inquiry*, *37*(4), 493-506.

Bostrom, N. (2005a). In Defense of Posthuman Dignity. *Bioethics*, *19*(3), 202-214.

Bostrom, N. (2005b). A History of Transhumanist Thought. *Journal of Evolution and Technology*, *14*(1), 1-30.

Bostrom, N. (2009). The Future of Humanity. In Jan Kyrre Berg Olsen, Evan Selinger, & Søren Riis (Eds.), *New Waves in Philosophy of Technology* (pp. 186-215). New York: Palgrave McMillan.

Bouma, H., Diekema, D., Langerak, E., Rottman, T., & Verhey, A. (1989). *Christian Faith, Health, and Medical Practice*. Grand Rapids, MI: William B. Eerdmans.

Bowman, K. (2004). What are the Limits of Bioethics in a Culturally Pluralistic Society? *Journal of Law, Medicine & Ethics*, *32*(4), 664-9.

Brain, R. (1979). *The Decorated Body*. New York, NY: Harper & Row Publishers.

Braithwaite, D., Robin Koning , R. & Ormerod, N. (Eds.). (2011). Fifty Years of Insight: Bernard Lonergan's Contribution to Philosophy and Theology. Hindmarsh, SA: ATF Press.

Brann, E. (1992). What is Post-modernism? *Harvard Review of Philosophy*. Spring. 4-7.

Braun, T.C., Hagen, N.A., Hatfield, R.E., & Wyse, D.G. (1999). Cardiac Pacemakers and Implantable Defibrillators in Terminal Care. *Journal of Pain and Symptom Management*, *18*(2), 126-31.

Brennan, J.G. (1973). *Ethics and Morals*. New York, NY: Harper & Row.

Brom, R.H. (2004). Homosexuality. *Catholic Answers*. Retrieved June 9, 2006 from http://www.catholic.com/tracts/homosexuality

Brookes, G. & Barfoot, P. (2008). *Global Impact of Biotech Crops: Socio-Economic and Environmental Effects*, 1996-2006 AgBioForum, Vol. 11, No. 1, A. 3

Brock, D. (1996, May). Enhancement of Human Functions: Some Distinctions for Policy Makers. (Unpublished Working Paper). Hastings Center, Briarcliff Manor, NY.

Brock, D. (1998). Enhancement of human function: some distinctions for policymakers. In E. Parens (Ed.), *Enhancing Human Traits: Ethical and Social Issues* (pp.48-69). Washington, DC: Georgetown University Press.

Buber, M. (1996). *Paths in Utopia*. Syracuse, NY: Syracuse University Press.

Buchanan, A., Brock, D., Daniels, N., & Wikler, D. (2000). *From Chance to Choice: Genetics and Justice*. New York, NY: Cambridge University Press.

Buchanan, A. (2009). Moral Status and Human Enhancement. *Philosophy & Public Affairs*, *37*(4), 346-381.

Burch, G. (2001). "Progress, Counter-Progress and Counter-Counter-Progress" *Extro5*. Retrieved June 9, 2006 from http://www.gregburch.net/progress.html

CAA. (n.d.). Distracted Driving Laws in Canada. *CAA*. Retrieved June 9, 2012 from http://distracteddriving.caa.ca/education/distracted-driving-laws-in-canada.php

Cahill, L.S. (1993). Current Teaching on Sexual Ethics. In Charles E. Curran and Richard A McCormick (Eds.), *Readings in Moral Theology No.8, Dialogue About Catholic Sexual Teaching* (pp. 525-535). New York, NY: Paulist Press.

Cahill, L.S. (2003). Richard McCormick and the Dilemma of Modern Medicine. In Jennifer Walter & Eran Klein (Eds.), *The Story of Bioethics: From Seminal Works to Contemporary Explorations* (pp. 131-148). Washington, DC: Georgetown University Press.

Cahill, L.S. (2004). *Bioethics and the Common Good*. Milwaukee, WI: Marquette University Press.

Cahill, L.S. (2005a). *Theological Bioethics: Participation, Justice, Change*. Washington, DC: Georgetown University Press.

Cahill, L.S. (2005b). *Genetics, Theology, Ethics: An Interdisciplinary Conversation*. New York, NY: Crossroad.

Cahill, L.S. (2005c). *Modern Catholic Social Teaching: Commentaries and Interpretations*. Washington, DC: Georgetown University Press.

Caldecott, S. (2001). New Sins: Technology and the Frontiers of Catholic Social. *Communio*, *28*(3), 488-504.

Callahan, D. (1973), Science: Limits and Prohibitions. *The Hastings Center Report*, *3*(5), 5-7.

Callahan, D. (1981). *The Roots of Ethics: Science, Values, and Religion*. New York, NY: Plenum Press.

Callahan, D. (1990). *What Kind of Life: The Limits of Medical Progress*. New York, NY: Simon and Schuster.

Callahan, D. (2003). *What Price Better Health? Hazards of the Research Imperative.* Berkeley and Los Angeles, CA: University of California Press.

Callow, R. (2012). Brain-hackers create a backdoor to the human mind. *Sync.co.* Retrieved October 9, 2012 from http://www.sync-blog.com/sync/2012/08/brain-hackers-create-a-backdoor-to-the-human-mind.html

Canadian Women's Health Network. (2012). *Body Image and the Media*. Retrieved October 9, 2012 from http://www.cwhn.ca/en/node/40776

Canguilhem, G. (1989). *The Normal and the Patholigical*. New York, NY: Zone Books.

Capaldi, N. (2008). A Catholic Perspective on Organ Sales. *Christian Bioethics*, *6*(2), 139-151.

Caplan, A.L. (2000). What's Morally Wrong with Eugenics? In Phillip R. Sloan (Ed.), *Controlling Our Destinies: Historical, Philosophical, Ethical and Theological Perspectives on the Human Genome Project* (pp. 209-222). Notre Dame, IN: University of Notre Dame Press.

Caplan, A.L. (2006). *Smart Mice, Not-So-Smart People: An Interesting and Amusing Guide to Bioethics.* Lanham, MD: Rowman & Littlefield Publishers.

Caplan, A.L. & Coelho, D.H. (1998). *The Ethics of Organ Transplants: The Current Debate*. Amherst, NY: Prometheus Books.

Caplan, A.L. & Elliott, C. (2004). Is it ethical to use enhancement technologies to make us better than well? *PLoS Medicine*, *1*(3), 172-75.

Caplan, A.L., Engelhardt, H., & McCartney, J.J. (1981). *Concepts of Health and Disease: Interdisciplinary Perspectives.* Reading, MA: Addison-Wesley.

Carrico, D. (2004). Better Humans. *IEEE*. Retrieved June 9, 2006 from http://ieet.org/index.php/IEET/more/carrico20041222/

Catholic Answers. (2013). *What does the term ex cathedra mean, and where did the Catholic Church come up with it*? Retrieved June 19, 2006 from http://www.catholic.com/quickquestions/what-does-the-term-ex-cathedra-mean-and-where-did-the-catholic-church-come-up-with-it

Catholics United for the Faith (CUF). (2006). *Faith Facts, the Answers You Need: Tattoos*. Retrieved June 9, 2006 from http://cuf.org/faithfacts/details_view.asp?ffID=233

Cauwels, J.M. (1986). *The Body Shop: Bionic Revolutions in Medicine.* Ann Arbor, MI: Mosby-Year Book.

CBC News Online. (2004). *Body Art: The Story Behind Tattooing and Piercing in Canada*. Retrieved June 9, 2006 from http://www.cbc.ca/news/background/tattoo/index.html

Center for Responsible Nanotechnology. (2008). *Conflicting Definitions Retrieved* January 10, 2009 from http://www.crnano.org/whatis.htm

Cernera, A. & Morgan, O. (Eds.). (2000). *Examining the Catholic Intellectual Tradition.* Fairfield, CT: Sacred Heart University Press.

CHAC. (1991). *Health Care Ethics Guide.* Ottawa, ON: Catholic Health Association of Canada.

CHAC. (2012). 2012 Annual Report. *Catholic Health Alliance of Canada*. Retrieved January 5, 2013 from http://www.chac.ca/alliance/annual_report/annualreport_e.php

CHAUS. (2013a). Fast Facts. *Catholic Health Association of the United States*. Retrieved January 5, 2013 from http://www.chausa.org/Pages/Newsroom/Fast_Facts/

CHAUS. (2013b). Catholic Health Care Statistics. *Catholic Health Association of the United States*. Retrieved January 5, 2013 from http://www.chausa.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=7830

Cherry, M.J. (2000). Body Parts and the Market Place: Insights from Thomistic Philosophy. *Christian Bioethics*, *6*(2), 171-193.

Cherry, M.J. (2005) *Kidney for Sale by Owner: Human Organs, Transplantation, and the Market.* Washington, DC: Gerorgetown University Press.

Childress, J. (2003). Principles of Biomedical Ethics: Reflections on a Work in Progress. In Jennifer Walter & Eran Klein (Eds.), *The Story of Bioethics: From Seminal Works to Contemporary Explorations* (pp. 47-66). Washington, DC: Georgetown University Press.

Chingcuanco, L. (2012). Fr. Bernard Lonergan Biography. *Prezi Inc*. Retrieved April 23, 2012 from http://prezi.com/s8dnjhwndnkn/fr-bernard-lonergan/

Chmielewski, P. J. (2006). A Method of Value Assessment for Social Technologies. *IEEE Technology and Society Magazine*, *25*(3), 5-7.

Chyrowicz, B. (2009, 25 February). The Risks of Pushing Towards Perfection. Proceedings of the Pontifical Academy for Life on the occasion of its 15th General Assembly "New frontiers of genetics and the dangers of eugenics". Rome: L'Osservatore Romano.

CIMIT, (2010). *Biomaterials & Tissue Engineering Projects*. Retrieved October 5, 2010 from http://www.cimit.org/programs-biomaterials.html

Cimino, R. (2011). Transhumanism: a "secular spirituality" of life extension and cosmic consciousness finds mainstream hearing. *Religioscope.* Retrieved April 23, 2012 from http://religion.info/english/articles/article_538.shtml

Clark, A.R. (2010). Transhumanism and Posthumanism: Lifting Man Up or Pulling Him Down? *Ignatius Insight*. Retrieved November 30, 2012 from http://www.ignatiusinsight.com/features2010/aclark_tranhumanism_mar2010.asp

Clynes, M. & Kline, N.S. (1960, September). Cyborgs and Space. *Astronautics*, *26*(27), 74-75.

CNS. (2012). Health is universal good to be defended, not commoditized, says pope. *Catholic News Service*. Retrieved November 30, 2012 from http://www.cathnewsusa.com/2012/11/health-is-universal-good-to-be-defended-not-commoditized-says-pope/

CNW Group. (2008, November 20). *Canadians Say They're Doing Research Before*

Cosmetic Surgery. Retrieved April 23, 2008 from http://www.newswire.ca/en/releases/archive/November2007/20/c2389.html

Cole-Turner, R. (2001). "Science, Technology, and the Mission of Theology in a New Century." In Max L. Stackhouse and Don S. Browning (Eds.), *God and Globalization: The Spirit and the Modern Authorities* (pp. 139-165). Harrisburg, VA: Trinity Press International.

Cole-Turner, R. (Ed.). (2011). *Transhumanism and Transcendence: Christian Hope in an Age of Technological Enhancement*. Washington, DC: Georgetown University Press.

Coppa, F.J. (2003). *The Papacy Confronts the Modern World*. Malabar, FL: Krieger Publishing Company.

Corradetti, C. (2009). *Relativism and Human Rights: A Theory of Pluralistic Universalism*. USA: Springer SBM.

Court of Arbitration for Sport. (2008, 16 May). *CAS 2008/A/1480 Pistorius v/ IAAF*. Retrieved August 10, 2011 from http://web.archive.org/web/20080529024602/http://www.tas-cas.org/d2wfiles/document/1085/5048/0/Pistorius+award+%28scanned+published+on+CAS+website%29.pdf

Creamer, D. (1996). *Guides for the Journey: John MacMurray, Bernard Lonergan, and James Fowler*. Lanhan, MD: University Press of America.

Crowe, M.B. (1977). *The Changing Profile of the Natural Law*. The Hague: Nijhoff.

Crowe, F.E. (1992). *Lonergan*. Collegeville, MN: Liturgical Press.

Csordas, T.J. (1998). Body. In Warren T. Reich (Ed.), *The Ethics of Sex and Genetics: Selections from the 5 Volume Macmillion Encylopedia of Bioethics Revised Edition* (pp.84-91). New York, NY: MacMillan Reference.

Csordas, T.J. (2004). Body: II Cultural and Religious Perspectives. In Stephen G. Post (Ed.), *Encyclopedia of Bioethics* (3rd ed.), (Vol. 1, pp.327-334). New York, NY: MacMillan Reference.

Cubitt, C. (1995). *Anglo-Saxon Church Councils c. 650-c.850*. New York, NY: St. Martin's Press.

Curran, C.E. (1982). *American Catholic Social Ethics: Twentieth-Century Approaches*. Notre Dame, IN: University of Notre Dame Press.

Curran, C.E. (1987). Roman Catholic Sexual Ethics: A Dissenting View. *Christian Century Magazine*. Retrieved June 11, 2008 from http://www.religion-online.org/showarticle.asp?title=113

Curran, C.E. (2003). The Catholic Moral Tradition in Bioethics. In J.K. Walter & E.P. Klein (Eds.), *The Story of Bioethics: From Seminal Works to Contemporary Explorations* (pp. 113-130). Washington, DC: Georgetown University Press.

Curran, C.E. (2008). *Catholic Moral Theology in the United States: A History.* Washington, DC: Georgetown University Pres.

"Cyborg" (1989). *The Oxford English Dictionary* (2nd ed.). Retrieved June 10, 2008 from http://www.oed.com/bbcwordhunt/cyborg.html

Daly, G. (1980). *Transcendence and Immanence: A Study in Catholic Modernism and Integralism*. Oxford, UK: Clarendon Press.

Daly, B.M. (2004, October 25). Transhumanism. *America*, *191*, 12.

Daniels, N. (2000). Normal functioning and the treatment-enhancement distinction. *Cambridge Quarterly Healthcare Ethics*, *9*(3), 309-22.

Daniels-Sykes, S.M. (2007). *Roman Catholic Social Bioethics Critiques Secular Bioethics: Fetal Tissue Research and Vulnerable Populations*. (Doctoral Dissertation). Retrieved from ProQuest. (UMI Number: 3263815)

Davis, L. (1995). *Enforcing Normality: Disability, Deafness and the Body*. New York, NY: Verso.

de Chardin, T. (1950). *L'Energie Spirituelle De La Souffrance*. Paris, FR: Seuil.

de Chardin, T. (1965). *The Phenomenon of Man*. (B. Wall, Trans.). London, UK: Fontana.

de Chardin, T. (1971). *Christianity and Evolution*. (R. Hague, Trans.). New York, NY: Harcourt Brace Jovanovich

de Chardin, T. (2003). *The Human Phenomenon*. (S. Appleton-Weber, Trans.). Portland, OR: Sussex Academic Pres.

de Chardin, T. (2004). *The Future of Man*, (N. Denny, Trans.). New York, NY: Doubleday Image Book.

De Cuyper, C., Pérez-Cotapos, M.L., & Cossio L. (2010). Piercings: Techniques and Complications in C. de Cuyper, M. L. Pérez-Cotapos S. (Eds.), *Dermatologic Complications with Body Art* (pp. 43-52). Berlin Heidelberg: Springer-Verlag.

De Rosa, P. (23 November, 1992). Catholics and Sex [Television Series]. In M. French & K. Iles (Producers). UK: Channel Four Productions.

Delany, J. (1911a). Obedience. *The Catholic Encyclopedia*. Retrieved September 6, 2012 from New Advent: http://www.newadvent.org/cathen/11181c.htm

Delany, J. (1911b). Prudence. *The Catholic Encyclopedia*. Retrieved September 6, 2012 from New Advent: http://www.newadvent.org/cathen/12517b.htm

Delany, J. (1911c). Pride. *The Catholic Encyclopedia*. Retrieved September 6, 2012 from New Advent: http://www.newadvent.org/cathen/12405a.htm

Delany, J. (1912). Temperance. In *The Catholic Encyclopedia*. Retrieved January 13, 2012 from New Advent: http://www.newadvent.org/cathen/14481a.htm

Delaney, J. J. & Martin, D. P. (2011). The Role of Physician Opinion in Human Enhancement. *American Journal of Bioethics 11*(1), 19-20.

Delgado, J.M.R. (1969). *Physical Control of the Mind: Toward a Psychocivilized Society*. New York, NY: Harper and Row.

Delgado**,** J.M.R. (1977). Therapeutic programmed stimulation of the brain in man. In W. Sweet, S. Obrador & J.G. Martin-Rodriguez (Eds.), *Neurosurgical treatment in psychiatry, pain, and epilepsy* (pp.615-637). Baltimore, MD: University Park Press.

Delgado**,** J.M.R, Obrador, S., and Martin-Rodriquez, J.G. (1973). Two-way radio communication with the brain in psychosurgical patients. In Laitinen, L.V. and Livingston (Eds.) *Surgical approaches in psychiatry.* Lancaster, England: Medical and Technical Publishing.

Delio, I. (2012). Transhumanism or Ultrahumanism? Teilhard de Chardin on Technology, Religion and Evolution. *Theology and Science*, *10*(2), 153-166.

DeMello, M. (2007). *Encyclopedia of Body Adornment*. Westwood, CT: Greenwood Press.

Denzinger. (1492). Concile de Trente (XIXeme oecum.), Decretum de libris sacris et de traditionibus recipendis, 8 avril 1546, #1501, *783*. *Ictus Win*. Retrieved January 12, 2012 from http://www.catho.org/9.php?d=bx2

Denzinger, H. (2002). *Sources of Catholic Dogma*. Fitzwilliam, NH: Loreto Publications.

Dewdney, C. (1998). *Last Flesh: Life in the Transhuman Era*. Toronto, ON: Harper Collins Publishers.

Dickenson, D. & Widdershoven, G. (2001). Ethical issues in limb transplants. *Bioethics. 15*(2)*,* 110-24.

Disputations. (2009, January 9). Who's Adding Nothing? *Disputations*. Retrieved August 20, 2012 from http://disputations.blogspot.ca/2009_01_01_archive.html

Dixerit. (2005). *A Voice from Eden*. Retrieved September 1, 2006 from http://voicefromeden.blogspot.ca/

Does Appearance Matter. (2006). *Apostolicchurch.org*. Retrieved September 1, 2006 from http://www.apostolicchristianchurch.org/Pages/Beliefs-appearance.htm

Donahue, E.L. (1993). Bernard Lonergan's contribution to social economics. *Forum for Social Economics*, *22*(2), 45-60.

Doyle, D. (1992). *The Church Emerging from Vatican II: A Popular Approach to Contemporary Catholicism*. Mystic, CT: Twenty-Third Publications.

Driscoll, R. W. (1963). Engineering Man for Space: The Cyborg Study. *Final Report NASA-512. To: NASA (OART) Biotechnology and Human Research,* 76-81.Washington, DC & Farmingdale, CT.

Dugan, D. (2001, August). Ethics Committees in Religious Hospitals, *Park Ridge Center Bulletin, 22*.

Dumler, N.L. (2003). *The Harm of Neglecting Embodiment: How Biomedical Ethics' Neglect of Bodies and Context Hurts Women and Minorities.* (Master's Thesis). Retrieved from OpenThesis.

Duraiswami P.K., Orth M., & Tuli S.M. (March/April, 1971). 5000 Years of Orthopaedics in India. *Clinical Orthopaedics & Related Research*, *75*, 269-80.

Durbin, P.T. (1984). Thomism and Technology: Natural Law Theory and the Problems of a Technological Society. In Carl Mitcham & Jim Grote (Eds.), *Theology and Technology: Essays in Christian Analysis and Exegesis* (pp. 209-225). Lanham, MD: University Press of America.

Durkheim, E. (1968). *The Elementary Forms of the Religious Life*. London, UK: George Allen and Unwin Ltd.

Durkheim, E. (1982). *Rules of Sociological Method*. (Macmillian Press Ltd., Trans.). New York, NY: The Free Press.

Dvorsky, G. (2004). *"Our Telepathic Future." Evolving Towards Telepathy, Demand For Increasingly Powerful Communications Technology Points to Our Future as a "Techlepathic" Species*. Retrieved May 15, 2009 from, http://web.archive.org/web/20070706064752/http://archives.betterhumans.com/Columns/Column/tabid/79/Column/267/Default.aspx

Dvorsky, G. (2007). Transhumanist and artificial heart recipient Peter Houghton dies. *Sentient Developments*. Retrieved June 11, 2008 from http://www.sentientdevelopments.com/2007/12/transhumanist-and-artificial-heart.html

Eisenberg, D. (2006). *A Comprehensive Overview on Plastic Surgery in Jewish Law.* Retrieved June 9, 2006 from http://www.aish.com/societyWork/sciencenature/Judaism_and_Cosmetic_Surgey.asp

Elliott, C. (2003). *Better Than Well: American Medicine Meets the American Dream.* New York, NY: Norton.

Ellul, J. (1964). *The Technological Society*. (J. Wilkinson, Trans.). New York, NY: Alfred A. Knopf.

Engelhardt, T.H. (2003). The Foundations of Bioethics: Rethinking the Meaning of Morality. In Jennifer Walter & Eran Klein (Eds.), *The Story of Bioethics: From Seminal Works to Contemporary Explanations* (pp. 91-109). Washington, DC: Georgetown University Press.

Engelhardt, T.H. (1995). Christian Bioethics as Non-Ecumenical. *Christian Bioethics*, *1*(2), 182-99.

Engdahl, F. (2007). *Seeds of Destruction: The Hidden Agenda of Genetic Manipulation*. Montreal, QC: Global Research.

Ettinger, R.C.W. (1964). *The Prospect of Immortality*. Garden City, NY: Doubleday.

Ettinger, R.C.W. (1972). *Man into Superman: The Startling Potential of Human Evolution and How to Be Part of It*. New York, NY: St. Martin's Press.

Eubanks, V. (1996). Zones of Dither: Writing the Postmodern Body. *Body Society*, *2*(3), 73-88.

Fagiolo E., (2007). Medical practice in the thought of Thomas Aquinas. *Med Secoli*, *19*(3), 783-96.

Farah, M. & Wolpe, P. (2004). Monitoring and manipulating brain function: new neuroscience technologies and their ethical implications. *Hastings Centre Report, 34*(3), 33-45.

Faramelli, N.J. (1971). *Technethics: Christian Mission in an Age of Technology.* USA: Friendship Press.

Favazza, Armondo R. (1987). *Bodies Under Siege: Self-mutilation in Culture and Psychiatry*. Baltimore, MD: The Johns Hopkins University Press.

Featherstone, Mike. (2000). Body Modification: An Introduction. In Mike Featherstone (Ed.), *Body Modification* (pp. 1-15). London, UK: Sage Publications.

Ferguson, H. (1999). Body piercing. *BMJ*, *3*(19), 1627-1629.

Ferre, F. (2003). Technology and Ethics. In J. Wentzel Vrede van Huysteen (Ed.), *Encyclopedia of Science and Religion* (2nd ed.). (pp. 863-868). New York, NY: Macmillan Reference.

Finnis, J. (1980). *Natural Law and Natural Rights*. New York, NY: Oxford University Press.

Fischman, J. (2010, January). The Blind Can See: A One-Armed Woman Can Fold her Shirts. *National Geographic*, *217*(1), 34-54.

Fitzgibbons, R.P., & Nicolosi, J. (2001). Gender Identity Disorder in Children. *Lay Witness*. Retrieved September 1, 2006 from http://www.narth.com/docs/fitz.html

Fitzgibbons, R.P., Sutton, P.M., & O'Leary, D. (2009). The Psychopathology of "Sex Reassignment" Surgery: Assessing Its Medical, Psychological, and Ethical Appropriateness. *The National Catholic Bioethics Quarterly*. Spring, 97-125.

Fletcher, J.F. (1966). *Situation Ethics: The New Morality.* Philadelphia, PA: Westminster Press.

Fletcher, J.F. (1979). *Morals and Medicine*. Princeton, NJ: Princeton University Press.

Fletcher, M. (2008, August). *The Consumer Product Safety Commission and Nanotechnology*. Retrieved March 10, 2009 from http://www.nanotechproject.org/process/assets/files/7033/pen14.pdf

Flynn, K. (2001). *Views on Genetic Modification of Food Influenced by Religious Beliefs, Not Just Science*. Retrieved September 1, 2006 from http://pewagbiotech.org/newsroom/releases/072601.php3

FM-2030. (1989). *Are You a Transhuman*? New York, NY: Warner Books.

Foerst, A. (2004). *God in the Machine: What Robots Teach Us About Humanity and God*. New York: Dutton

Foerst, A. (2006). Virtual Reality. In *The Encyclopedia of Science and Religion* (2nd ed.). (Vol. 1, pp. 923-926). Detroit, MI: Macmillan Reference.

Forrest, D.W. (1974). *Francis Galton: The Life and Work of a Victorian Genius.* New York, NY: Taplinger.

Forshaw, B. (2003). Doctors. In *The New Catholic Encyclopedia*. (Vol. 4, pp. 798-802). Detroit, MI: Health Press.

Foster, C. (2001). *The Ethics of Medical Research on Humans*. Cambridge, UK: Cambridge University Press.

Foucault, M. (1970). *The Order of Things.* UK: Tavistock Publications Ltd.

Foucault, M. (1973). *The Birth of the Clinic*. UK: Tavistock Publications Ltd.

Franklin, S. (2001). Culturing biology: cell lines for the second millennium. *Health, 5*(3), 335-54.

Franssen, Maarten, Lokhorst, Gert-Jan and van de Poel, Ibo. (2010). Philosophy of Technology. In Edward N. Zalta (Ed.) *The Stanford Encyclopedia of Philosophy (Spring 2010 Edition)*. Retrieved August 10, 2011 from http://plato.stanford.edu/archives/spr2010/entries/technology/

Freire, P. (2006). *Pedagogy of the Oppressed*. New York, NY: Continuum International.

Fukuyama, F. (2002). *Our Posthuman Future: Consequences of the Biotechnology Revolution.* New York, NY: Farrar, Straus and Giroux.

Furton, E.J. (Ed.). (1999). *Ethical Principles in Catholic Health Care (Short Essays in Catholic Medical Ethics, Vol. 1.)*. Philadelphia, PA: National Catholic Bioethics Center.

Gallagher, J. (1984). The Principles of Totality: Man's Stewardship of His Body. In Donald G. McCarthy (Ed.), *Moral Theology Today*: *Certitudes and Doubts* (pp. 217-242). St. Louis, MO: Pope John Center.

Gallardetz, R.R. (2005). The Ecclesiological Foundations of Modem Catholic Social Teaching. In Kenneth R. Himes, Lisa Sowle Cahill, Charles E. Curran, David Hollenbach and Thomas Shannon (Eds.), *Modern Catholic Social Teaching: Commentaries and Interpretation* (pp. 72-98). Washington, DC: Georgetown University Press.

Garcia, J.L. (2006). Sin and Suffering in a Catholic Understanding of Medical Ethics. *Christian Bioethics, 12*(2), 165-186.

Gardner, J. (2007). *The Intelligent Universe: AI, ET, and the Emerging Mind of the Cosmos.* USA: New Page Books.

Garner, S.R. (2005). Hacking with the Divine: A metaphor for Theology-Technology Engagement. *Colloquium 37*, 2, 181-195.

Gauthier, D. (1986) *Morals by Agreement*. Oxford, UK: Clarendon Press.

Georgetown University Press. (2003). *Review of David F. Kelly's (2004) Contemporary Catholic Health Care Ethics*. Retrieved August 30, 2006 from http://www.press.georgetown.edu/detail.html?id=1589010302

Geraci, R. (2010). *Apocalyptic AI: Visions of Heaven in Robotics, Artificial Intelligence, and Virtual Reality*. USA: Oxford University Press.

Geertz, C. (1973). *The Interpretation of Cultures: Selected Essays*. New York, NY: Basic Books.

Gibbs, (2008, January 28). Cool Running. *TIME*, *171*, 48.

Gilbert, S. (2001). *Tattoo History: A Source Book*. USA: Powerhouse Books.

Gilman, S.L. (2002). *God's Aesthetic Surgery Creating Beauty to Cure the Soul: Race and Psychology in the Shaping of Aesthetic Surgery*. Retrieved January 20, 2003, from http://www.arts.arizona.edu/mar337/readings/Gilman--AestheticSurgery.htm

Glendon, M.A. (1999). Rousseau & the Revolt Against Reason. *First Things 96*, 42-47.

Gholmieh, G., Soussou, W., Courellis, S., Marmarelis, V., Berger, T., Baudry, M. (2001) A biosensor for detecting changes in cognitive processing based on nonlinear systems analysis. *Biosens Bioelectron* 16, 491-501.

Gholmieh, G., Soussou, W., Han, W., Ahuja, A., Song, D., Hsiao, M., Wang, Z., Tanguay, A.R., & Berger, T.W. (2006). Mapping Spatio-Temporal Electrophysiological Activity in Hippocampal Slices with Conformal Planar Multi-Electrode Arrays. In Makoto Taketani & Michel Baudry (Eds.), *Advances in Network Electrophysiology* (pp.127-152). USA: Springer Publishing.

Golijan, R. (2011). Installing a camera in a man's head proves to be painful. *MSNBC*. Retrieved January 6, 2011 from http://www.nbcnews.com/technology/installing-camera-mans-head-proves-be-painful-125196

Goodin, R.E. (1985). The Priority of Needs. *Philosophy and Phenomenological Research*, *45*(4), 615-625.

Goodman, A., Heath, D. & Lindee, S. (2003). *Genetic Nature/Culture: Anthropology and Science Beyond the Two-culture Divide*. Berkeley, CA: University of California Press.

Goodwin, M. (2006). *Black Markets: The Supply and Demand of Body Parts*. New York, NY: Cambridge University Press.

Gordon, N. & Sagman, U. (2003). *Nanomedicine Taxonomy Briefing Paper, February 2003*. Retrieved March 10, 2009 from http://www.regenerativemedicine.ca/nanomed/Nanomedicine%20Taxonomy%20(Feb%202003).PDF

Graham-Rowe, D. (2003, March 12). World's first brain prosthesis revealed. *New Scientist Magazine.* Retrieved August 10, 2012 from http://www.newscientist.com/article/dn3488

Gray, J. (1995). *Enlightenment's Wake: Politics and Culture at the Close of the Modern Age.* USA: Routledge.

Gray, C.H. (2001). Cyborg warriors. In C.H. Gray (Ed.), *Cyborg Citizen: Politics in the Posthuman Age* (pp.55-65). New York, NY: Routledge.

Greely, H.T. (2005). Regulating Human Biological and International Complicati*ons Enhancements: Questionable Justifications*. Stanford Law School: Stanford Public Law and Legal Theory Working Paper Series.

Green, L. (2002). *Technoculture: From Alphabet to Cybersex*. Crowsnest, AUS: Allen & Unwin.

Green, R.M. (2007). *Babies by Design: The Ethics of Genetic Choice*. New Haven, CT and London, UK: Yale University Press.

Gribbin, A. (2011, December 22). Preview: The Four Horsemen of New Atheism reunited. *New Statesman*. Retrieved February 13, 2012 from http://www.newstatesman.com/blogs/the-staggers/2011/12/richard-dawkins-issue-hitchens

Grodin, M.A. (1993). Religious Advance Directives: The Convergence of Religion, Medicine and Public Policy. *American Journal of Public Health,* 83, 899-903.

Grumett, D. (2011). Transformation and the end of enhancement: Insights from Pierre Teilhard de Chardin. In Ronald Cole-Turner (Ed.), *Transhumanism and Transcendence: Christian Hope in an Age of Technological Enhancement* (pp. 37-49). Washington, DC: Georgetown University Press.

Gula, R. (1989). *Reason Informed By Faith: Foundations of Catholic Morality.* New York, NY: Paulist Press.

Gustafson, J. (1975). *The Contributions of Theology to Medical Ethics*. Milwaukee, WI: Marquette University Press.

Gustafson, J. (1992). Genetic Therapy: Ethical and Religious Reflections. *Journal of Contemporary Health Law and Policy*, *8*, 196.

H+. (2008). World Transhumanist Association – Ecologists. Retrieved March 11, 2009 from http://www.transhumanism.org/index.php/WTA/communities/environmentalists/

H+. (2008a). World Transhumanist Association – The Physically Disabled. Retrieved March 11, 2009 from http://www.transhumanism.org/index.php/WTA/communities/physicallydisabled/

H+. (2008c). World Transhumanist Association – Women's & Repro Rights Advocates. Retrieved March 11, 2009 from http://www.transhumanism.org/index.php/WTA/communities/reprorights/

H+. (2008d). World Transhumanist Association – Cognitively/Mentally Disabled Retrieved March 11, 2009 from http://www.transhumanism.org/index.php/WTA/communities/cog-men-disabilities/

H+. (2008e). World Transhumanist Association – We All Have a Stake in Safe and Accessible Human Enhancement Technologies. Retrieved March 11, 2009 from http://transhumanism.org/index.php/WTA/perspectives//

H+. (2008f). World Transhumanist Association – People of Faith. Retrieved March 11, 2009 from http://www.transhumanism.org/index.php/WTA/communities/religious/

H+. (2012). *The Transhumanist FAQ, 3.0.* Retrieved March 11, 2009 from http://humanityplus.org/philosophy/transhumanist-faq/

Haakonssen, K. (1996). *Natural Law and Moral Philosophy*. Melbourne: Cambridge University Press.

Haas, J. (n.d.). Begotten Not Made: A Catholic View of Reproductive Technology. *USCCB*. Retrieved August 9, 2012 from http://old.usccb.org/prolife/programs/rlp/98rlphaa.shtml

Haas, J. (1995). The Totality and Integrity of the Body. *Ethics & Medics—A Catholic Perspective on Moral Issues in the Health and Life Sciences*, *20*(2), 1-24.

Habermas, J. (199). *Moral consciousness and Communicative Action.* (C. Lenhardt & S.W. Nicholsen, Trans.). Cambridge and London: MIT Press.

Hacking, I. (1990). *The Taming of Chance.* Cambridge, UK: Cambridge University Press.

Hall, T. (1991, May 19). Piercing Fad Is Turning Convention on Its Ear. *New York Times.* Retrieved March 11, 2009 from http://www.nytimes.com/1991/05/19/news/piercing-fad-is-turning-convention-on-its-ear.html?pagewanted=all&src=pm

Handrick, W., Nenoff, P., Müller, H. & Knöfler, W. (2003). Infections caused by piercing and tattoos–a review. *Wien Med Wochenschr*, *153*, 194-197.

Hanson, R. (2007). The Hanson-Hughes Debate on "The Crack of a Future Dawn". *Journal of Evolution and Technology, 16*(1), 99-126.

Hanson, R. (2008). Economics of the Singularity, *IEEE Spectrum*, 37-42. Reprinted as: A New World Order, *Cosmos, 26*, 47-54, April/May 2009.

Hansson, S.O. (2005). Implant Ethics. *Journal of Medical Ethics*, *31*, 519-525.

Haraway. D. (1985). Manifesto for cyborgs: science, technology and socialist feminism in the 1980s. *Social Revue, 80*, 65-108.

Haraway. D. (1991). *Simians, Cyborgs and Women: The Reinvention of Nature.* New York, NY: Routledge.

Hardon, J. (1999). Vanity. *Modern Catholic Dictionary.* Retrieved Sept 2, 2011 from http://www.therealpresence.org/cgi-bin/getdefinition.pl

Harris, J. (2007). *Enhancing Evolution: The Ethical Case for Making Better People*. Princeton, NJ: Princeton University Press.

Harsanyi, J. C. (1982). Morality and the Theory of Rational Behavior. In Amartya Sen and Bernard Williams (Eds.), *Utilitarianism and Beyond* (pp. 39-62). Cambridge: Cambridge University Press.

Hau, M. (2003). *The Cult of Health and Beauty in Germany: A Social History 1890-1930*. Chicago, IL: University of Chicago Press.

Hayles, K.N. (1999). *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics*. Chicago, IL: University of Chicago Press.

Hayman, D. (2000). *Tattoo: Its Role in Psychic Compensation*. Unpublished Masters Thesis, Ottawa, ON: Carleton University.

Health Canada. (July, 1999). Infection Control Guidelines: Infection Prevention and Control Practices for Personal Services: Tattooing, Ear/Body Piercing, and Electrolysis. *Canada Communicable Disease Report.* Vol. 25S3.

Heubel, F. & Biller-Andorno, N. (2005). The contribution of Kantian moral theory to contemporary medical ethics: a critical analysis. *Medical Health Care Philosophy 8*(1), 5-18.

Hefner, P. (2003). *Technology and Human Becoming*. Minneapolis, MN: Fortress Press.

Hench L.L (2002). *Science, Faith and Ethics*. USA: World Scientific Publishing Company

Hendricks, M. (Aug 9, 2012) Stunning reversal keeps Oscar Pistorius' Olympic run from ending on a sour note. *Yahoo Sports*. Retrieved August 9, 2012 from http://sports.yahoo.com/blogs/olympics-fourth-place-medal/oscar-pistorius-olympic-run-ends-sour-note-120422926--oly.html

Henry, M., Fishman, J., & Youngner, S. (2007). Propranolol and the prevention of post-traumatic stress-disorder: Is it wrong to erase the "sting" of bad memories? *American Journal of Bioethics, 7*(9), 12-20.

Hermerén, G., Alivizatos, N.C., de Beaufort, I., Capurro, R., Englert, Y., Labrusse-Riou, C., McLaren A, Nielsen, L., Puigdomenech-Rosell, P., Rodota, S., Virt, G., Whittacker, P. (2005). *Ethical Aspects of ICT Implants in the human body*. Opinion No. 20 of the European Group on Ethics (EGE) in Science and New Technologies to the European Commission.

Hervada, J. (1983). Principios de Doctrina Social de la Iglesia. *SIDEC*, *Vol. XXV*(427 & 428).

Herzfeld, N. (2005). Cybernetics. In Lindsay Jones (Ed.), *Encyclopedia of Religion* (2nd ed.) (Vol. 30, p. 2111). Detroit, MI: Macmillan Reference.

Hicks, J. (2012, Summer). More Human than Human. *Chemical Heritage Magazine*, *30*(2).

Ho, M.W. (2000). *Genetic Engineering-Dream or Nightmare?: The Brave New World of Bad Science and Big Business*. New York, NY: Continuum International Publishing Group, Limited

Ho, C., Tsakonas, E., Tran, K., Cimon, K., Severn, M., Mierzwinski-Urban, M., Corcos, J., & Pautler, S. (2011). Robot-Assisted Surgery Compared with Open Surgery and Laparoscopic Surgery: Clinical Effectiveness and Economic Analyses (Technology report no. 137). Ottawa, ON: Canadian Agency for Drugs and Technologies in Health.

Hogan, M.M. (1993). *Finality and Marriage*. Milwaukee, WI: Marquette University Press.

Hogle, L. (2003). Life/time Warranty: rechargeable cells and extendable lives. In S. Franklin & M. Lock (Eds.), *Remaking Life and Death: Toward an Anthropology of the Biosciences* (pp.61-96). Santa Fe, NM: Sch. Am. Res.

Hogle, L. (2005). Enhancement Technologies and the Body. *Annual Review of Anthropology*, *34*, 695-716.

Holloway, R. (1999). *Godless Morality: Keeping Religion Out of Ethics*. Edinburgh: Canongate.

Holloway, S. & Jones, V. (2005). The importance of skin care and assessment. British *Journal of Nursing*, *14*(22), 1172-6.

Hook, C. C. (2002). Cybernetics and Nanotechnology. In John F. Kilner, Christopher C. Hook & DianneB. Uustal (Eds.), *Cutting-Edge Bioethics: A Christian Exploration of Technologies and Trends* (pp.52-70). Grand Rapids, MI: W.B. Eerdmans Publishing.

Hook, C. C. (2003). Transhumanism. In Stephen G. Post (Ed.), *Encyclopedia of Bioethics* (3rd ed.) (pp.2517-2520). USA: Macmillan Reference Library.

Hook, C.C. (2004a). "Techno sapiens": Nanotechnology, Cybernetics, Transhumanism and the Remaking of Humankind. In Charles W. Colson & Nigel M. De S. Cameron (Eds.), *Human Dignity in the Biotech Century: A Christian Vision for Public Policy* (pp. 75-97). Downers Grove, IL: InterVarsity Press.

Hook, C.C. (2004b). It's Time to Ask the Tough Questions. *Catholic Digest, 68*(10), 55-60.

Hook, C.C. (2004c). The Techno Sapiens are Coming. *Christianity Today, 48*(1), 38.

Hook, C.C., Uustal, D.B. & Kilner, J. (Eds.). (2006). *Cutting-Edge Bioethics: A Christian Exploration of Technologies and Trends*. Grand Rapids, MI: W.B. Eerdmans Publishing.

Hopkins, P. (2011). Toward a Transhumanist Theology. *Metanexus.* Retrieved June 9, 2012 from http://www.metanexus.net/essay/toward-transhumanist-theology

Hotze, T.D., Shah, K., Anderson E. E., & Wynia M.K. (2011). "Doctor, Would You Prescribe a Pill to Help Me…?" A National Survey of Physicians on Using Medicine for Human Enhancement. *The American Journal of Bioethics, 11*(1), 3 -13.

Howard, J.A. (2003). *The Decalogue*. Retrieved June 9, 2006 from http://www.profam.org/pub/rs/rs_2006.htm

Hutchinson, M.G. (1985) *Transforming Body Image: Learning to Love the Body You Have*. USA: Crossing Press.

Hughes, J. (2002). *The Transhumanist Declaration*. Retrieved April 4, 2002, from http://www.transhumanism.org/declaration.htm

Hughes, J. (2004a). *Citizen Cyborg: Why Democratic Societies Must Respond to the Redesigned Human of the Future*. USA: Westview Press.

Hughes, J. (2004b). Battle Plan to Be More than Well. *Humanity +*. Retrieved February 1, 2011 from http://transhumanism.org/index.php/th/more/509/

Hughes, J. (2009). An Epistle on H+ to the Italian Catholics. *IEET*. Retrieved February 10, 2010 from http://ieet.org/index.php/IEET/more/hughes20090910

Hughes, J. (2010a). Problems of Transhumanism: Introduction. *IEET*. Retrieved February 10, 2010 from http://ieeet.org/index.php/IEET/more/

Hughes, J. (2010b). Problems of Transhumanism: Atheism vs. Naturalist Theologies. *IEET*. Retrieved February 10, 2010 from http://ieeet.org/index.php/IEET/more/

Hughes, J. (2010c). Problems of Transhumanism: The Unsustainable Autonomy of Reason. *IEET*. Retrieved February 10, 2010 from http://ieeet.org/index.php/IEET/more/

Hughes, J. (2010d). Problems of Transhumanism: Belief in Progress vs. Rational Uncertainty. *IEET*. Retrieved February 10, 2010 from http://ieeet.org/index.php/IEET/more/

Hughes, J. (2010e). Problems of Transhumanism: Moral Universalism vs. Relativism. *IEET*. Retrieved February 10, 2010 from http://ieeet.org/index.php/IEET/more/3731

Hughes, J. (2010f). Problems of Transhumanism: Liberal Democracy vs. Technocratic Absolutism. Retrieved February 10, 2010 from http://ieeet.org/index.php/IEET/more/

Hughes, J. (December 2010). Contradictions from the Enlightenment Roots of Transhumanism. *Journal of Medical Philosophy, 35*(6), 622-40.

Human Enhancement and the Future of Work. (2012). Report from a joint workshop hosted by the Academy of Medical Sciences, the British Academy, the Royal Academy of Engineering and the Royal Society. Retrieved Nov 1, 2012 from http://royalsociety.org/policy/projects/human-enhancement

IAAF. (2008). Oscar Pistorius - Independent scientific study concludes that cheetah

prosthetics offer clear mechanical advantages. Retrieved Jan 2, 2009 from http://www.iaaf.org/news/printer,newsid=42896.htmx

IgnoranceIsntBlisss. (2010). *Transhumanism vs. Libertarianism*. Retrieved Jan 2, 2011 from http://www.abovetopsecret.com/forum/thread562992/pg1

Iltis, A.S. & Cherry, M.J. (Eds.). (2005). *Religious Perspectives in Bioethics*. Leiden: Taylor & Francis Group.

Jablonski, N.G. (2006). *Skin: A Natural History*. USA: University of California Press.

Jacobsen D. & Jacobsen E. (1994). *Doctors Are Gods: Corruption and Unethical Practices in the Medical Profession*. USA: Thunder's Mouth Press.

Jeanninemariedymphna. (2011). Deus Ex Machina: Can Transhumanism be reconciled with traditional Abrahamic religions? *Another Liberal Catholic*. Retrieved July 12, 2012 from http://anotherliberalcatholic.wordpress.com/2011/07/09/deus-ex-machina-can-transhumanism-be-reconciled-with-traditional-abrahamic-religions/

Jennings, J. (2009 April 26). On the cutting edge. *Sunday Age*.

Jensen, D., McBay, A. & Keith, L. (2011). *Deep Green Resistance: Strategy to Save the Planet*. New York, NY: Seven Stories Press.

John Paul II. (1983). The Ethics of Genetic Manipulation. *Origins*, *13(23)*, 385.

John Paul II. (1984). *Salvifici Doloris* (On the Christian Meaning of Human Suffering). Retrieved July 12, 2012 from http://www.vatican.va/holy_father/john_paul_ii/apost_letters/documents/hf_jp-ii_apl_11021984_salvifici-doloris_en.html

John Paul II. (1987). *Sollicitudo Rei Socialis* (On the Twentieth Anniversary of *Populorum Progressio*). Retrieved July 12, 2012 from http://www.vatican.va/holy_father/john_paul_ii/encyclicals/documents/hf_jp-ii_enc_30121987_sollicitudo-rei-socialis_en.html

John Paul II. (1989). *The Church Must Learn to Cope With the Computer Culture*: *Statement In Connection With World Communications Day*. Retrieved October 10, 2002, from http://listserv.american.edu/catholic/church/papal/jp.ii/computer-culture.html

John Paul II. (1995). *Evangelium Vitae (On the Value and Inviolability of Human Life)*. Boston: Pauline Books and Media.

John Paul II. (1997). Addresses in *Theology of the Body*. Boston: Pauline Books and Media.

John Paul II. (1998). *Post-synodal Apostolic Exhortations of John Paul Second.* J. Michael Miller (Ed.). Huntington, IN: Our Sunday Visitor.

John Paul II. (2003). Address to participants in the Ninth General Assembly of the Pontifical Academy for Life, 24 February 2003, n. 4.

Jonsen, A.R. (1998). *The Birth of Bioethics*. New York, N.Y: Oxford University Press.

Joy, B. (2000). "Why the Future Doesn't Need Us". *Wired*, *8*:04. Retrieved Jan 2, 2009 from http://www.wired.com/wired/archive/8.04/joy_pr.html

Juengst, E. (1998) What Does *Enhancement* Mean? In E. Parens (Ed.), *Enhancing Human Traits: Ethical and Social Implications* (pp.29-47). Washington, DC: Georgetown University Press.

Kaczor, C. (2013). Seven Principles of Catholic Social Teaching. *Trinity Communications.* Retrieved August 12, 2010 from http://www.catholicculture.org/culture/library/view.cfm?id=7538

Kalb, C. (1999, August). Our quest to be perfect. *Newsweek, 9*, 52-60.

Kamm, F.M. (2005). Is there a problem with enhancement? *American Journal of Bioethics, 5*(3), 5-14.

Kane, P.M. (2002). She offered herself up: The Victim Soul and Victim Spirituality in Catholicism. *Church History*, *71*(1), 80–119.

Kass, L.R. (1993). Organs for Sale? Propriety, Property, and the Price of Progress. In T. Shannon (Ed.), *Bioethics* (4th ed.) (pp. 474-487). Mahwah, NJ: Paulist Press.

Kass, L.R. (2001). L'Chaim and Its Limits: Why not Immortality? *First Things.* Retrieved August 12, 2010 from http://www.firstthings.com/article/2007/01/lchaim-and-its-limits-why-not-immortality-36

Kass, L.R. (2003). Foreword to *Beyond Therapy: Biotechnology and the Pursuit of Happiness*. Washington: President's Council on Bioethics.

Kass, L.R., & Wilson, J.Q. (1998). *The Ethics of Human Cloning*. Washington, DC: AEI Press.

Kazandjieva, J. & Tsankow, N. (2007). Tattoos: dermatological complications. *Clinical Dermatology, 25*, 375–382.

Kelly, D.F. (1979). *The Emergence of Roman Catholic Medical Ethics in North America*. New York: The Edwin Mellen Press.

Kelly, D.F. (1985). *A Theological Basis for Health Care and Health Care Ethics*. Washington, DC: National Association of Catholic Chaplains.

Kelves, D. (2003). From Eugenics to genetic manipulation. In J. Krige & D. Prestre (Eds.), *Companion to Science in the Twentieth Century* (pp.301-18). New York, NY: Routledge.

Kilbourn, J. (1999). *Can't Buy Me Love: How Advertising Changes The Way We Think and Feel*. New York, NY: Touchstone.

Kluge, E.W. & Lucock, C. (1991). *New Human Reproductive Technologies: A Preliminary Perspective of the Canadian Medical Association.* Ottawa: Canadian Medical Association.

Kluge, E.W. (1992). *Biomedical Ethics in a Canadian Context.* Scarborough, ON: Prentice-Hall Canada.

Klugman, C. (2001). From Cyborg Fiction to Medical Reality. *Literature and Medicine 20(1)*, 39-54.

Ko, Y.C., Ho, M.S., Tai-An, C., Shun-Jun, C., Change, P.Y. (1992). Tattooing as a Risk of Hepatitis C Virus Infection. *Journal of Medical Virology 38*, 288-291.

Kolo, C. & Baur, T. (2004). *Living a Virtual Life: Social Dynamics of Online Gaming*. Retrieved June 28, 2006 from http://www.gamestudies.org/0401/kolo/

Kohrman, M. (2003). Why am I not disabled? Making state subjects, making statistics in Post-Moa Chine. *Medical Anthropology Quarterly 17*(1), 5-24.

Korman, T.M., Grayson, M.L. & Turnidge, J.D. (1997). Polymicrobial septicaemia with Pseudomonas aeruginosa and streptococcus pyogenes following traditional tattooing. *Journal of Infection, 35(2)*, 203.

Korsgaard, C. (1996). *The Sources of Normativity*. New York, NY: Cambridge University Press.

Kotch, J.R., Roberts, A.E., Armstrong, M.L., & Owen, D.C. (2010). Body art, deviance, and American college students. *The Social Science Journal, 47*(1), 151–161

Kramer, P. (1993). *Listening to Prozac*. New York, NY: Viking Press.

Krause, N. (2010). Assessing coping responses within specific faith traditions: suffering in silence, stress, and depressive symptoms among older Catholics. *Mental Health, Religion & Culture, 13*(5), 513-529.

Kreeft, P. (1986). *Making Sense Out of Suffering*. Cincinnati, OH: Servant Books.

Kroker, A & Kroker M. (1987). Body Digest: Essays on the Disappearing Body in the Hyper-Modern Condition. *Canadian Journal of Political and Social Theory*, *11*(1&2).

Kroker, A. & Kroker, M. (Eds.). (1987b). *Body Invaders: Panic Sex in America*. Montréal, QC: New World Perspectives.

Kurzman, M. (2003). *Performing able-bodiedness: amputees and prosthetics in America.* PhD thesis. University California, Santa Cruz.

Kurzweil, R. (1999). *The Age of Spiritual Machines*. New York, NY: Penguin Putnam.

Kurzweil, R. (2006). *The Singularity is Near: When Humans Transcend Biology.* New York, NY: Penguin Books.

LaFleur, W.A. (1992). *Liquid Life: Abortion and Buddhism in Japan*. Princeton, NJ: Princeton University Press.

Lakoff, G. & Johnson, M. (1999). *Philosophy in the Flesh: The Embodied Mind and Philosophy*. Chicago, IL: University of Chicago Press.

Lammers, S.E. & Verhey, A. (Eds.). (1998). *On Moral Medicine: Theological Perspectives in Medical Ethics* (2nd ed.). Grand Rapids, MI: Eerdmans.

Lane H. & Bahan, B. (1998, October). Ethics of Cochlear Implantation in Young Children: A Review and Reply from a Deaf-World Perspective. *Journal of Otolaryngology—Head and Neck Surgery*, *119*(4), 297-313.

Lanza, R. & Berman, B. (2009). *Biocentrism: How Life and Consciousness are the Keys to Understanding the True Nature of the Universe.* Dallas, TX: Benbella Books.

Latin Mass Magazine. (2006). Our Mission Statement. Retrieved June 15, 2006 from http://www.latinmassmagazine.com/about/about_main.html

Laumann, A.E. & Derick, A.J. (2006). Tattoos and Body Piercing in the United States: A National Data Set. *Journal of the American Academy of Dermatology*, *55*(3), 413-421.

Lawson, E. & McCauley, R. (1990). *Rethinking Religion: Connecting Cognition and Culture*. Cambridge, UK: Cambridge University Press.

Lih Yi, B. (2012). Hong Kong Police Body Cameras Spark Fears. *AFP.* Retrieved September 15, 2012 from http://technology.topnewstoday.org/technology/article/3026794/

Leclercq, H. (1911). The First Council of Nicaea. *New Advent*. Retrieved March 20, 2013 from: http://www.newadvent.org/cathen/11044a.htm

Léger Marketing (2002). How Canadians Feel About Tattoos and Body Piercing. *Docstoc*. Retrieved September 11, 2011 from http://www.docstoc.com/docs/40952286/How-Canadians-Feel-About-Tattoos-and-Body-Piercing

Lehmkuhl, A. (1887). *Theologia Moralis*. Freiburg: Herder.

Levinas, E. (1969). *Totality and Infinity: An Essay on Exteriority*. (A. Lingis, Trans.). Pittsburgh, PA: Duquesne University Press.

Levine, C. (Ed.). (1987). *Taking Sides, Clashing Views on Controversial Bioethical Issues*, 2nd ed. New York, NY: The Dushkin Publishing Group.

Lewis, J. (2009). Transgender and Christian: Finding identity. *Religion Dispatches Magazine.* Retrieved June 15, 2012 from http://www.religiondispatches.org/

Limentani, A.E., Elliot, L.M., Noah, N.D., Lamborn, J.K. (1979). An Outbreak of Hepatitis B from Tattooing. *Lancet 2*, 86-8.

Lipovetsky, G. & Charles, S. (2005). *Hypermodern Times (Themes for the 21st Century).* Cambridge: Polity Press.

Lo, P.C. (2009). Secular Humanist Bioethics and Regenerative Medicine. In King Tak IP (Ed.), *The Bioethics of Regenerative Medicine*: *Volume 102 of Philosophy and Medicine* (pp. 47-62). Hong Kong: Springer Press.

Lock, M. (2000). Accounting for disease and distress: morals of the normal and abnormal. In G. Albrecht, R. Fitzpatrick & S. Scrimshaw (Eds.), *Handbook of Social Studies of Health and Medicine* (pp. 259-76). Thousand Oaks: Sage.

Lombardi, F. (2008). Vatican Aide Encourages Setting Aside Times of Silence. *Zenit.com*. Retrieved July 12, 2008 from http://www.zenit.org/article-24341?l=english

Lonergan, B. (1968). *The Subject*. Milwaukee, WI: Marquette University Press.

Lonergan, B. (1985). *A Third Collection.* Frederick E. Crowe (Ed.). London, UK: Paulist Press.

Lonergan, B. (1990a). *Method in Theology*, Volume 12. Toronto, ON: University of Toronto Press.

Lonergan, B. (1990b). *Collected Works of Bernard Lonergan: Understanding and Being*. Frederick E. Crowe & Robert M. Doran (Eds.), CWL 5. Toronto, ON: University of Toronto Press.

Lonergan, B. (1992). *Insight: A Study of Human Understanding*. Frederick E. Crowe & Robert M. Doran (Eds.), CWL 3. Toronto, ON: University of Toronto Press.

Long, G.E. & Rickman, L.S. (1994). Infectious Complications of Tattoos. *Clinical Infectious Diseases*, *18*(4), 610-19.

Lukosh, R.S. (n.d.). Physical Graffiti: Tattoo You? A Catholic perspective on Body Art. *Envoy Magazine Issue*, *7*(4), 20-25.

Lyotard, J.F. (1986). "Une Note sur le Post", in *Le Postmoderne*, ark: Galilee.

Lynch, J.J. (1967). Mutilation. In Catholic University of America, *New Catholic Encyclopedia* (Vol. 10, pp. 146-147). New York, NY: McGraw Hill Book Co.

MacIntyre, A. (1996). *After Virtue: A Study in Moral Theory* (2nd ed.). Notre Dame, IN: University of Notre Dame Press.

MacIntyre, A. (1999). *Dependent Rational Animals: Why Human Beings Need the Virtues: Volume 20 of The Paul Carus Lecture Series.* Chicago, IL*:* Open Court Publishing.

Macklin, R. (2003). Dignity is a Useless Concept. *BMJ*, *327*, 1419-1420.

Magner, L.N. (2005). *A History of Medicine* (2nd ed.). Boca Raton, FL: Taylor & Francis Group.

Mahoney, J. (1989). *The Making of Moral Theology: A Study of the Roman Catholic Tradition.* Oxford, UK: Clarendon Paperbacks.

Mann, S. (1998a). Wearable Computing. *Eyetap.* Retrieved July 1, 2008 from http://about.eyetap.org/fundamentals/

Mann, S. (1998b). Humanistic computing: "WearComp" as a new framework and application for intelligent signal processing. *Proceedings of the IEEE*, *86*(11), 2123-2151.

Mann, S. (2008a). What if We Become Dependent on WearComp? Retrieved July 1, 2008 from http://www.eyetap.org/resources/faq/faq_dependence.html

Mann, S. (2008b). EyeTap: The Eye Itself as Display and Camera. Retrieved July 1, 2008 from http://www.eyetap.org/research/eyetap.html

Marcin, R. (2004). The Moral Flaw in the "Pro-Choice" position. *The National Catholic Bioethics Quarterly*, *4*(4), 701-709.

Marcuse, H. (1964). *One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society*. Boston, MA: Beacon Press.

Maritain, J. (1991). Natural Law in Aquinas. In Charles E. Curran & Richard A. McCormick (Eds.), *Readings in Moral Theology No.7* (pp. 114-123). New York, NY: Paulist Press.

Markwell, H.J. & Brown, B.F. (2001). Bioethics for Clinicians: Catholic Bioethics. *Canadian Medical Association Journal*, *165*(2), 189-92.

Maryvale Institute Birmingham. (n.d.). MA *module course on Medical Ethics*. Retrieved January 20, 2012 from http://www.stjosephs-anderton.com/Moraltheology.html

Massaro, T. (2000). *Living Justice: Catholic Social Teaching in Action*. Franklin, WI: Sheed and Ward.

Matz, B.J. (2008). *Patristic Sources and Catholic Social Teaching: A Forgotten Dimension. A Textual, Historical, and Rhetorical Analysis of Patristic Source Citations in Social Documents*. Annua Nuntia Lovaniensia. Louvain, BE: Peeters Publishing.

May, W. (2003). Contending images of the healer in an era of turnstile medicine. In Jennifer Walter & Eran Klein (Eds.), *The Story of Bioethics: From Seminal Works to Contemporary Explorations* (pp. 149-162). Washington, DC: Georgetown University Press.

MCC. (2004). A Marked Man. *A Common Place*. Jan/Feb, 10-15.

McCarty, M. (2009). "Life of Bionics Founder a Fine Adventure," Dayton Daily News. Thursday, January 29, 2009. Retrieved March 12, 2009 from http://www.daytondailynews.com/o/content/oh/story/opinions/columns/2009/01/29/ddn012909mary.html?cxntlid=inform_sr

McCarthy, T. (1994). *The Catholic Tradition: Before and After Vatican II, 1878-1993*. Chicago, IL: Loyola University Press, 1994.

McClory, R. (2000). *Faithful Dissenters: Stories of Men and Women Who Loved and Changed the Church*. Maryknoll, NY: Orbis Books.

McCormick, R.A. (1975). Transplantation of Organs: A Comment on Paul Ramsey. *Theological Studies*, *36*, 503-509.

McCormick, R.A. (1981a). *How Brave a New World*? New York, NY: Doubleday and Co.

McCormick, R.A. (1981b). *Notes on Moral Theology: 1965-1980.* Washington, DC: University Press of America.

McCormick, R.A. (1984). *Health and Medicine in the Catholic Tradition*. New York, NY: Crossroad.

McCormick, R.A. (1991). The Natural Law: Recent Literature. In Charles E. Curran & Richard A. McCormick (Eds.), *Readings in Moral Theology No.7* (pp 173-183). New York, NY: Paulist Press.

McGuire, G.Q. & McGee E.M. (1999). Implantable Brain Chips? Time for Debate, in *Hastings Centre Report*, *29*(1), 7-11.

McInery, R. (1993). Humane Vitae and the Principle of Totality. In Janet E. Smith (Ed.), *Why Humanae Vitae Was Right: A Reader* (pp. 327-343). San Francisco, CA: Ignatius Press.

McKenny, G.P. (1998). Enhancements and the Ethical Significance of Vulnerability. In E. Parens (Ed.), *Enhancing Human Traits: Ethical and Social Implications* (pp.222-237). Washington, DC: Georgetown University Press.

McKenny, G.P. (2002). Technologies of Desire: Theology, Ethics, and the Enhancement of Human Traits. *Theology Today*, *4*(59), 90-103.

McClimans, F. (1998, September 2). *Is That a Chip in Your Shoulder, Or Are You Just Happy to See Me?* Retrieved October 10, 2010 from http://www.cnn.com/TECH/computing/9809/02/chippotent.idg/index.html

Medicard. (2005). *Cosmetic Surgery Quick Facts. Medicard's Statistics 2003*. Retrieved January 12, 2010 from http://www.plasticsurgerystatistics.com/quick_facts_03.html

Menon, D. & Stafinski, S. (2009). Health Technology Assessment in Canada: 20Years Strong? *Value in Health*, *12*(2), 14-19.

Merkel, R., Boer, G., Fegert, J., Galert, T., Hartmann, D., Nuttin, B., & Rosahl, S. (2007). *Intervening in the Brain: Changing Psyche and Society (Ethics of Science and Technology Assessment Volume 29).* Berlin: Springer Publishing.

Miah, A. (2003). Be Very Afraid: Cyborg Athletes, Transhuman Ideals & Posthumanity. *Journal of Evolution and Technology*. Retrieved February 12, 2012 from http://jetpress.org/volume13/miah.htm

Mill, J.S. (1987). *Utilitarianism*. Buffalo, NY: Prometheus Books.

Miller, F.G., Brody, H., & Chung, K.C. (2000). Cosmetic surgery and the internal morality of medicine. *Cambridge Quarterly of Healthcare Ethics*, *9*(3), 353-364.

Minchak, G. (2007). What is the Church's Response to Human Commoditization? *Catholic Online*. Retrieved February 12, 2012 http://www.cathcom.net/featured/headline.php?ID=2533&page=1

Mitcham, C. (1994). *Thinking through Technology: The Path between Engineering and Philosophy.* Chicago, IL: University of Chicago Press.

Mitcham, C. (2004). Technology: II. Philosophy of Medical Technology. In Stephen G. Post (Ed.), *Encyclopedia of Bioethics* (3rd ed.) (Vol. 5, pp. 2503-2511). New York, NY: Macmillan Reference USA.

Mitcham, C & Grote, J. (Eds.). (1984). *Theology and Technology: Essays in Christian Analysis and Exegesis*. Lanham, MD: University Press of America.

Mitchell, C.B., Pellegrino, E.D., Elshtain, J.B., Kilner, J.F., & Rae, S.B. (2007). *Biotechnology and the Human Good.* Washington, DC: Georgetown University Press.

Mnyusiwalla, A., Daar, A. & Singer, P. (2003). *Mind the Gap: Science and Ethics in Nanotechnology*. Toronto, ON: University of Toronto.

Montague, M., & Grira, S. (2010). Egyptian Christians get their faith tattooed. *France International News.* Retrieved January 4, 2011, from http://observers.france24.com/content/20101118-egyptian-christians-tattoo-faith-religion

Montserrat, D. (Ed.). (1998). *Changing Bodies, Changing Meanings: Studies on the Human Body in Antiquity*. London, UK: Routledge.

Mooney, C.F. (1990). Cybernation, Responsibility, and Providential Design. *Theological Studies*, *51*(2), 286-309.

Moor, J.H. (2005). Should We Let Computers Get Under Our Skin? In Robert Cavalier (Ed.), *The Impact of the Internet on our Moral Lives* (pp. 121-138). Albany, NY: State University of New York Press.

Moore, G.E. (1965). Cramming more components onto integrated circuits. *Electronics Magazine*. p. 4.

Moravec, H. (1988). *Mind Children: The Future of Robot and Human Intelligence.* Cambridge, MA: Harvard University Press.

Moravec, H. (2000). *Robot: Mere Machine to Transcendent Mind*. New York, NY: Oxford University Press.

More, M. (1994). *On Becoming Posthuman*. Retrieved January 4, 2009 from http://www.maxmore.com/becoming.htm/

More, M. (1994b). *Pancritical Rationalism: An Extropic Metacontext for Memetic Progress*. Retrieved January 4, 2009 from http://www.maxmore.com/pcr.htm

More, M. (1997). *Self-Ownership: A Core Transhuman Virtue*. Retrieved January 4, 2009 from http://www.maxmore.com/selfown.htm

More, M. (2003). *Principles of Extropy V. 3.1.1*. Retrieved January 24, 2003, from http://www.extropy.com/ideas/principles.html

More, M. (2004). Democracy and Transhumanism. *Extropy: Journal of Transhumanist Solutions.* Retrieved Jan 5, 2010 from http://www.extropy.org/politicaltheory.htm

Morelli, M. & Morelli, A. (Eds.). (1997). *The Lonergan Reader*. Toronto, ON: University of Toronto Press.

Mueller, T. (2008, April). *Biomimetics: Design by Nature. What Has Fins Like a Whale, Skin Like a Lizard, And Eyes Like a Moth? The Future of Engineering*. Retrieved September 1, 2010 from http://ngm.nationalgeographic.com/2008/04/biomimetics/tom-mueller-text

Nairn, T.A. (20007). Roman Catholic Ethics and the Preferential Option for the Poor *Virtual Mentor*, *9*(5), 384-387.

Nanorex Inc. (2008). *Management*. Retrieved June 1, 2008 from http://nanoengineer-1.com/content/index.php?option=com_content&task=view&id=31&Itemid=32

Napier, S. (n.d.). Dignitas personae on Gene Therapy and Enhancement, A Commentary On: Dignitas Personae, Part One, nn 4-5. *Nbccentre.org*. Retrieved June 12, 2011 from http://www.ncbcenter.org/page.aspx?pid=1011

National Eating Disorders Association. (2013). The Media, Body Image, and Eating Disorders. *NEDA*. Retrieved January 2, 2013 from http://www.nationaleatingdisorders.org/

Neurotech Reports. (2008). The Neurotechnology Market. *Neurotech*. Retrieved June 2, 2008 from http://www.neurotechreports.com/pages/marketdata.html

Norton, J. (2003). Vatican says 'sex-change' operation does not change person's gender. *Catholic News Service*. Retrieved June 2, 2008 from http://ai.eecs.umich.edu/

Numbers, R. & Amundsen, D. (Eds.). (1986). *Caring and Curing: Health and Medicine in the Western Religious Traditions.* Baltimore, MD: Johns Hopkins Press.

O' Connell, M.R. (1986). The Roman Catholic Tradition Since 1545. In Ronald L. Numbers and Darrel W. Amundsen (Eds.), *Caring and Curing: Health and Medicine in the Western Religious Traditions* (pp. 108-145). Baltimore, MD: Johns Hopkins Press.

O'Donnell, T. (1956). *Morals in Medicine*. Westminster, MD: The Newman Press.

O'Leary, C.G. (1962). Catholic Views on Cosmetic Surgery. *Eye, Ear, Nose & Throat Monthly*, Vol. 41, 60-1.

Ogbonnaya, J. (2013). *Lonergan, Social Transformation, and Sustainable Human Development*. Eugene, OR: Pickwick Publications, an Imprint of Wipf and Stock Publishers

Okin, S.M. (1989). *Justice, Gender, and the Family*. New York, NY: Basic Books.

Order of the Cosmic Engineers. (2009). Prospectus. *Turing Church*. Retrieved December 24, 2009 from http://turingchurch.com/2012/01/02/order-of-cosmic-engineers/

Osler, W. (1921). *The Evolution of Modern Medicine: A Series of Lectures Delivered at Yale University on the Silliman Foundation in April, 1913*. New Haven, CT: Yale University Press.

Össur Inc. (2008). Company Background. *Ossur*. Retrieved April 24, 2008 from https://www.ossur.com/pages/3642

Össur Statement. (2008). Statement by Össur Regarding Bilateral Amputee Oscar Pistorius' Bid to Participate in IAAF-Sanctioned Events, and Ultimately the Olympics. *Ossur*. Retrieved January 2, 2009 from http://www.ossur.com/?PageID=6743

Ott, K., Serlin, D. & Mihm, S. (Eds.). (2002). *Artificial Parts, Practical Lives: Modern Histories of Prosthetics.* New York, NY: New York University Press.

Pacholczyk, T. (2005). Imposing Our Beliefs' on Others. *Making Sense Out of Bioethics*. Retrieved March 30, 2011 from http://catholiceducation.org/articles/medical_ethics/me0093.htm

Palazzini, P. (Ed.). (1966). Mutilatio. *Dictionarium Morale et Canonicum* III (pp.334-335). Rome, IT: Catholic Book Agency.

Panicola, M.R. (2007). *An Introduction to Health Care Ethics: Theological Foundations, Contemporary Issues, and Controversial Cases*. Winona, MN: St. Mary's Press.

Pangaroo, P. (2008). *CYBERNETICS—A Definition*. Retrieved May 1, 2008 from

http://www.pangaro.com/published/cyber-macmillan.html

Pare, A. (1840). Oeuvres Completes. *Archive.org*. Retrieved on October 1, 2010 from http://www.archive.org/download/uvrescompltesd05par/uvrescompltesd05par.pdf

Parens, E. (Ed.). (1998). *Enhancing Human Traits: Ethical and Social Implications.* Washington, DC: Georgetown University Press.

Paul VI. (1965). *Dignitatis Humanae* (On The Right Of The Person And Of Communities To Social And Civil Freedom In Matters Religious). Retrieved May 12, 2008 from http://www.vatican.va/archive/hist_councils/ii_vatican_council/documents/vat-ii_decl_19651207_dignitatis-humanae_en.html

Paul VI. (1972). *Udienza Generale* Mercoledì, 19 Aprile 1972, *Congresso internazionale di chirurgia*. Retrieved October 1, 2011 from http://www.vatican.va/holy_father/paul_vi/audiences/1972/documents/hf_p-vi_aud_19720419_it.html

Paul VI. (1981). *Humane Vitae* (On the Regulation of Birth). In Claudia Carlen (Ed.), *The Papal Encyclicals: 1958-1981* (pp. 226-230). Washington, DC: McGrath Publishing.

Pearce, D. (2001). *Who are the Transhumanists?* Retrieved October 5, 2003, from http://www.transhumanism.com/

Pellegrino, E. (2003). From Moral Ethics to a Moral Philosophy of the Profession. In Jennifer Walter & Eran Klein (Eds.), *The Story of Bioethics: From Seminal Works to Contemporary Explanations* (pp. 3-15). Washington, DC: Georgetown University Press

Perlingieri, B.A. (2003). The Myth of the Modern Primitive: Emulation and Idolization. *BMZINE.com*. Retrieved October 5, 2011, from http://news.bme.com/wp-content/uploads/2008/09/pubring/guest/20030727.html

Pernick, M. (2000). Defining the defective: eugenics, aesthetics and mass culture in early-twentieth-century America. In D. Mitchell & S. Snyder (Eds.), *The Body and Physical Difference: Discourses of Disability* (pp.89-110). Ann Arbor, MI: University of Michigan Press.

Peters, T. (Ed.). (2003). *Playing God: Genetic Determinism and Human Freedom* (2nd ed.). New York, NY: Routledge.

Peters, T. (2005). The Soul of Trans-Humanism. *Dialog: A Journal of Theology*, *44*(4), 381-95.

Peters, T. (N.D.). *Patenting Genes—Some Perspectives*. Retrieved October 5, 2010 from

http://www.counterbalance.net/genetics/hugo-body.html

Pew Research Centre. (2007). *A Portrait of "Generation Next" How Young People View Their Lives, Futures and Politics*. Retrieved Jan 22, 2009 from http://people-press.org/report/300/a-portrait-of-generation-next

Pinker, S. (May 28, 2008). The Stupidity of Dignity: Conservative bioethics' latest, most dangerous ploy. *The New Republic*. Retrieved August 10, 2012 from http://pinker.wjh.harvard.edu/articles/media/The%20Stupidity%20of%20Dignity.htm

Pitts, V. (2000). Visibly Queer: Body technologies and sexual politics. *The Sociological Quarterly*, *41*(3), 443-463.

Pius XI. (1930). *Casti Connubii (On Christian Marriage)*. Retrieved, April 2 2006 from http://abbey.apana.org.au/OFFICIAL/PAPAL/Pius11/P11casti.Htm

Pius XII. (1952). *Address Given September 14, 1952 to the First International Congress on the Histopathology of the Nervous System: The Moral Limits of Medical Research and Treatment*. Retrieved, April 2, 2006 from http://www.intratext.com/X/ENG2009.HTM

Pius XII. (1953). Address to the Twenty-sixth Congress of the Italian Society of Urologists. *Acta Apostolicae Sedis 45*, Oct. 8, 673-79.

Pius XII. (1956). Address to the Italian Association of Cornea Donors and to Clinical Oculists and Legal Medical Practitioners. *Acta Apostolicae Sedis 48,* May 14, 454-467.

Pius XII. (1957). Moral Problems in Fashion Design: Address to the Congress of the "Latin Union of High Fashion". *Osservatore Romano*, Nov. 9, 1957. Trans. by N.C.W.C. News Service.

Pius XII. (1958). The Art and Science of Plastic Surgery. (*Di vivo gradimento*). Address of to the Italian Society of Plastic Surgeons. *Acta Apostolicae Sedis Commentarium Officiale* vol. XXV, n. 19. 13-32-1958.

Plastic Surgery Research Info. (2006). *Cosmetic Plastic Surgery Research Statistics and Trends for 2001, 2002 and 2003*. Retrieved June 9, 2006 from http://www.cosmeticplasticsurgerystatistics.com/statistics.html

Pliny the Elder. (1601). *The Historie of The World Commonly Called, The Naturall Historie of C. Plinius Secundus. Translated Into English by Philemon Holland Doctor in Physicke. The First Tome*. Retrieved April 24, 2008 from http://gateway.proquest.com.proxy.bib.uottawa.ca/openurl?ctx_ver=Z39.88-2003&res_id=xri:eebo&rft_id=xri:eebo:citation:99851135

Pontifical Academy for Life. (2003). *Concluding Communiqué on the Ethics of Biomedical Research for A Christian Vision.* Retrieved April 20, 2003, from http://www.vatican.va/roman_curia/pontifical_academies/acdlife/documents/rc_pont-acd_life_doc_20030226_ix-gen-assembly-final_en.html.

Pontifical Academies for Science, Social Science, Life. (n.d.). *Vatican*. Retrieved April 20, 2008 from http://www.vatican.va/roman_curia/pontifical_academies/acdlife/documents/rc_pa_acdlife_pro_20051996_en.html

Pontifical Bible Commission. (1993). "The Interpretation of the Bible in the Church" (as published in *Origins*, January 6, 1994), Electronic Version formatted by Felix Just. Retrieved January 2, 2011 from http://catholic-resources.org/ChurchDocs/PBC_Interp-FullText.htm

Pontifical Council for Justice and Peace. (2004). Compendium of the Social Doctrine of the Church. *Libreria Editrice Vaticana* . Retrieved April 24, 2008 from http://www.vatican.va/roman_curia/pontifical_councils/justpeace/documents/rc_pc_justpeace_doc_20060526_compendio-dott-soc_en.html

Pope, D. (Ed.). (2008). *Neurotech Business Report, DARPA Prosthetics Programs Seek Natural Upper Limb*. Retrieved April 23, 2008 from http://www.neurotechreports.com/pages/darpaprosthetics.html

Popper, K.R. (1960). On the Sources of Knowledge and of Ignorance. *Proceedings of the British Academy 46*, 39–71.

Porter, T. (1995). *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life.* Princeton, NJ: Princeton University Press.

Porterfield, A. (2003). Piercing. In G. Laderman and L.D. Leon (Eds.), *Religion and American Cultures: an Encyclopedia of Traditions, Diversity, and Popular Expressions* (p. 356). Santa Barbara, CA: ABC-CLIO Inc.

Post, S, & Binstock, R. (Eds.). (2004). *Fountain of Youth: Cultural, Scientific and Ethical Perspectives on a Biomedical Goal*. New York, NY: Oxford University Press.

President's Council on Bioethics. (2003). *Beyond Therapy: Biotechnology and the Pursuit of Happiness.* Retrieved January 2, 2009 from http://www.bioethics.gov/reports/beyondtherapy

Price, M. (2006 Aug. 10) Innovations: Having an Inkling. *The Jerusalem Post*, pp. 1-2.

Primo Posthuman (2005). The New [human] Genre — Primo Posthuman. *Natasha Vita-More*. Retrieved June 11, 2009 from http://www.natasha.cc/primo.htm

Prisco, G. (2006). Engineering Transcendence . *IEEE*. Retrieved June 11, 2009 from http://giulioprisco.blogspot.ca/2006/12/engineeringtranscendence.html

Prisco, G. (2007). Soft Tiplerianism. *IEEE*. Retrieved June 11, 2009 from http://ieet.org/index.php/IEET/more/1727

Prisco, G. (2009). Teilhard and Transhumanism. *IEEE*. Retrieved June 11, 2009 from http://ieet.org/index.php/IEET/more/2825

Prisco, G. (2010, January 8). Problems of Transhumanism: Introduction: Ethical Technology [Web log comment]. Message posted to http://ieet.org/index.php/IEET/more/hughes20100105

Prisco, G. (2011). Engineering Transcendence: Addendum from 2011 . *H+ Magazine*. Retrieved June 11, 2009 from http://hplusmagazine.com/2011/06/28/engineering-transcendence-addendum-from-2011/

Proctor, R. (1988). *Racial Hygiene: Medicine Under the Nazis*. Cambridge, MA: Harvard University Press.

Quinn, K.P. (2000). Method in Catholic Bioethics. *Kennedy Institute of Ethics Journal*, *10*(4), 353-63.

Rabbi, D.A. (1995). Utilitiarianism. In John K. Rother (Ed.), *International Encyclopedia of Ethics* (pp.894-5). Chicago, IL: Salem Press.

Radder, H. (2009). The philosophy of scientific experimentation: a review. *Automated Experimentation*. Retrieved January 2, 2011 from http://www.aejournal.net/content/1/1/2

Rahner, K. (1961-92). *Theological Investigations*, Vols. 1-23. London and New York: Crossroad.

Rahner, K. (1978). *Foundations of Christian Faith*. New York, NY: Seabury Press.

Ramsey, P. (1978). *Ethics at the Edges of Life*. New Haven, CT: Yale University Press.

Randall, A.J. (1986). The Philosophy of Luddism: The Case of the West of England Woolen Workers, ca. 1790-1809. *Technology and Culture*, *27*(1), 1-17.

Rappaport, R. (1999). Ritual and Religion in the Making of Humanity. Cambridge, UK: Cambridge University Press.

Rawls, J. (1971). *A Theory of Justice*. Cambridge, MA: The Belknap Press Harvard University.

Reich, W.T. (Ed.). (1978). *Encyclopedia of Bioethics*. New York, NY: Macmillan Library Reference.

Reich, W.T. (2003). Shaping and Mirroring the field: The Encyclopedia of Bioethics. In Jennifer Walter & Eran Klein (Eds.), *The Story of Bioethics: From Seminal Works to Contemporary Explorations* (pp. 165-196). Washington, DC: Georgetown University Press.

Rendtorff, J.D. (2002). Basic Ethical Principles in European Bioethics and Biolaw: Autonomy, Dignity, Integrity and Vulnerability – Towards a Foundation of Bioethics and Biolaw. *Medical Health Care Philosophy*, *5*(3), 235-44.

Rickaby, J. (1896). *The Moral Teaching of St. Thomas*. London, UK: Burns and Oates.

Rickaby, J. (1908). *Ethics and Natural Law*. London, UK: Longmans, Green and Co.

Ricoeur, P. (1992). *Oneself as Another*. (K. Blamey, Trans.). Chicago, IL: University of Chicago Press.

Rifkin, J. (1984). *Algeny: A New Word—A New World*. USA: Penguin (Non Classics).

Rifkin, J. (1998). *The Biotech Century: Harnessing the Gene and Remaking the World*. New York, NY: Penguin Books.

Rizzo, C. (1962). Grafting. In Francesco Roberti & Pietro Palazzini (Eds.), *Dictionary of Moral Theology* (Vol. 1, pp. 552-553). Westminster, MD: The Newman Press.

Rose, N. (1996). Identity, Geneology, History. In Stuart Hall and Paul du Gay (Eds.), *Questions of Cultural Identity* (pp.128-50). London, UK: Sage Publishing.

Rose, N. (2001). The politics of life itself. *Theory of Culture and Society, 18*(6), 1-30.

Rosenzweig, M. (2005). *Win-Win Ecology: How the Earth's Species Can Survive in the Midst of Human Enterprise*. USA: Clarendon Press.

Rothman, S & Rothman, D. (2003). *The Pursuit of Perfection: The Promise and Perils of Medical Enhancement.* New York, NY: Pantheon Books.

Ruse, M. & Castle, D. (Eds.). (2002). *Genetically Modified Foods: Debating Biotechnology (Contemporary Issues Series)*. New York, NY: Prometheus Books

Sabin, J & Daniels, N. (1994). Determining 'Medical Necessity' in Health Practice. *Hastings Center Report*, *24*(6), 5-13

Sade, R. (1998). Enhancement technology, ethics, and public policy. *Journal of the South Carolina Medical Association*, *94*(9): 411-415.

Samson, P.R. & Pitt, D.C. (1999). *The Biosphere and Noosphere Reader: Global Environment, Society, and Change*. London, UK: Routledge

Samuel, M.C., Doherty, P.M., Bulterys, M. (2001). Association between heroin use, needle sharing and tattoos received in prison with hepatitis B and C positivity among street-recruited injecting drug users in New Mexico, USA. *Epidemiology and Infection*, *127*(3), 475–484.

Sandler, R. & Kay, W. D. (2006). The National Nanotechnology Initiative and the Social Good. *The Journal of Law, Medicine & Ethics*, *34*(4), 675-681.

Satter, R. (2012). Experts raise concerns over superhuman workplace. *The Associated Press*. Retrieved Nov 1, 2012 from http://bigstory.ap.org/article/experts-raise-concerns-over-superhuman-workplace.

Saunders, W. (January 11, 2001). Surgery That Destroys Bodily Integrity. *The Catholic Herald.* Retrieved April 23, 2008 from http://www.catholicherald.com/stories/bSurgery-That-Destroys-Bodily-Integrityb,4684?sub_id=4684

Savulescu, J. (2007). Genetic interventions and the ethics of advancements on human beings. In B. Steinbock (Ed.), *The Oxford Handbook of Bioethics* (pp. 516-535). Oxford: Oxford University Press.

Savulescu, J. (2008). Procreative Beneficence: Reasons Not to Have Disables Children. In L. Skene and J. Thomason (Eds.), *The Sorting Society* (pp.51-68). Cambridge, UK: Cambridge University Press.

Schall, J.V. (2003). Tyranny. In *The New Catholic Encyclopedia.* (Vol. 14, p.257). Detroit, MI: Health Press.

Scheufele, D.A., Corley, E.A., Shih, T.J., Dalrymple, K.E., & Ho, S.S. (2009). Religious Beliefs and Public Attitudes Toward Nanotechnology in Europe and the United States. *Nature Nanotechnology*, *4*, 91-94.

Schmalz , V. (2013). Should people be allowed to sell their organs for transplant? *Our Sunday Visitor.* Retrieved, January 2, 2013 from http://www.osv.com/tabid/7621/itemid/5228/Should-people-be-allowed-to-sell-their-organs-for.aspx

Schneider, S. (2008). Future Minds: Transhumanism, Cognitive Enhancement, and the Nature of Persons. *Center for Cognitive Neuroscience*. Retrieved August 1, 2009 from http://ieet.org/archive/schneider01.pdf.

Schroeder, K. (1999). *Transhumanism, Libertarianism, and Choice*. Retrieved August 1, 2009 from http://www.kschroeder.com/archive/blog/1145459043/index_html.htm

Scully, J. & Rehmann-Sutter, C. (2001). When norms normalize: the case of genetic 'enhancement.' *Human Gene Therapy*, *12*(1), 87-95.

Segal, H.P. (2005). *Technological Utopianism in American Culture: Twentieth Anniversary Edition.* Syracuse, NY: Syracuse University Press.

Seifert, J. (2004). *The Philosophical Disease of Medicine and their Cure*. Norwell, MA: Springer Publishing.

Seltzer, AP. (1965). Religion and cosmetic surgery. *Journal of the National Medical Association*, *57*(3), 205-7.

Serlin, D. (2002). *Replaceable You: Engineering the Body in Postwar America.* Chicago, IL: University of Chicago Press.

Shannon, T.A. & Walter, J.J. (2005). *Contemporary Issues in Bioethics: A Catholic Perspective*. Lanham, MD: Rowman & Littlefield Publishers Inc.

Shannon, T.A. (1981). The Tradition of a Tradition: An Evaluation of Roman Catholic Medical Ethics. In Thomas A. Shannon (Ed.), *Bioethics* (pp. 4-10). New Jersey: Paulist Press.

Shannon, T.A. (1987). *An Introduction to Bioethics* (2nd ed.). New York, NY: Paulist Press.

Shannon, T.A. (Ed.). (1993). *Bioethics: Basic Writings on the Key Ethical Questions That Surround the Major, Modern Biological Possibilities*. Mahwah, NJ: Paulist Press.

Shannon, T.A. (2002). *American Catholic Social Teaching.* Collegeville, MI: The Liturgical Press.

Shelp, E.E. (Ed.). (2003). *Theology and Bioethics: Exploring the Foundations and Frontiers.* New York, NY: Springer Press.

Shklar, J. & Lucash, F.S. (1986). *Justice and Equality Here and Now.* Ithaca, NY: Cornell University Press.

Silvers, A. (1998). 'Species-Typical' Functioning. In E. Parens, (Ed.), *Enhancing Human Traits: Ethical and Social Implications* (pp.95-123). Washington, DC: Georgetown University Press.

Sinding, C. (2004). The Power of Norms. In J.H. Warner & F. Huisman (Eds.), *Medical History: The Stories and Their Meanings* (pp.262-84). Baltimore, MD: Johns Hopkins University Press.

Sirius, R.U. (October 20, 2010). Digital Polytheism (on the Event of Timothy Leary's 90th Birthday). *H+ Magazine.*

Sloan, P.R. (Ed.). (2000). *Controlling Our Destinies: Historical, Philosophical, Ethical and Theological Perspectives on the Human Genome Project.* Notre Dame, IN: University of Notre Dame Press.

Smart, J. (2008). *Brief History of Intellectual Discussion of Accelerating Change: Accelerating Universal Phases of Physical-Computational Change*. Retrieved August 1, 2011 from http://www.accelerationwatch.com/history_brief.html

Smith, J.E. (1991). *Humane Vitae a Generation Later*. Washington, DC: The Catholic University of America Press.

Smith, J.M. (2003). *Seeds of Deception: Exposing Industry and Government Lies about the Safety of the Genetically Engineered Foods You're Eating*. Fairfield, IA: Yes! Books

Smith, M. (Ed.). (2007). *Stelarc: The Monograph (Electronic Culture: History, Theory, and Practice)*. Cambridge, MA: MIT Press.

Smith, M.R. & Marx, L. (Eds.). (1994). *Does Technology Drive History? The Dilemma of Technological Determinism.* London, UK: MIT Press.

Spierer, E. (2012). *Why You Should Upload Your Mind.* Retrieved August 5, 2012 from http://hplusmagazine.com/2012/05/09/why-you-should-upload-your- mind/

Stahl, W.A. (2002). Technology and Myth: Implicit Religion in Technological Narratives. *Implicit Religion*, *5*(2), 93-103

Stanford HCI Program. (2008). *The Cybernetics of HCI: A Pragmatic Approach.* Retrieved June 12, 2008 from http://hci.stanford.edu/cs547/abstracts/01-02/020215-pangaro.html

Stirn, A. (2003). Body Piercing: Medical Consequences and Psychological Motivations. *Lancet*, *361*(9346), 1205–1215.

Stein, E. (1987). *Woman*. (F.M Oben, Trans.). Washington, DC: ICS Publications.

Stein, L. & Martin, S.T. (2010, September 26). *St. Petersburg Times: It Isn't Easy to Take Away a Doctor's Prescription Pad*. Retrieved October 10, 2010 from http://www.tampabay.com/news/health/medicine/it-isnt-easy-to-take-away-a-doctors-prescription-pad/1123881

Steinhart, E. (2008). Teilhard de Chardin and Transhumanism. *Journal of Evolution and Technology*, *20*(1), 1-22.

Steffen, A. (2004, August 6). *Tools, Models and Ideas for Building a Bright Green Future: Reports from the Team*. Retrieved June 10, 2010 from http://www.worldchanging.com

Stenger, V.J. (1995). Scientist Nitwit Atheist Proves Existence of God, The Physics of Immortality: Modern Cosmology and the Resurrection of the Dead. *Free Inquiry*, *15*(2), 54-55.

Sterling, B. (2001). *Viridian: The Manifesto of January 3, 2000*. Retrieved October 10, 2010 from http://www.viridiandesign.org/manifesto.html

Steward, S.M. (1990). *Bad Boys and Tough Tattoos—A Social History of the Tattoo with Gangs, Sailors and Street-corner Punks, 1950-1965*. New York, NY: The Haworth Press.

Stock, G. (2003). *Redesigning Humans: Choosing Our Children's Genes.* London, UK: Profile Books.

Stock, G, & Campell, J. (Eds.). (2000). *Engineering the human germline: An exploration of the science and ethics of altering the genes we pass to our q children.* New York, NY: Oxford University Press.

Stone, R. (1995). Religious Leaders Oppose Patenting Genes And Animals. *Science*, *268*(5214*)*, 1126.

Stourton, E. (1998). *Absolute Truth: The Catholic Church in the World Today*. London, UK: Viking.

Streeter, C. (Ed.). (1999). The Glossary Project. *Concordia.ca*. Retrieved October 10, 2010 from http://lonergan.concordia.ca/glossary/glossary_c-d.htm#conversion

Sullivan, F.A. (1983). *Magisterium: Teaching Authority in the Catholic Church*. Mahwah, NJ: Paulist Press.

Suzuki, D. & Knudtson, P. (1989). *Genethics: The Clash between the New Genetics and Human Values*. Cambridge, MA: Harvard University Press.

Szeman, I. (2007). System Failure: Oil, Futurity, and the Anticipation of Disaster**.** *South Atlantic Quarterly*, *106*(4), 805.

Talbot, D. (2002). Super soldiers. *Technology Revue*, *105*(8), 44-50.

Tauber, A.I. (2003). Medical Ethics. In Wentzel Van Huyssteen, Niels Henrik Gregersen, Nancy R. Howell, & Wesley J. Wildman (Eds.), *Encyclopedia of Science and Religion* (pp. 548-552). New York, NY: Macmillan Reference.

Taniguchi N. (1974). On the Basic Concept of Nanotechnology. In *Proc. Int. Cong.Prod. Eng.* Tokyo, JP: JSPE.

TattooSymbol.com. (2006). *Christian Tattooing—Part 1*. Retrieved August 29, 2006 from http://www.tattoosymbol.com/christian/christian1.html

Tattoo Facts. (2006). *Tattoo Facts & Statistics*. Retrieved April 1 2006 from http://www.vanishingtattoo.com/tattoo_facts.htm

Taylor, C. (2007). A Secular Age. Cambridge, MA: Harvard University Press.

Tertullian. (1885). Translated by S. Thelwall from *Ante-Nicene Fathers*, Vol. 4. Alexander Roberts, James Donaldson, and A. Cleveland Coxe (Eds). Buffalo, NY: Christian Literature Publishing Co.

Thiel, P. (2009). The Education of a Libertarian. *Cato Unbound*. Retrieved April 3 2011 from http://www.cato-unbound.org/2009/04/13/peter-thiel/the-education-of-a-libertarian/

Thomas, D.M. (2003). Social Effects of Technology. In *The New Catholic Encyclopedia*. (Vol. 13, pp. 786-789). Detroit, MI: Health Press

Thomas, W.R. (2012). *Transhumanism: How Does It Relate To Objectivism?* Retrieved August 1, 2012 from http://www.atlassociety.org/transhumanism-how-does-it-relate-objectivism

Tillich, P. (1961). The Meaning of Health. *Perspectives in Biology and Medicine*, *5*, 92-100.

Tillich, P. (1990). *Writings in the Philosophy of Culture—Kulturphilosophische Schriften*. Berlin, GE: Walter De Gruyter Inc.

Tipler, F. (1988). The anthropic principle: a primer for philosophers. *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association*, 2, 27-48.

Tipler, F. (1995). *The Physics of Immortality: Modern Cosmology, God and the Resurrection of the Dead.* New York, NY: Anchor.

Toth-Fejel, T.T. (2004). Humanity and Nanotechnology: Judging Enhancements. *National Catholic Bioethics Quarterly*, *4*(2), 335-364.

United States Conference of Catholic Bishops. (2001). *Ethical and Religious Directives for Catholic Health Care Services* (4th ed.). Washington, DC: USCCB Publishing Services.

United States Conference of Catholic Bishops. (2009). *Ethical and Religious Directives for Catholic Health Care Services* (5th ed.). Washington, DC: USCCB Publishing Services.

Universal Declaration of Human Rights. (1948). *The Universal Declaration of Human Rights*. Retrieved March 27, 2007 from http://www.un.org/Overview/rights.html

Vanghetti, G. (1899). Plastica dei monconi a scopo di protesi cine-matica (Plastic Surgery of Stumps for Cinematic Prostheses). *Arch Ortop*, *41*(305), 385.

Vanier, J. (1998). *Becoming Human*. Toronto, ON: House of Anansi Press.

Veatch, R. (2003). Revisiting a Theory of Medial Ethics: Main themes and Anticipated Changes. In Jennifer Walter & Eran Klein (Eds.), *The Story of Bioethics: From Seminal Works to Contemporary Explorations* (pp. 67-91). Washington, DC: Georgetown University Press.

Vermeersch, A. (1911). Religious Obedience. *The Catholic Encyclopedia*. Retrieved September 6, 2012 from New Advent: http://www.newadvent.org/cathen/11182a.htm

Vernant, J.P. (1989). Dim Body, Dazzling Body. In Michel Feher (Ed.), *Fragments for a History of the Human Body* (pp. 18–47). New York, NY: Zone

Vernasky, V.I. (1998). *The Biosphere*. M.A.S. McMenamin (Ed.). (D.B. Langmuir, Trans.). New York, NY: Copernicus.

Vinge, V. (1993). The Coming Technological Singularity: How to Survive in the Post-Human Era. *Alpha.se*. Retrieved March 27, 2007 http://www.aleph.se/Trans/Global/Singularity/sing.html

Vogue. (2005). Gay ear piercings. *Vogue Forums*. Retrieved September 6, 2012 http://forums.vogue.com.au/showthread.php?t=76596

Waldby, C. (2002). Stem cells, Tissue cultures and the Production of Biovalue. *Health*, *6*(3), 305-23.

Walker, M.A. (Feb. 2002). Prolegomena to Any Future Philosophy. *Journal of Evolution and Technology*. Retrieved August 5, 2003 from http://ieet.org/index.php/IEET/more/walker20020225

Walter, J.J. (1997). 'Playing God' or Properly Exercising Human Responsibility? Some Theological Reflections on Human Germ-line Therapy. *New Theology Review*, *10*(11), 39-59.

Walter, J.J. & Klein, E.P. (Eds.). (2003). *The Story of Bioethics: From Seminal Works to Contemporary Explorations*. Washington, DC: Georgetown University Press.

Walters, L., & Palmer, J.G. (1997). *The Ethics of Human Gene Therapy*. New York, NY: Oxford University Press.

Warwick, K. (2005a). *Implant Technology*. Retrieved May 1, 2008 from http://www.kevinwarwick.com/implant_technology.htm

Warwick, K. (2005b). *The Next Step Towards True Cyborgs?* Retrieved May 5, 2008 from http://www.kevinwarwick.com/Cyborg2.htm

Warwick, K. (2005c). *Frequently Asked Questions*. Retrieved May 1, 2008 from http://www.kevinwarwick.com/Cyborg1.htm

Warwick, K. (N.D.). *Interviews*. Retrieved May 11, 2008 http://www.kevinwarwick.com/interviews.htm

Wearable Computing. (2006). *University of Toronto*. Retrieved March 27, 2007 from http://about.eyetap.org/cyborgs/people.shtml

Weber, D.O. (2005, March). Unethical Business Practices in U.S. Health Care Alarm Physician Leaders. *Physician Executive*, *31*(2), 6-7.

Webster, T.J. (Ed.). (2004). *Nanotechnology Enabled In situ Sensors for Monitoring Health*. New York: Springer Publishing.

Weigle, G. (2002). Leon Kass: A National Treasure. *The Catholic Difference*. Retrieved August 1, 2010 from http://catholiceducation.org/articles/medical_ethics/me0036.html

Weil, V. (2003). Zeroing in on Ethical Issues in Nanotechnology. *Proceedings of The IEEE*, *91*(11), 1976-1979.

Weindling, P. (1990). *Health, Race and German Politics Between National Unification and Nazism 1870-1945*. Cambridge, UK: Cambridge University Press.

Wiker, D. (1999). Can We Learn from Eugenics? *Journal of Medical Ethics*, *25*(2), 183-94.

Wilkerson, L. (2004). T*he History of Body Piercings – Ancient and Fascinating Around the World*. Retrieved January 11, 2012 from http://www.thehistoryof.net/the-history-of-body-piercings.html

Willimans, J.R. (1997). *Christian Perspectives on Bioethics*. Ottawa, ON: Novalis.

Wired Magazine. (2000, February). *Cyborg 1.0: Kevin Warwick Outlines His Plan To Become One With His Computer. Issue 8.02*. Retrieved October 10, 2010 from http://www.wired.com/wired/archive/8.02/warwick.html

Witt, S. (1999). *Is Human Chip Implant Wave of the Future?* Retrieved June 20, 2008 from http://www.cnn.com/TECH/computing/9901/14/chipman.idg/

Wolbring, G. (2003). NBIC, NGO's society and three types of disabled people. *Within and Beyond the Limit of Human Nature* [Conference], October 12-16th 2003 Berlin, Germany.

Wolbring, G. (2005). The triangle of enhancement medicine, disabled people, and the concept of health: a new challenge for HTA, health research, and health policy. *HTA Inititive*, 23. Edmonton, AB: Alberta Heritage Foundation for Medical Research.

Wolbring, G. (2006). The Un-enhanced Underclass. *WAAC Global*. Retrieved October 11, 2010 from http://www.waccglobal.org/en/20062-communicating-with-angels-being-digital-being-human/580-The-Un-enhanced-Underclass.html

Wolf, N. (2002). *The Beauty Myth: How Images of Beauty Are Used Against Women*. New York, NY: Harper Collins Publishing Inc.

Wolfenbarger L.L. & Phifer P.R. (2000, December). The Ecological Risks and Benefits of Genetically Engineered Plants. *Science, 290*(5499), 2088—93.

Wong, N. (2006). *Tattoo Facts & Statistics*. Retrieved Jan 22, 2009 from http://www.vanishingtattoo.com/tattoo_facts.htm

Wood, M.A. & Ellenbogen, K. (2002). Cardiac Pacemakers From the Patient's Perspective. *Circulation*, *105*(18), 2136-18.

World Transhumanist Association. (2004). *World Transhumanist Association*. Retrieved May 10, 2003, from http://transhumanism.org/index.php/WTA/

Wright, G.R. (2000). Second Thoughts: How Human Cloning Can Promote Human Dignity. *Valparaiso University Law Review*, *35*(1), 1-38.

Zenit. (2001). Where the Church Draws the Line on Drugs. *Catholic Education Resource Centre*. Retrieved Jan 21, 2009 from http://catholiceducation.org/articles/civilization/cc0110.html

Zucker, K. & Bradley, S. (1995). *Gender Identity Disorder and Psychosexual Problems in Children and Adolescents.* New York, NY: Guilford Publications.