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Boston College

The College of Arts and Sciences

Department of Theology
and
Department of Philosophy

Finding Divinity in FORTRAN: Towards a Theological Computer Ethic

a thesis

by

Scott J. Molony

submitted in partial fulfillment of the requirements

for the degree of

Bachelor of Arts

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Finding Divinity in FORTRAN: Towards a Theological Computer Ethic

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Reader: Stephen J. Pope

Abstract

The information revolution is the single most important change in society since the printing press. At no other time has our society benefited from nearly limitless access to information and communication, and the changes brought on by this access have changed, and are changing, society in fundamental ways. Our homes, our workplaces, and our democracy have all been transformed by information and communication technologies.

However, our ethics have not kept pace with our technological progress, and the immense changes brought by this this revolution have posed some equally immense moral questions. Indeed, there has been an almost total lack of religious discourse regarding the problems which have arisen out of the information revolution. This thesis is an attempt to change that.

The thesis itself is structured as a series of essays on four key problems:

1. Intellectual Property, as it relates to Scripture
2. Information Ethics, the novel moral theory arising from Computer Ethics
3. Robotic Ethics, especially the ethics of robotic warfare
4. Hacker Culture, and its implicit spirituality

Each of these essays attempts to tackle one of these key problems, and demonstrate how a religious perspective illuminates some aspect of it. As befits a thesis from a Jesuit, Catholic university, most of the essays are drawn from a Catholic, Christian perspective.

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This thesis could not have been written without the support and steadfast encouragement of a number of wondrous people. First of all, I am deeply grateful to my advisor, Dr. Richard Spinello, for his grace, kindness, and patience. He has always been a source of wisdom and support, and has been generous with both his time and his network. I cannot express how grateful I am.

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I am grateful also to Mr. Robert Kubala, Mr. Brian Varian, and Mr. Steven Liu, who have taught me the value of forgiveness.

Most importantly, I am grateful to my parents, Bill and Doni Molony. They have given me everything, and I can only hope that I can repay their boundless love and sacrifice with love of my own.

Everything good in this thesis is indebted to others; all errors are solely mine.

For My Mothers,
Earthly and Heavenly

Contents

Chapter 1

Introduction

The information revolution is the single most important change in society since the printing press. At no other time has our society benefited from nearly limitless access to information and communication, and the changes brought on by this access have changed, and are changing, society in fundamental ways. Our homes, our workplaces, and our democracy have all been transformed by information and communication technologies.

However, our ethics have not kept pace with our technological progress, and the immense changes brought by this this revolution have posed some equally immense moral questions. Issues like privacy, strong security, and intellectual property will have deep and far-reaching consequences for us now, and will only increase as computers grow more prevalent. Indeed, one group of voices which have been conspicuously absent from the current discussion are religious voices. Religious communities have been deeply formative of our collective conscience; thinkers like St. Augustine, St. Thomas Aquinas, Mahatma Gandhi, Archbishop Romero and Dr. Martin Luther King, Jr. have left deep marks on even secular thinkers.

However, there has been an almost total lack of religious discourse regarding the problems which have arisen out of the information revolution. While the Holy See, to its credit, produced two very general statements[1] on the subject, with a short follow-up statement on social media[2], there has been almost no concentrated effort on the part of religious thinkers to address issues arising from the Information Revolution. This thesis is an attempt to change that.

I do not pretend that this thesis lays out a complete or definitive religious answer to questions raised in computer ethics. Partly, this is because the issues are both thorny and manifold; partly this is due to the rapidly-changing nature of computer ethics,

[1] Pontifical Council for Social Communications, 'Church in Internet'; idem, 'Ethics in Internet'.
[2] Benedict XVI.

and partly due to a great respect for wiser thinkers who could contribute much to the topic. However, what I do intend for this thesis is the beginning of a conversation. By laying out detailed, religious responses to computer ethics problems, I hope to impress upon my fellow theologians that these issues are worthy of attention, and to impress upon the community of philosophers that so far have taken these problems on that religious thinkers can have dynamic contributions to the field.

The thesis itself is structured as a series of essays on four key problems:

1. Intellectual property, as it relates to Scripture
2. Information ethics, the novel moral theory arising from computer ethics
3. Robotic ethics, especially the ethics of robotic warfare
4. Hacker culture, and its implicit spirituality

Each of these essays attempts to tackle one of these key problems, and demonstrate how a religious perspective illuminates some aspect of it. As befits a thesis from a jesuit, catholic university, most of the essays are drawn from a Catholic, christian perspective.

1.1 Copylight of the World: Intellectual Property & the *New American Bible*

The first chapter deals with the copyright policies surrounding the *New American Bible* (NAB), the authorized translation of the Bible put forward by the Magisterium as the official translation of the Bible used in the worship and liturgy of the Roman Catholic Church in the English language. While the translation is not highly used in the scholarly world, it is regarded as a solid, if somewhat conservative, bible used for

devotional use. The first part of the chapter introduces the NAB, and establishes its importance.

Attempts to bring the NAB into the 21st Century, however, have been met with mixed success. Indeed, the current copyright policies regarding electronic distribution of the NAB are nothing short of incoherent. While some of the sloppiness of the current policy of the bishops' conference may be attributed towards a changing understanding of how people use computers, especially given the rise of mobile computing, the current policy is very difficult to parse. The second section of the essay delves into how incoherent this policy really is, and makes the case that it is a problem needing a solution.

In order to have a solution to the problem, however, one needs a solid foundation. The third section of the essay delves into the theoretical foundations of intellectual property regimes, including three major forbears:

1. Locke's *Labor-Desert Theory*
2. Hegel's *Personality Theory*
3. John Stewart Mill and Jeremy Bentham's *Utilitarian Theory*.

Scripture, however, is a very complicated work. The fourth section of the essay attempts to lay out precisely *who* has claim to the Bible. The problem is difficult, however, since in the multi-millennial history of the text, untold numbers of people have labored to produce what we have today. Indeed, I attempt to lay out a theological argument regarding the Bible as properly belonging to all people, given the great commission, but held in stewardship by the institutional church.

This problem is laid bare in the fifth section of the chapter, where the status of Scripture established in the previous section is shown to be incompatible with each of the IP frameworks established earlier. Indeed, Scripture appears to be so radically

different from the models of intellectual property thus established that I argue it appears to be in a category of its own.

Finally, having shown that Scripture does not fit easily into established frameworks. I then examine how Scripture is handled by two separate arms of the institutional church: the United States Conference of Catholic Bishops (USCCB), and the International Commission for English in the Liturgy (ICEL). The USCCB and the ICEL have radically different frameworks, which befits their separate functions — the USCCB, being a teaching arm, attempts to centralize control, while the ICEL, fundamentally a cooperative body, attempts to standardize texts as widely as possible, and therefore promotes comparatively liberal sharing. In trying to harmonize the two, I argue for adopting ICEL's model more widely, essentially prioritizing access to scripture while accommodating efforts to preserve its integrity.

1.2 Cosmopoesis: A Theological Interpretation of Information Ethics

The single biggest development to arise from the computer ethics field has been the development of a new moral system by Dr. Luciano Floridi, currently of the University of Oxford. In his new system[3], Dr. Floridi argues for the concept of *information* to take a sort of priority in moral philosophy that concepts like *being* have held before. While the system is not without controversy, it represents a real innovation not only for computer ethics, but for the wider discipline.

The second chapter is an attempt to get the christian tradition and Dr. Floridi's traditions to intersect. Floridi is, essentially, a platonist, and so I alternate Augustine

[3]Luciano Floridi; Jeroen van den Hoven and John Weckert, editors, Chap. 3 In 'Information Ethics: Its Nature and Scope', (Cambridge University Press, 2008).

and Eastern Orthodox neo-platonist sources as a place for intersection.

The first section of the chapter describes Floridi's fundamental value judgement, which references *inforgs* — a sort of ontologically minimalist notion which encompasses any structured object at a given level of abstraction:

1. Inforgs exist
2. Ceteris Paribus, this existence is a good thing
3. Therefore, existing inforgs have "a Spinozian right to persist in its own status, and a Constructionist right to flourish, i.e. to improve and enrich its existence and essence.[4]"

Using the notion of God as sustainer, I transform Floridi's base value judgement into a notion that God's presence in sustaining beings can form the basis of an ethical system.

In the second section of the chapter, I attempt to christianize Floridi's anthropology. Floridi's view of humans as anti-entropic agents leads him to have three major ontic powers:

1. Control
2. Modeling
3. Creation

I tie these notions to the Holy Trinity, and show how each of these ontic powers can be seen as deriving from the human's partial participation in the divine life of each of the persons of the Trinity.

In the final section of the chapter, I explore floridian and christian eschatology, and speculate on how they need not be contradictory. I also propose a name for the rather awkward *information ethics project* with the name *Cosmopoeisis*.

[4]Floridi, 'Information Ethics: Its Nature and Scope' (as in n. 3), p. 48.

1.3 Mercy and Justice in Robot Ethics: A Christian Approach

Computers are also changing the way in which we conduct war. While much has been made of the threat of *cyberwar*, computers are now entering the battlefield in the person of *robots*. As mechanization appears inevitable, the christian community will be called to assess this new weapon of war. The first section of chapter 4 attempts to do just that — layout how the face of war will be changing.

The second section attempts to lay out the foundations for a christian approach to the problem. It describes three approaches within the tradition:

1. Holy War
2. Christian Pacifism
3. Just War

While dismissing the first almost outright, the chapter examines whether the kind of pacifism shown by the US bishops in the face of nuclear weapons[5] is warranted. Ultimately, the section decides that robots do not pose the same sort of indiscriminate threat, and decides on a just war stance for pragmatic, pastoral reasons.

The chapter then examines some rather terrifying statistics from Iraq and Afghanistan which are used by the proponents of robotic warfare to justify some of their claims. This helps to situate the moral situation in its appropriate gravity.

In the next section, the chapter makes a distinction between autonomous and semi-autonomous robots. These machines are not autonomous in the sense of being moral agents, but are autonomous in the sense of being able to function apart from humans for a time — anywhere from a few minutes to hours.

[5]United States Conference of Catholic Bishops, *The Challenge of Peace: God's Promise and Our Response*, (Office of Publishing Services, USCCB, 1983).

The chapter is able to examine some of the ethical issues arising from semi-autonomous robots, most of which raise questions of virtue and vice. The earlier data from Iraq and Afghanistan showed that significant violence is done to soldiers' character in war; the question the section examines is whether the emotional and epistemological distance that semi-autonomous war robotics offers is ameliorating that violence, or swapping one kind of ethical damage for another. The chapter hesitantly affirms the ethical use of semi-autonomous robots, while pleading for more data.

After a significant detour into machine learning techniques for context, the final section of the paper attempts to adjudicate between two models of artificial consciences — one, proposed by a team led by Patrick Lin, advocates a virtue-ethics based approach based upon machine learning, while Ronald Arkin proposes a more deontological model. I ultimately favor Arkin's model, after examining some flaws in Lin's model; notably, that machine-learning techniques are *spooky* — they deliver superior results, but when they fail, they fail both unpredictably and badly. Given that not all failures are equivalent in wartime, I argue it is better to have a machine that fails more often, but more predictably and more mercifully, than one which fails badly.

1.4 `God in All Code`: The Ignatian Spirituality of Hacker Culture

The first section in the final chapter examines the foundational documents of modern hacker culture, and attempts to draw parallels between them, with the hope of initiating dialogue between these vital traditions of power and wisdom.

The second section examines notions of *joy*, both in hacker culture and in Ignatian spirituality. The joy of constant play found in Raymond's writings is juxtaposed

against the Ignatian notion of moments of consolation. Both appear to have very similar elements.

The third section deals with the Ignatian notion of *mission*, and how that contrasts with the self-evident mission found in Hacker culture. The intense dedication of both of their adherents are compared.

The fourth section deals with the teleological goal of the mission — Raymond's ethic of constant innovation, and Ignatius's ethic of *magis* striving for perfection. More similarities are uncovered.

Human relationality and service is examined in the fifth section. Jesuit commitment to justice — particularly in the wake of superior general Pedro Arrupe. Hacker commitment to shared labor is also examined.

Notions of formation are taken seriously in the final section. Both traditions are shown to begin with a particular normative view of the human person, and develop the person towards this aspiration.

Chapter 2

Copylight of the World: Intellectual Property and the *New American Bible*

2.1 Introduction

The evangelistic imperative is one of the defining features of Christianity. While each major faith tradition proclaims its own truths to the world community in its own way, no other major faith tradition, with the possible exception of Islam, has felt the need to make its truths so widely accessible to everyone. Much of that imperative can be attributed to the *Great Commission*, when Jesus commands the disciples to spread the news of his resurrection. Perhaps its most famous formulation is in Matthew 28:

> [16]The eleven disciples went to Galilee, to the mountain to which
> Jesus had ordered them.
> [17] When they saw him, they worshiped, but they doubted.
> [18] Then Jesus approached and said to them, "All power in heaven
> and on earth has been given to me.
> [19] Go, therefore, and make disciples of all nations, baptizing
> them in the name of the Father, and of the Son, and of the
> holy Spirit,
> [20] teaching them to observe all that I have commanded you.
> And behold, I am with you always, until the end of the age."

Combined with the Pauline affirmation that the Gospel applies to all people (hence *disciples of all nations*), Christianity formulated conceptions of *evangelism* and *missionary work*. Within the Roman Catholic tradition, this usually takes the form of emphasizing both *sacred Scripture* and *sacred tradition*[1]. Since the promulgation of *Dei Verbum*, the Dogmatic Constitution on Divine Revelation in 1965, there hasn't been a great deal of controversy about *how* the Gospel should be promulgated — until now.

[1]Paul VI.

With the dawning of the digital age, the publishing industry is now undergoing a huge revolution in their ways of doing business, with great uncertainty. This uncertainty carries over into the 21st century, as new methods of spreading the Gospel overtake reflection on those same methods. In particular, the thorny issue of copyright law has left much of the online world scratching its head, and tying itself in knots. In this essay, I'm going to examine how this debate affects our understanding of *evangelization* in the 21st century. First, I will examine current theories of intellectual property, and demonstrate why they are lacking when applied to scripture. I will then attempt to posit an ethical solution, based on current (and, hopefully, future) frameworks.

2.2 Case Description

The New American Bible (NAB) is the fruit of several decades' worth of work by several generations of scholars. Originally commissioned by the Confraternity of Christian Doctrine (CCD), which, importantly, still holds the copyright, its administration in the US has largely fallen to the United States Conference of Catholic Bishops (USCCB) and, abroad, with the International Commission on English in the Liturgy (ICEL), which is "[A] mixed commission of Catholic Bishops' Conferences in countries where English is used in the celebration of the Sacred Liturgy according to the Roman Rite,"[2] and coordinates translations of English liturgical works, including the Roman Lectionary, which, in turn, includes its material from the NAB.

The ICEL maintains *its* copyright on the liturgical works, giving the following rationale:

> ICEL copyrights its texts in order to maintain under the civil law and

[2]International Commission on English in the Liturgy, 'Welcome to ICEL'.

> international conventions the Church's ownership of these texts used by Catholics in their worship. The legal safeguard provided by copyrighting the texts helps to preserve their literary and liturgical integrity under the ecclesiastical authority given to the conferences of bishops by the Second Vatican Council and by subsequent instructions of the Apostolic See. Through copyright of its texts ICEL can also help to promote their availability to all the English-speaking countries through the international copyright conventions.[3]

The ICEL also collects royalties from publication of these works. Again, from the ICEL:

> As a nonprofit body at the service of the Church in the countries where English is spoken, ICEL endeavors to conduct its program with just remuneration for translators, editors, composers, consultants, and staff and with expenditures directly related to liturgical purposes. To provide a continuing source of revenue for ICEL's current and future expenses in developing liturgical materials, a royalty fee is charged to all publishers.
>
> ICEL does not charge for the reproduction of its texts when they appear in materials produced by individual parishes, schools, religious houses, and the like for their private and non-commercial, nonprofit use. Even in such cases, however, the requisite acknowledgment and copyright notice should always appear.[4]

Finally, in an appendix to the policy (presumably part of the 2008 revision):

[3]International Commission on English in the Liturgy, *Publication Policies of the International Committee on English in the Liturgy, Inc.* Revised edition. (2008), p. 4.

[4]Ibid.

Use of ICEL Materials on Global Computer Networks

ICEL texts and translations that have been approved by the Conferences of Bishops, have received the recognition of the Holy See, and have subsequently been promulgated for use on the date established by the Conferences of Bishops may be reproduced in a non-commercial site ("Site") on the global computer network commonly known as the Internet without obtaining written or oral permission, subject to the following conditions:

1. There must be no fee charged to access the Site or any of the ICEL translations, texts, or music, thereon;
2. The appropriate ICEL copyright acknowledgment must appear on the first and last pages and/or frames within the Site displaying the ICEL translation or text (see www.icelweb.org and click on "copyright policies");
3. The ICEL translations and texts must be followed exactly;
4. These policies do not grant a license to publish texts in any other form or any other right in ICEL's name and marks, and the Site may not display the ICEL translations or texts or otherwise use the ICEL name in any way that implies affiliation with, or sponsorship or endorsement by, ICEL;
5. ICEL reserves the right to terminate or modify its permission to use its translations and texts;
6. ICEL reserves the right to take action against any party that fails to conform to these policies, infringes any of its intellectual property rights, or otherwise violates applicable law.

The USCCB, which administers the CCD's copyright of the New American Bible, however, has a very different set of copyright guidelines:

- No permission is required for use of less than 5,000 words of the NAB in print, sound, or electronic formats (for web usage, see below) provided that such use comprises less than 40% of a single book of the Bible and less than 40% of the proposed work.
- Permission must be requested for use of more than 5,000 words from the NAB (or when the use comprises more than 40% of a single book of the Bible or more than 40% of the proposed work).
- A copy of the manuscript pages that contain Scripture selections should be sent to [the Associate Director of Permissions]
- The Scripture citations should be highlighted and the reference citations must be clearly marked. The following information should be included: title, publisher, publisher address, publisher contact name, proposed publication date, print run, list price, length of work.
- Manuscripts may be accepted via e-mail with prior authorization. To obtain authorization, please send an email to nabperm@usccb.org.
- Permission is no longer granted to reproduce the 1970 New Testament (apart from in the Liturgy of the Hours).
- All quotations must be verbatim from the text, including capitalization and punctuation. The poetic structure of some passages and books written in verse (for example, Psalms, Wisdom, Isaiah, etc.) must be preserved in verse as printed.
- The appropriate copyright acknowledgment must be given [as per a given formula]

The end result of all of this legalese, however, is quite confusing. In practical terms, this means it is perfectly legal for one to view the NAB *online*, on a personal laptop, or on Apple Computer's new iPad, but if one were to download the text in order to read it *offline*, say on the train, is illegal copyright infringement. Surely, however the confluence of the church and the state set the rules for reading the bible in the 21st century, the presence or absence of a wireless signal shouldn't make that difference.

2.3 Background: Justification for Intellectual Property

How can one own an idea? Such a question has been raised in society since the time of Gutenberg – and, until recently, had been more-or-less satisfactorily answered. The advent of the internet, however, has changed the entire frame of the question. When books, inventions, and other creative works heretofore were physical objects – things that could be touched, made, and controlled by scarcity – society developed copyrights and patents, which worked admirably. However, the digital revolution of the internet changed the rules of the game when two major advances changed the nature of creative works:

1. Creative works are digital – composed on computers. This means that a work has gone from being markings on a piece of paper to being bits in a data stream. It is therefore now possible to reproduce flawless copies of any work composed on the computer. While this capability existed in the hands of book printers up until now, the widespread adoption of computers and desktop publishing has enabled even average citizens to produce work on the level of professional typesetters.

2. The internet connects personal computers together in a global network. While the capability to move files from one computer to another was one of the first major advances of the computer industry, Geography had heretofore posed a definite limitation to any attempt to share files; Users could put a file on portable storage media like a floppy disk, say, and share it with neighbors, but only realistically able to share information between people who are geographically close. Companies could control the distribution of software by being the only people who could ship uses copies of software. With the advent of the internet, however, works can now be placed online for anyone to access and copy.

This has thrown back open the question of intellectual property (IP) rights: are the rights given by traditional intellectual property regimes morally legitimate? Some, like noted activist and founder of the Electronic Frontier Foundation (EFF) Richard M. Stallman argue that intellectual property rights, at least applied to software, constitute a "betrayal"[5] of other users; an idea which he calls "morally sickening" and argue that "It is not ethical to use non free software." Other authors, however, like Richard Spinello[6] argue that at least the *idea* of some sort of copyright is completely legitimate, if not the current US copyright regime.

The debate appears to be somewhat intractable. However, in some ways, the debate is also moot. It is highly unlikely that the logical conclusion of abolitionists like Stallman's reasoning will come to pass, and copyright will be abolished. The debate, then, needs to be refocused — given that copyright exists, what is acceptable conduct within this framework? What is the most morally *superior* way of conducting oneself under the scheme? It is *these* questions which have the most direct bearing on the question at hand, and deserve the most scrutiny.

[5] Anarcho Babe.

[6] Richard Spinello, *Cyberethics: Morality and Law in Cyberspace*, 3rd edition. (Jones and Bartlett, 2006).

In order to deal with these questions, however, it is necessary to first examine what justifications are given for IP rights in the first place in order to be able to adequately answer the question. There are three sources for justifications of IP rights. Briefly, they are:

1. A Lockean theory, commonly referred to as the Labor-Desert theory[7][8][9][10]
2. A Hegelian theory, referred to as the Personality theory[11][12]
3. A Utilitarian theory[13]

A brief discussion of the three follows.

2.3.1 Locke: Labor-Desert Theory

The Lockean argument is perhaps the one most documented. Briefly, the argument emphasizes that *Labor makes right* – an agent has a legitimate claim to only that which the agent works for.

Locke begins with a rights-based approach; declaring, as noted above, that everyone has rights to life, liberty, and property. His main moral thrust comes in his assertion that people are entitled to as much property as may be necessary to sustain themselves' and their dependents' right to life. (The text lends itself to a broader reading of "sustenance" to include a modest, though not extravagant, living.) Locke also asserts

[7]Spinello (as in n. 6), p. 98.

[8]Justin Hughes, 'The Philosophy of Intellectual Property', *The Georgetown Law Journal*, 77 (1988):2, p. 296-329.

[9]Kai Kimppa, *Problems with the Justification of Intellectual Property Rights in Relation to Software and Other Digitally Distributable Media*, Ph. D thesis, (Turku Centre for Computer Science, 2003), p. 59-75.

[10]Herman T. Tavani, 'Locke, Intellectual Property Rights, and the Information Commons', *Ethics and Information Technology*, 7 June (2005):2.

[11]Spinello (as in n. 6), p. 99.

[12]Hughes (as in n. 8), p. 330-358.

[13]Spinello (as in n. 6), p. 100.

that the earth was, originally, held by people in common; property rights derive from people claiming certain small portions of land and other resources to exclude other's access to, thus increasing the number of people who can subsist on the remaining common land. (Ironically, he essentially justifies private property on altruistic grounds.)

Locke derives his theory entirely from a supposition that all tangible property is held in common; the Lockean argument for IP rights extends this to creating a parallel *immaterial commons*[14]. One key feature of the immaterial commons, however, is that every object in it is both unique and non-diminishing. *Hamlet* is only one particular combination of words in the entire English language, and so can be said to be unique, but my reading *Hamlet* does not prohibit my next-door neighbor from doing so as well.

Hughes identifies two alternate readings of Locke's theory:

1. Labor-Avoidance: This reading holds that labor is, by definition, an implicitly unpleasant activity that people pursue only reluctantly. It is just, therefore that those who labor be rewarded with the fruits that are thence derived. Applying it to *Hamlet* Shakespeare deserves the IP right to *Hamlet* because writing plays is painful (or, at least, less pleasant than alternate options).

2. Value-Added: Those whose labor creates value should be rewarded with its profits. Rather than stressing the unpleasantness of the work, this theory stresses the value that is created. Applying this to the *Hamlet* example, Shakespeare is entitled to the IP rights to *Hamlet* not because it is painful to write plays, but because *Hamlet* is a great play.

[14]Kimppa (as in n. 9), p. 64.

2.3.2 Hegel: Personality Theory

The Hegelian[15] position holds that an author invests some facet of the author's personality in all created works. The works created by a given author embody a part of the author's personality. Therefore, an author is entitled to some amount of control over the created work.

Note that the IP rights associated with this theory are separate and distinct from those associated with the Lockean argument. Rather than stressing compensation for pain or value, the Hegelian instead demands veto power over derivative works, and seeks to ensure that created works accurately reflect *the author*. Unlike either the Lockean or the utilitarian, who argue that creation must be incentivized, the Hegelian does so almost from a defensive posture – to define the agent itself concretely in the world, rather than allow others to define the agent. This argument assumes that creation will happen, and even encourages it, but insists that the rationale behind creative works – a self-actualization solely by an agent – must remain only within the agent's sole control.

2.3.3 Mill/Bentham: Utilitarianism

The Utilitarian's argument is perhaps the simplest of the three, and is most prominently articulated in the US Constituion, which reads, in part "The Congress shall have power ... To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." (Art. I, §8, Cl. 8)

The utilitarian's argument is merely that creating works takes time, and effort, and without sufficient protection, authors will have no incentive to create, and will,

[15] Hughes (as in n. 8), p. 330-365.

accordingly, not. Important to this idea is that creation: artistic, literary, scientific, or technical, must be incentivized. Agents within the system do not create IP works absent these incentives, because, economically, the "costs of expression" outweigh the "costs of distribution" – in effect, because it does not make *economic* sense to create IP works, agents will, accordingly, not create IP works. Because IP works are held to be a nonmoral good, the utilitarian argues that the only moral route for society is to give some sort of economic incentive for IP works to be created. Futher, the utilitarian argues, the best method to incentivize the production of IP works is the limited monopoly granted by IP rights; ergo IP works are moral.

2.4 Ownership of Scripture

Before we can examine the justification for Scriptural IP rights, we must first resolve one important question: *Who owns the Bible?*

In a certain sense, this question is nonsensical — we certainly do not *own* the Bible in the same way that we may own even original works. The ICEL gives the following argument in answer to that question (emphasis mine):

> [I]n order to maintain under the civil law and international conventions *the Church's ownership* of these texts used by Catholics in their worship.[16]

Thus, the ICEL contends that the Church owns the Bible. While this is a superficially satisfactory answer, there are two deeper questions which lie beneath the surface here. The first is *who do we mean when we say "The Church"*? Do we mean all of God's children (that is, the entirety of humanity?) Do we mean the Catholic

[16]International Commission on English in the Liturgy, *Publication Policies of the International Committee on English in the Liturgy, Inc.* (as in n. 3), p. 4.

Christian community? Or do we mean the institutional, teaching arm of the church embodied in the Roman Magisterium?

The ICEL clearly has one particular view of the answer to this question. In the ICEL's view, the Bible belongs to the institutional Church. Yet, I think a stronger case could be made for seeing *church* as a cipher for *the entire people of God*.

The case for such a view rests in view of St. John's view of Christ the *Word of God*. It has been understood since the earliest days of the church *Christ came to redeem all people, not merely the Jewish people*. Thus, it is incumbent upon the Christian Community, which has joyously received this news, to proclaim to the entire world the good news of salvation in Christ. Insofar as Christ *is* the Word of God and is himself the good news of salvation, then the Word of God belongs to all the people, and all people belong to the Word of God.

However, the other question that must be answered is more subtle: *is the word "own"* the appropriate use of the word in the context of Scripture? For the ICEL, the answer is *yes*, but I confess that I am not quite sure.

It is clear that the Bible is a gift from God; however, as stated above, that gift, if it "belongs" to anyone, belongs to the whole of God's people. Yet, where is the Christian community and the institutional Church in this conception? Surely, as the people who recognize scripture as holy, they should have some place in this theoretical conception?

My answer is yes, though the notion of *stewardship*. I argue that Scripture, like Christ, is a gift which is beyond our power to hold. It is given to us, and it is at the same time beyond us. Thus, it is given to the Christian community as an inheritance held in trust for the whole people of God to claim.

2.5 Scripture and IP Rights Frameworks

Given the brief systematic sketch, we should be able to determine which, if any, system seems to make the most sense when applied to Scripture. Alas, despite the copious detail of each framework, Scripture, taken seriously as the inspired Word of God does *not* fit neatly into any one of these systems, as we will see.

2.5.1 Scripture and the Lockean Theory

The Lockean theory is based on two separate assumptions:

1. Ownership is in some way tied to labor (whether by the Labor-Avoidance theory or the Value-Added theory.

2. Property is held in common until an individual claim supersedes on the commons.

Neither one of these statements is entirely defensible with regard to Scripture, but the second is much more defensible than the first.

The notion that ownership is tied to labor prompts an examination of the question *what is labor regarding scripture?* The immediate answer for most people will be *translation*, and this is to be expected, given the intense amount of time, dedication and effort that biblical scholars pour into every word (and, sometimes, every letter) of the Bible in order to ensure as accurate a translation as possible. Yet, in our rush to acclaim the translators, we must not forget the *primary* labor of creating the bible: Authorship.

Authorship with regard to the Bible is a complex thing. Any Christian will answer that the primary author of the Bible is God. Yet this is where the simplicity of the question ends. The secondary authors of the texts are presumably the manuscript authors themselves — St. Paul is rather straightforward, but also, if the documentary

hypothesis is to be believed, the Yahwist, the Elohist, the Deuteronomist and the Priestly source are the four main (if ill-understood) authors of the Old Testament. A third level of authorship rests in the *editors* of the same works — the priestly editors who laid out the Genesis story with two creation accounts clearly had some sort of theological agenda in doing so, and by studying their revisions we can divine it.

Translators are yet another layer of abstraction added onto this complex animal, so any work done by modern translators, even if they were working *only* with manuscript texts and were not relying on any previous scholarship at all (a laughably naïve assumption), they would, at best, appear to be only at the fourth degree of removal in this vast process of co-creation. Thus, while it's clear that translators have *some* role to play in determining the IP status of the bible, to grant to them all of the benefits of several previous generations of scholarship and labor seems disingenuous.

Largely, this is due to the Lockean model's understanding of labor and work — for Lockeans, creation is like agriculture: A single person tills a field, plows, puts blood, sweat, and tears into working to soil, and derives fruit thereby. In reality, the process of translating the Bible isn't like agriculture (or writing a novel) whose primary agent is a single person with accompanying initiative, but is in fact closer to building a road: later workers use earlier workers' progress in order to get to their work; still later workers will build on them.

The Lockean model's other assertion is quite different, and much easier to harmonize with the Christian tradition. We have already established that, within the Christian tradition, the Bible is given to all people. This is quite comparable to Locke's assertion that all property is held, originally, in common. Indeed, in Locke's original *Second Treatise on Government*, begins with the assertion that everything is held in common because it was given to humanity by God.

It's Locke's second model — that individual claims, made to support oneself, can supersede the commons, that this becomes an issue. The nature of immaterial works is such that scarcity may only be artificially imposed. Thus, the ultimately altruistic basis for Locke's argument breaks down when dealing with immaterial things.

2.5.2 Scripture and the Hegelian Theory

The Hegelian theory is at once both the best and worst theory to apply to scripture. Its set of concerns are closest to the Christian community's concerns, and yet applying it in the way it is applied to every other work would be a gross injustice to scripture.

The core of Hegel's theory is that a work by an author is an expression of an author's personality in the world — an act of self-definition — and, therefore, IP rights are an intrinsic component of personal liberty to define oneself. Leaving aside the question of whether human beings can really define themselves, this is striking in its resemblance to normal theological discourse about Scripture: the Word of God is God's self-revelation in the world.

Much of the Hegelian theory's concerns mirror concerns of the Christian community. Indeed, while Utilitarians and, to a lesser extent, Lockeans are concerned with deriving economic advantage from their works, Hegelians are focused exclusively on concerns of *textual integrity*. This mirrors ICEL's reasoning (again, emphasis mine):

> The legal safeguard provided by copyrighting the texts helps *to preserve their literary and liturgical integrity* under the ecclesiastical authority given to the conferences of bishops by the Second Vatican Council and by subsequent instructions of the Apostolic See.[17]

[17] International Commission on English in the Liturgy, *Publication Policies of the International Committee on English in the Liturgy, Inc.* (as in n. 3), p. 4.

This is precisely what the bishops are trying to affirm: Textual integrity is important, and, indeed, is why safeguards are kept on the text in the first place.

However, on a theoretical basis, this line of reasoning breaks down when applied to anyone except God. A translation of many other works can be a work of art itself — Robert Fagles's *Iliad*, for example, is truly remarkable, and Sir David Ross's translation of the *Nicomachean Ethics* is still essential over 80 years after it was first published in 1925 — that kind of personal shaping of the text that marks Fagles's and Ross's work is precisely what modern Biblical commentators are attempting to *avoid*. While eisegesis is inevitable, and exegesis always only a possibility, great care and attention is given to make the translator's work as transparent and unobtrusive as possible. Thus, although translations can be judged and praised, they ultimately should *not* be counted as primarily the work of the translator but rather of the original, primary author, which, here, is God.

Alas, God cannot make copyright claims, and, despite some efforts, cannot be sued either. Ostensibly, this is where the Church can step in. Yet, this is where the Church must be very careful and very humble, if it can make this step at all — the entirety of the Hegelian argument rests upon an author objecting to others' use of the author's work, because, since a work is an extension of that person, those who use an author's work are compelling the author into undesired association.

Following that line of reasoning, the (presumably institutional) church, on behalf of the Living God, would be claiming that God does not desire association with someone else's message. That's an extraordinary claim, and it is not at all clear who would be qualified to judge such a claim. Copyrights are currently administered through our court system, but I can think of no Christian who would think that a court of law is an appropriate place for a theological debate, much less one with the force of civil law.

2.5.3 Scripture and the Utilitarian Theory

The Utilitarian theory is the most straightforward of all the theories, and the one which is most oblique to scripture. However, it must be taken seriously, because our current system of copyright law has taken this as its justification.

The Utilitarian holds that copyright is nothing more than economic incentive to produce works. If people can't derive economic advantage from producing, say, novels, then fewer novels will be written. Since we want a socially optimal number of novels to be written, we give people a temporary monopoly on their novel, in order to sell them.

This produces many problems, which will be shown in a later section, but there is a major problem with applying this conception to scripture. If the Christian community has any sort of unified consensus about the Bible, it is surely that that *the Bible is not just another IP work.* Indeed, Christians need no external incentive to produce translations or commentary — indeed, the great commission makes it a religious imperative. What this system may do, however, is make it possible to derive *income* from copies of a religious text, although, as we will see

2.5.4 Scripture is its own Category

As we have seen, the notions of scripture categorized in section 2.4 fits into no preconceived notion of IP rights. However, scripture does lend itself to its own set of concerns for Christians, which will be important to our ethical determination:

1. Integrity. The Christian community broadly, and the Catholic Christian community narrowly, are both very concerned to ensure the integrity of the scriptures. Any legal protections applied

2. Access. Christians are keen to ensure access to the scriptures for anyone who would like them. While Catholic Christians are also key to ensure that appropriate pastoral direction accompanies the scriptures (since Catholics do not have the right of private interpretation), Catholics are just as eager as any other Christian group to encourage the spread of God's Word.

The key to our pastoral dilemma, then, is trying to fit these two major concepts into how the ICEL, the NCCB, and other Catholic agencies which have control over copyrights of the New American Bible and other scriptural contexts should conduct themselves.

2.6 Comparison: ICEL vs. USCCB

The the ICEL and the USCCB both have copyright policies, as noted in section 2.2. What's interesting is *these policies are almost total inverses of one other*. I will examine possible motivations for this split, comment on the pros and cons of each approach, and then make recommendations for synthesizing the two approaches.

2.6.1 ICEL

The ICEL is a cooperative body *between* conferences of bishops where English is the primary liturgical language. Its explicit goal is to attempt to standardize, as much as is pastorally possible, the liturgy between English-speaking countries, in order to encourage solidarity between English-speaking countries, and a sense of community with the wider church. Indeed, many smaller countries, or countries where English is not the *primary* language of the liturgy, rely on larger countries ("publishing" countries) to export liturgical books, and therefore discourage regionalism in order to

minister pastorally to English speakers all around the globe.

In essence, ICEL is an organization founded on *coordination* and *cooperation*, and their copyright policy reflects this focus. Their electronic copyright policy is quite liberal, and allows essentially anyone to host a web version of any ICEL text. Thus, if Boston College or another Catholic University (or, for that matter, *anyone*) decided it wanted to host the text of the *Roman Missal*, it wouldn't even have to ask permission — they could proceed, so long as three salient points were followed:

1. No fee must be charged to access such a site.

2. ICEL's copyright must be acknowledged.

3. The copy must be verbatim.

ICEL also essentially reserves the right to revoke this permission, if, say, an anti-Catholic group decided to host material for the purposes of mockery.

ICEL's approach has a number of benefits. Its approach maximizes interchangeability, at least between web-enabled computers, and grants maximum flexibility to the faithful, and minimizes clerical oversight. Thus, if ICEL doesn't have the time or money to extensively police sites which would want to host the Roman Missal, it can set broad guidelines, and only police those which abuse its liberal policy. The downside, of course, is the other side of its upshot — where there is great freedom, there is great possibility for abuse.

2.6.2 USCCB

The USCCB, unlike the ICEL, is not a grouping of bishops' councils, but is a council of bishops itself. Thus, the USCCB sees its primary job as *pastoral direction*, and exercise

of the teaching arm of the institutional church. This orientation is also reflected in their copyright policy, which they maintain over the NAB.

Unlike the ICEL, the USCCB maintains comparatively strict controls over use of the NAB. While still liberal by many publishing houses' standards, its controls are quite strict:

- Only 40% of a work may consist of NAB material without written permission.
- No work can contain more than 40% of a given book of the bible (which means that one couldn't even include all of Obadiah's denunciation of Edom).
- No one else may duplicate the work done at `usscb.org`, which includes
  - Podcasting the NAB, or the Daily Readings
  - Posting the complete NAB or the Daily Readings

The USCCB's approach, then, is to keep as many things "in house" at `usccb.org` as is possible. Presumably, this is because they have spent a great deal of time maintaining a very complete and meticulous website. In a larger consideration, the bishops view their teaching role as primary, and want to ensure that, when Catholics look to scriptures, that they do so through the bishops.

This approach is consistent with the Catholic approach to scriptural understanding, in that the Church is the primary locus of scriptural interpretation. However, this approach has its limitations. Notably, the faithful who want an electronic version are dependent upon either `usccb.org`. Those who want an electronic version in a format other than standard HTML, or who want to read the Bible on their Kindle, or in the full-screen version of their iPad either have to wait until a publisher produces a particular version. Currently, Olive Tree Bible Software produces an (admittedly

well-done, if expensive) NAB for the iPhone/iPad; Kindle users are, as of this writing, out of luck.

The USCCB's approach supports the integrity of the text, but at the expense of access to the text. Contrary to ICEL's opinion, the american bishops' approach seems to be "If you can't do it well, don't do it at all."

2.6.3 Reconciliation

Each of the two approaches treats one of the Christian concerns, and favors it over the other. While both approaches play to the strengths of the agency favoring it, there may, in fact, be a superior option that incorporates both concerns *better*.

If priority must be given to either of the two concerns, it is better, I argue to prioritize access. Mostly, this derives from theological concern — the great commission's evangelistic imperative is clear and unambiguous, and I am convinced that the pastoral support that an immediately accessible Bible would represent is a greater contribution than a completely whole but utterly inaccessible one.

However, there is also a pragmatic dimension to such advice — US copyright law is unabashedly utilitarian in its basis (although some proponents argue for its strengthening on Lockean grounds), and many of the controls that the Hegelian authors argue for are not only *absent* in US copyright law, the doctrine of fair use carves out certain exceptions (e.g. the right of quotation, parody, etc.) which make policing difficult, litigious, and ultimately a distraction to the work of spreading the Gospel.

A third option is to take an approach which is similar to the ICEL approach, using a selected license. Creative Commons, a foundation committed to offering alternatives to full copyright claims. In particular, Creative Commons offers an "Attribution-

Noncommercial-No Derivative Works 3.0" license, which is a legal document giving *anyone* the narrow freedom to make verbatim copies of a given work, provided it is properly attributed, used for noncommercial purposes, and not used to create a new work without the copyright holder's permission. Such a middle way would strike, I argue, the best balance between accessibility and integrity — the text could be moved to whichever format is popular at the moment (.html, .tex, .epub, etc.), while still forcing the text, as promulgated by the US bishops, to remain unaltered.

This does *not* mean, however, that the work of the USCCB should be wasted, or that Catholics should not look to their bishops when interpreting Scripture. `usccb.org` is one of the best Catholic websites on the web; it just shouldn't feel that it must be the *only* good Catholic website.

Chapter 3

Cosmopoesis: A Theological Interpretation of Information Ethics

3.1 The Ontology of Goodness

Luciano Floridi's Information Ethics project is based around a fundamental axiom: that being has a fundamental value over non-being.[1] At first glance, this assertion doesn't appear to be controversial, but the precise meaning of it reveals how extraordinary it is. The salient definition of being here does not mean the binary condition of either existing or not existing; rather, Floridi is viewing being through an Informational level of abstraction. Information and being are correlated together — information here meaning something more akin to "structured existence" rather than existence itself.

Floridi's system has a base observation, and a basic value judgement, from which it derives all further ethical conclusions:

1. Inforgs exist
2. Ceteris Paribus, this existence is a good thing
3. Therefore, existing inforgs have "a Spinozian right to persist in its own status, and a Constructionist right to flourish, i.e. to improve and enrich its existence and essence.[2]"

While it is true that all philosophy must begin from some postulates, and this is a well-developed set of postulates, it is ultimately unsatisfying to the theologian. For a Christian, God is both good and the source of goodness, so any reference to goodness absent a reference to God is incoherent for a theologian.

Thankfully, however, Floridi's second postulate isn't difficult to connect with a notion of God; indeed, it actually flows quite well from traditional understandings of God, albeit understood in a new, informational way.

[1] Floridi, 'Information Ethics: Its Nature and Scope' (as in n. 3), p. 47.
[2] Ibid., p. 48.

3.1.1 God the Sustainer

The metaphysical properties of God are a subject of considerable confusion and controversy within Christian theology. While there are three major properties in the traditional theistic formulation (omnipotence, omniscience, and omnibenevolence) which have bedeviled believers tackling theodicy since the beginning of theological discourse, there is another, less prominent attribute of God in the Christian tradition which dovetails well with an informational perspective. This is God as sustainer — the guarantor of being. In this view, existence itself is the result of the continuing action of God. Since God's actions are, by definition, good, existence is therefore good. Taken informationally, this view means that information is nothing short of the product of God's actions, and, in some sense, the continuing presence of God.

This assertion is not given as much prominence in the west as it is in the east, especially in Hinduism, where Lord Shiva's primary attribute is the sustainer. However, a Judeo/Christian version of this notion finds its basis both in Scripture and in the broader tradition. St. Paul's Speech in the areopagus in the Acts of the Apostles is especially noteworthy:

> For "In him we live and move and have our being"; as even some of your own poets have said,"For we too are his offspring." (Acts 17:28)

The context of this verse is Paul speaking to the stoic and epicurean philosophers in Athens, proclaiming to them the gospel of Christ, whom he sees as the "unknown God" which the Athenians have dedicated an altar to in the Areopagus. Paul brings a Judaic reading to a quote from a (lost) Greek poem, and it is the final word of the poem, "esmen" which is the crucial hook. While its proper interpretation of whether or not it connotes *participation* or merely dependence[3] on the divine life, either reading

[3]Luke Timothy Johnson; Daniel J. Harrington, SJ, editor, *The Acts of the Apostles*, Volume 5,

adequately emphasizes God's role as sustainer of being for this argument.

St. Augustine also mused on this topic in the opening paragraphs of his *Confessions*:

> [S]ince without thee nothing would be which does exist ... Therefore I would not exist – I would simply not be at all – unless I exist in thee, from whom and by whom and in whom all things are.[4]

Here, the Doctor of Grace is much more direct than St. Paul. He directly states that his existence must be due to some minimal participation in the divine life. God's own action sustains Augustine's being, and he credits God's grace with sustaining his own life. This is quite consistent with Augustine's litany throughout the entire sum of the *Confessions* that all goodness ultimately derives from God's own actions.

3.1.2 Meonic Evil

The postive assertions are actually the contrapositives of Floridi's main arguments. While I have heretofore argued about Floridi's *positive* assertions, most of his ontology of Good has actually been an ontology of evil, or, more accurately, an ontology of *entropy*, which he sees as synonymous with evil. Of his four famous laws, three are all formulated to deal with minimizing entropy. This view is a platonic one, which finds evil as the absence of being. Such a view is quite common in the Orthodox east, where evil is said to be *meonic*, which is greek for "anti-being"[5].

The whole sum of this theological reading gets at the core Floridi's reasoned critique of environmentalist ethics — that the kind of prima facie dignity granted to

Sacra Pagina, (Liturgical Press, 1992), p. 316.

[4]St. Augustine; Albert C. Outler, editor, *Confessions and Enchiridion*, Volume 7, Library of Christian Classics, trans. by Albert C. Outler (Westminster Press, 1955) ⟨URL: `http://www.ccel.org/ccel/augustine/confessions.html`⟩, pp. 16-17, I.ii.2.

[5]Stanley S. Harakas, *Toward Transfigured Life: The Theoria of Eastern Orthodox Ethics*, (Light & Life Publishing Company, 1983), p. 34.

life in environmentalism is quite proper, but that it doesn't go far enough. Floridi argues for moving the locus of ethical concern outward even farther than environmental ethics has moved it. Environmentalism sought to move ethics from anthropocentrism to biocentrism, Floridi's argument is to move from biocentrism to ontocentrism. In a purely secular arena, such an assertion may well be quite controversial, but in a Christian setting, arguing that the presence of God is preferable to God's absence — the core of this reading of Floridi — is not only uncontroversial, it is tautological.

3.2 Homo Poieticus: Christianizing Floridi's Philosophical Anthropology

3.2.1 Floridian Anthropology

The definition of Good and Evil demonstrated in the previous section relates directly to Floridi's philosophical anthropology. Floridi first begins by examining a seemingly marvelous property of living things, and humans in particular: we are able to, at least locally, reverse entropy's effects, and create order from disorder. Thermodynamically, of course, this is impossible — expenditure of energy inevitably means that net disorder increases. However, since Floridi means something more akin to the popular, rather than the thermodynamic definition of entropy — a corruption of information, rather than a measure of disorder — the gains we are able to make are real, albeit temporary.

In particular, this anti-entropic characteristic is the single most essential thing about humanity. In particular, Floridi contends that there are three major ontic powers which humanity possesses:

1. Control
2. Modelling
3. Creation

The critical things about these powers is that they are *ontic* — that is, that they represent an ability to affect the nature of things. Floridi's critique of virtue ethics is that it describes only what happens when these powers are reflexively directed, rather than being extended outward towards society and the world at large. Ethics consist not merely in proper formation of the self (*egopoiesis*), but also proper formation of society (*sociopoiesis*) and perhaps even proper formation of the world at large — a concept we will return to in a moment.

3.2.2 Christian Anthropology

As with many things dealing with a religion spanning three millennia, there is a great deal of difficulty in making sweeping declarations about what a broadly "Christian" anthropology is or might be. However, there are a few salient characteristics which can be marshaled for the sake of this argument. A great deal of Christian anthropology has been a continuing exegesis on Genesis's creation narratives: the *priestly* account (Genesis 1-2:4a), and the *yahwistic* account (2:4b-3:2). While most of modern biblical scholarship holds that they were written by two different authors, and were later combined by a later redactor, we can still assume that the two accounts, while separate, both contain core points which must be harmonized in any coherent Biblical worldview, even if such harmonization dispenses with a literal hermeneutic.

Priestly Account

The priestly account is notable for its heavy use of repetitious, liturgical language. One of the refrains, which happens after almost every one of God's creative acts, is that "God saw that it was good." Such an affirmation has been the source of notions of the dignity of creation throughout most environmental theology. It is also the foundational place for any theology of creation — at least at some point, creation was good. The continuing question comes later, when trying to harmonize the Priestly account with the yahwistic account: does the fall of man alter creation's dignity? While early christians may well have affirmed such a stance by following St. Paul, and seeing anything worldly as in opposition to things of the sprit. However, modern reflections have refined the understanding of the fall — while the sins of our forbears may well have done violence to *human* nature, creation's dignity wasn't fundamentally altered. With the previous discussion of the ontology of evil, it is easy to see how — if part of that dignity is the continuing presence of God, then it is difficult to affirm that anything can be completely corrupted, especially the inanimate.

Another major point is that God creates man in "our image and likeness." While legions of theologians have been trying to explicate the very mysterious phrase, it is understood that this sets humans apart from the rest of the created order — only we have been created this way, and there are is also an implication that such a state is superior to other created beings. Accordingly, there is a tendency to see those things which separate us from other "lower" beings as being constituent in what the image and likeness of God is.

Finally, God says to human beings, "... [H]ave dominion over the fish of the sea and over the birds of the air and over every living thing that moves upon the earth." (Genesis 1:28). This passage, which at one point was interpreted to mean that the

created world was created for humanity's exploitation, more modern reflection has replaced the notion of king (the logical antecedent to *dominion*) with the equally biblical notion of *steward*. Humanity is therefore seen not as despots ruling over the created order, but rather as viceroys, in place until the true king — Christ — returns.

Yahwist Account

The Yahwist account is the familiar story of the creation, flourishing, and eventual downfall of the archetypal first humans, Adam and Eve. The fall is the great theological grist of the passage, and arguably most of western theology has been continual examination and reexamination of this passage's connection to the Gospels. However, the salient passage here is *not* the actual fall, but is considerably earlier in the story, in Genesis 2:19. God, having decided that Adam needs a companion, brings all of the animals to the (as yet unnamed) man. What happens next is one of the most extraordinary things in the entire passage. God allows the man to call each beast by a name that the man gives to it.

By any reckoning, this is a seriously important passage to the theological anthropology of the Bible. God voluntarily relinquishes the authority to name *his own creation*, and instead gives that authority to Adam. As usual in Biblical interpretation, there is a deeper dimension to this act. Rather than giving to the man mere autonomy over language (so that Adam would decide what *he* would call the animals; essentially a form of taxonomic nominalism), God instead gives Adam control over what the name the animal will *actually* have. Broader than the mere ceding of divine authority (and, make no mistake, that is an enormous decision), is how this affects the character of Adam, and, by the same theological extension that arrived at the doctrine of original sin, humanity as a whole. In short, it is the beginning of Adam's *ontic* powers.

3.2.3 Reconciling the Floridian and Biblical accounts

God grants human beings authority in both the priestly account and the yahwistic account. In the Priestly account, God says to human beings, "... [H]ave dominion over the fish of the sea and over the birds of the air and over every living thing that moves upon the earth." (Genesis 1:28) The yahwistic account gives the power to name (semantic authority) to Adam, which God voluntarily cedes to humanity. These are also the only authority given to people in either account, so it is not a stretch to assume that the "dominion" over creation given in the priestly account is deeply related to the nominative authority granted in the yahwistic account.

The nominative authority granted to Adam must therefore be deeper than mere language. Reflection on the meaning of the verb "to name" reveals that implicit in semantic authority also includes the ability to categorize, to systematize, to order, and to generalize — in short, to reason. Thus, implicit in Genesis's nominative authority is the gift of reason to human beings, something which must speak to modern readers deeply. This also has deep ethical implications — reasoning, far from being a theologically suspect activity, is, in a very profound sense, a constituent of human flourishing, and therefore commanded by God.

This also dovetails well with the notion of ontic powers that Floridi attributes to human beings. If we are able to affect things at a deeper level than mere linguistic labels by means of reason, then it is perfectly rational to associate our semantic authority with our ontic powers. In fact, this sort of semantic authority can be shown to cohere with each of Floridi's three primary ontic powers of humanity.

Modeling

While modeling is the second of Floridi's three powers, it is easiest to tackle this first. The most important notion one must remember about Floridi is that he is an epistemic constructivist as well as an ethical constructivist. For Floridi, reality-in-itself is a black box; its ultimate secrets fundamentally inaccessible to us. However, using the celebrated method of *levels of abstraction*, we can construct models of reality. While our models are not guaranteed to be true in the sense of corresponding to ultimate reality (thus retaining epistemic fallibilism), our models *can* be built and refined to correspond to observable reality *at a given level of abstraction.* Newtonian physics as a model for reality is quite consistent with reality at a human-scale level of abstraction, but breaks down at the cosmic and the quantum scale. Likewise, special relativity and quantum mechanics are (developing) models of reality at their respective levels of abstraction. Thus, when Floridi grants to humans the ability to model, what he is really granting is an *epistemic* ability. To be able to model is to be able, in whatever sense the word can be applied, to *know.* Therefore, the assertion that humans have a unique ability to model is a restatement of our ability, unique among inforgs, to understand our surroundings.

This epistemic step is the one most intimately connected with our semantic authority, since the ability to use language is what gives us this ability to reason in the first place. Models, in large part, are semantic objects — they are constructed *out of language* — be that language mathematical or prosaic. An authority based in language as a divine gift leads directly to a unique epistemic access to a closer approximation of truth.

This also provides a convenient demarcation line between human beings and other inforgs — artificial and natural alike. While artificial agents can be models themselves

(e.g. a weather forecasting computer model), the kind of privileged epistemic access that allows meaningful information to be gleaned from such a model is reserved to humans alone. As a result, moral responsibility — as Floridi has maintained — remains with humans alone. On the other hand, moral accountability — the ability to produce entropy, and therefore evil — is not contingent on understanding or intention, and can therefore be attributed to artificial agents.

Control

From understanding comes *control*. It's important to differentiate here between two types of control. Obviously, all inforgs have some limited ability to affect their environment; without it, they could not be dynamic organisms — at best, they would be mere passive participants in the world around them. But there remains a difference between the limited control that most inforgs are able to exert over their environment, and the deeper control that humans have, which derives, ultimately, from our semantic authority.

Our models — an ability proper only to human beings — grant us a similarly privileged, albeit limited, ability to control our environment. All living things, for example have the ability to search and hunt for food, but humans have a detailed model of ecology and agriculture, which allows human beings to appropriately alter our environment to grow our own food. Without understanding, the ability to control that inforgs have is severely curtailed. Indeed, much of this control — or, in Biblical language, *dominion* — ultimately derives from our ability to understand our surroundings, and thereby rule it.

Creation

The final power Floridi attributes to human beings is creation. In many ways this element of creation is both the source of his name for humans (*homo poieticus*), but is also more profound than that. Creation is also the final extension of human beings' powers of control. While a sufficiently detailed model of agriculture is enough to tend a small vegetable garden and make it prosper with merely rudimentary tools, modern agriculture is a truly extraordinary effort, which requires very sophisticated, monumental tools. For this, we need machines — other inforgs — whose sole purpose is to accomplish the task we have set out to do in accordance with our model. Thus, our powers of control are most augmented by our ability — unique among inforgs — to spawn separate inforgs to accomplish our goals.

This seems straightforward enough — after all, in order to plow a field, humanity first used crude tools, then used those same tools to fashion better tools, and so on. Sharpened sticks gave way to plows, which in turn gave way to specialized tractors, which can plow extraordinary expanses at once. But this seems to stretch our theological definition — semantic authority may well account for our ability to model, and through those models, control. But from where comes our ability to create?

The answer is, in short, semantic authority *doesn't* guarantee our ability to create. What *does* allow us the ability to create is our creation in the image and likeness of God. God is the first creator, and, as discussed before, existence is, at some minimal level, the continuing presence of God. Therefore it makes sense that semantic authority would *not* enable creation, since it is a theological tautology that only God can make God present in the world.

This does run against some currents in Floridi; indeed, his Homo Poieticus was initially developed as a response to modernism's proclamation of, among other things,

the death of God[6]. This is rather problematic for those who reject the divine obituary. However, it need not be cause for abandoning the project of harmonization. It simply requires a reframing of human capacities. Christians must reject the notion of humans' being a *demiurge* – though Floridi emphasizes the original, Platonic meaning of the word, it is difficult to see how flawed humanity would not ultimately become demiurges more in line with the Gnostic conception. However, the same sentiment — a kind of radical awakening to agency, on a scale not dissimilar to the Enlightenment motto *sapere aude*, can still be taken to heart, albeit with a motto like *concipere aude*. Rather than taking God's place due to a vacancy in the office of Creator, we must awaken to our own radical agency alongside God in bringing about the Kingdom of God.

What it means to be created in the image and likeness of God is an ability to participate, in some way, in the divine life. Given a standard trinitarian description of the Trinity as comprised of Creator, Redeemer, and Sanctifier, participation in the Divine life allows human beings to be co-participants in these three divine activities — creation, redemption, and sanctification. Creation we have explored here; redemption and sanctification we will explore in the next section.

3.3 Cosmopoiesis: The Information Ethics Teleology and Eschatology

Having established a solid ontology of goodness, as well as an anthropology, we can now tackle two separate but intimately related topics: the eschatology and teleology of the information ethics project.

As with the theological anthropology, we must first establish two separate escha-

[6]Luciano Floridi, 'Two Approaches to the Philosophy of Information', *Minds and Machines*, 13 (2003), p. 464.

tologies: Floridi's, and a traditional Christian view, and then seek to harmonize the two.

3.3.1 Information Ethics Eschatology

The information Ethics eschatology primarily deals with entropy. While Floridi has said repeatedly that IE's conception of entropy is *not* the technical definition, the similarities are marked and intentional. In both cases, entropy is "fated to win" — that is to say, all order, and thus all information, will (eventually) be destroyed on a cosmological time scale.

In Floridi's understanding, however, this ultimately pessimistic stance is not, in fact, a cause for nihilism. Rather, our moral agency as sentient inforgs confer upon us a special status. There are two wrong ways for anti-entropic agents to understand Entropy's inevitable victory. They can passively accept the death of the Universe as inevitable and unchangeable fact, and therefore not worthy of effort to ontically change. This might prompt a terrifying sort of Nietzchean nihilism. Conversely, it could also prompting a vain effort to prolong the death of the universe. To quote Dylan Thomas, these agents should

> Do not go gentle into that good night.
> Rage, rage against the dying of the light.

For Floridi, both approaches are wrong. The proper way is to help to facilitate this death in the most gracious way possible. Ethics, then, is a sort of *ars moriendi* for the universe — comparable to Jeremy Taylor's famous *Holy Dying*. Since failure is inevitable, the important thing is *graceful* failure of the universe. In this sense, the anti-entropic agent isn't trying to remove *all* entropy from the infosphere, since that, writ large, is impossible. Rather, the anti-entropic agent's goal is to target her (limited)

ontic powers to ensure that the failure of some inforgs does not catastrophically impact others.

3.3.2 Christian Eschatology

Like the previous discussion of Christian anthropology, it is difficult to come to any sort of concrete points of agreement within a movement as diverse, and as old, as Christianity. eschatology, however, is uniquely difficult to generalize; while everyone agrees that anthropology is a critical topic, because of its direct effects upon the most critical subject of all in Christian Theology — soteriology. However, the relative importance of eschatology, especially *cosmic* eschatology as opposed to *personal* eschatology, is a matter of debate.

The concerns about eschatology, if not the systematization thereof, was clearly very important to the early church, which, following St. Paul, expected the second coming in the imminent future. Sts. Peter and Paul both fully expected to see Christ's return within their own lifetimes, and some of their admonitions (especially Paul's), reflect that fact. Indeed, it's not difficult to see how a simple reading of the gospel would give a great deal of credence to that reading.

However, as time went on, it became clear that the parousia was not quite as imminent as early Christians believed. Indeed, much of the interest in the Cosmic eschatology was shaped by intense persecution, and a desperate desire to see divine retribution for a litany of heinous crimes. As Christianity went from being outlawed to officially sanctioned with Constantine's conversion in 312, and from sanctioned to established with the edict of Thessalonica in 380, Christianity underwent a radical change.

As Christendom became the official religion of the Roman empire, injustices did

not cease, but the people committing them did. Thus, Christian longing for a great righting of wrongs changed from wanting God to judge a whole city or nation of oppressors (i.e. Pagan Rome) to wanting God to judge *individual* oppressors (i.e. a cruel magistrate, etc.); As a result, emphasis shifted away from a *cosmic* eschatology — the great final judgement, where Christians as an oppressed minority would be vindicated — to a personal judgement — where believers would be vindicated as part of a victorious collective; the *church militant*.

This split in emphasis persists into the modern day, where two separate groups of Christians have two very different views on the importance of cosmic eschatology — Evangelicals, broadly, tend to see the cosmic apocalypse as a very important topic for reflection, going into great detail about theories like "the rapture," and even going so far as to explore that theme in a series of popular novels.[7] Mainline Protestants and Catholics, on the other hand, tend to focus on *individual* questions of salvation; and see the interpretation of apocalyptic prophecy as a difficult business, and not one terribly relevant to the life of the church.

Thus, since consensus is difficult to find, the only real concrete point of agreement in cosmic eschatology seems to be the anticipation, however distant, of a concrete, temporal end of history. Indeed, parts of the Synoptic gospels (c.f. Matthew 24:43-44; 25:1-13) seem to indicate this, as well as St. Paul's writings (I Thessalonians 4:13-18) seem to indicate that, at some point in the hazy, indistinct future, there will be a second coming, and a specific time at which history will end.

[7] c.f. Tim LaHaye and Jerry B. Jenkins, *Left Behind: A Novel of the Earth's Last Days*, 1st edition. (Tyndale House, 1996)

3.3.3 Harmonizing Information Ethics and Christian Eschatology

Coming to a harmony between these two points of view is difficult, since philosophical reasoning about the end of history is necessarily speculative, and prophecy interpretation is difficult to do even in retrospect, let alone in prospect. Thus, it's difficult to say *anything* with certainty about the ultimate fate of the universe.

However, such definitive statements are not what is required in order to be a Christian information ethicist. Rather, it is only sufficient to show that the two views do not contradict one another, and that it is therefore possible to affirm both at the same time. The best way to do this is to show how the Christian view can be compatible with the information ethics view.

Although it is easy enough to conclude from the Parable of the Virgins (Matthew 25:1-13), and, especially, the Parable of the Thief (Matthew 24:43-44), that Christians are to expect an unexpected parousia, one major verse within Matthew's apocalyptic discourse seems to contradict that view: "Heaven and earth shall pass away, but my words shall not pass away." (Matthew 24:35)

In the context of the apocalyptic discourse, it serves as a highlight to the major emphasis of the passage — that the second coming's arrival *cannot* be predicted; the Matthean Jesus even goes so far as to say that no man knows the time of the parousia, and implies that even *he* doesn't know the time of the arrival (Matthew 24:36). By indicating that heaven and earth — here taken to mean the whole of creation — will pass away, Matthew's author seems to allow that the parousia may well be delayed until the end of time as we understand it.

So, if we permit that the delay of the parousia may well arrive at the triumph of entropy, how does this affect the ethical life of the Christian? Can the notion of

palliative care for the universe developed by Floridi be reframed in Christian terms? And whence the Resurrection?

Both of these concepts can be explained with reference to the anthropology developed in the previous section. As beings created in the image and likeness of God, we are imperfect co-participants in the divine life. We have already shown how we are co-participants in the divine life of the Creator; the important question now is how we are co-participants in the divine life of the Redeemer and the Sanctifier.

In order to be able to adequately argue that we can be co-participants in this way, it is better to understand, informationally, what we mean by these terms. Redemption is fundamentally concerned with the idea that, in the primeval disobedience, humanity lost its connection with the divine (as described in the Yahwistic creation story above). While in the past, the primeval disobedience had been blamed for introducing evil writ-large into the cosmos, more recent reflection along with the environmental movement has reaffirmed the dignity of creation, and has therefore limited most of the spiritual violence associated with the primeval disobedience has been primarily confined to humanity. Redemption, then, is the divine process of restoring what was lost as a result of the primeval disobedience. Our participation in the divine life of the Redeemer (the second person of the trinity) amounts to the role of our free will in our own salvation — a topic which has been far more extensively covered by far more eloquent theologians.

The life of the Sanctifier, on the other hand, is much more interesting from an informational point of view. Sanctification, unlike redemption, applies to all inforgs, rather than just humanity. Sanctification — the process of becoming more holy — is a process of becoming closer to God. Since we have already identified that at least part of that participation is the literal presence of God in the world as expressed through inforgs' structured existence, this leads to the synergy between the Information Ethics

approach and the theological approach — that our participation in sanctification is the removal of entropy and the expansion of structured existence and, therefore, divine presence.

This provides a theological grounding to Floridi's four laws, provided that Sanctification, or at least our own participation in such, is regarded as an imperative. Such an imperative can be grounded in, and is at least part of, the true meaning of the evangelical imperative that the Gospel imposes upon the faithful. However, the true depth of such a conviction is broader than it may appear at first blush. Floridi's ontocenric ethic has much to teach a tradition which has traditionally framed its questions in anthropocentric terms. However, Floridi's work also exploded the proper scope of ethical action. Far from merely trying to shape ourselves, our family, our society, or even our planet, the proper locus of ethical concern is the *infosphere*, or, in theological terms, the entirety of creation.

This is the real extraordinary leap that Floridi's ethics can teach us. The explicit refocusing of ethical concern to include the whole of the created order is almost unprecedented, and Floridi is certainly the first to develop a philosophy which has made such case explicit. The best distillation is from the late Romanian Orthodox priest Ion Bria: "The *cosmos* is becoming *ecclesia*"[8].

Such a formulation encapsulates the essence of Floridi's project — the proper understanding of ethics is not merely the proper formation of the self, or society, or even biosphere. Since ethics should be ontocentric, the proper understanding of ethics is the proper formation *of the created order itself*. Such a notion gives rise to its own term — not egopoiesis, or biopoiesis, but *cosmopoiesis*.

[8]Emphasis in original; Stanley S. Harakas, *Toward Transfigured Life: The Theoria of Eastern Orthodox Ethics*, (Light & Life Publishing Company, 1983), p. 31

Chapter 4

Mercy and Justice in Robot Ethics: A Christian Approach

> Power without love is reckless and abusive, and love without power is sentimental and anemic. Power at its best is love implementing the demands of justice, and justice at its best is power correcting everything that stands against love.
>
> — Dr. Martin Luther King, Jr.
> *Where Do We Go From Here: Chaos or Community?*

4.1 Introduction

We are entering a new age of warfare. While the ages of the archer, the knight, the cannon, the bomber, and the nuclear warhead have each in turn presented themselves to humanity, we are entering the age of a new type of weapon: the robot.

Robots have been a staple of science fiction since at least the 1920s, when Karel Čapek coined the term in his play *R.U.R. (Rossum's Universal Robots)*, but the idea of an artificial human being goes back at least as far as they myth of Talos ($\tau\acute{\alpha}\lambda\omega\varsigma$), the man of bronze who guarded the island of Crete from the argonauts.

Despite dreams that such artificial warriors or mechanical marines might actually supplant traditional armed forces, this reality is only now coming to fruition. The reasons for this delay are manifold — the difficulty of making delicate computer systems sufficiently rugged to exist within the harsh environments of the battlefield, the difficulty of certain computer problems, and the expense, until recently, of processors capable of handling such problems in a reasonable amount of time. However, at the dawn of the 21st Century, the barriers to robots on the battlefield finally appear to be coming down.

The Christian community has had a long history of influential reflection on war and peace. Indeed, even avowedly secular philosophers cite church fathers like Augustine when trying to comment on contemporary developments at the Pentagon. More recently, the United States Conference of Catholic Bishops, at the height of the cold war, released the pastoral letter "The Challenge of Peace[1]," dealing with the horror of the nuclear arms race — an example of political religion which helped to turn public opinion, broadly speaking, against unbridled accretion of nuclear arms.

This paper will attempt to bring a Christian perspective to troubling ethical

[1]United States Conference of Catholic Bishops (as in n. 5).

questions raised by the use of robotic warfare. In particular, we will consider the following major questions and sub-questions in turn:

1. Are Semi-Autonomous robots ethical to deploy on the battlefield?
   (a) If so, how can they be ethically deployed?
2. Are Autonomous robots ethical to deploy on the battlefield?
   (a) If so, what architectural constraints should be placed upon their design to ensure an ethical robot?

4.2 Christian Foundations

Before going too deeply into the topic at hand, it is necessary to clarify a few things from the beginning.

First, the Christian tradition, like any tradition that spans millennia, does not speak with one voice on matters of peace and war. Indeed, there are three distinct Christian perspectives on war and peace[2], each of which draws on a separate part of the tradition:

1. Holy War, or Christian Triumphalism
2. Christian Pacifism
3. Just, or *Limited* War

4.2.1 Holy War

Some voices in the Christian tradition have seen it as endorsing violence in certain situations. Drawing on Old Testament sources which portray Yhwh as a mighty warrior, as well as apocalyptic literature on the New Testament[3], some Christians view

[2]James A. Reimer, *Christians and War: A Brief History of the Church's Teachings and Practices*, (Fortress Press, 2010).

[3]Ibid., pp. 17-19, 36-39.

war as a positive thing, embodying the struggle of righteousness against corruption. Historically, this line of thinking reached its apogee in the Crusades — a series of theopolitical wars launched by Christian europeans in the 11^{th}, 12^{th}, and 13^{th} century against the Muslim inhabitants of present-day Israel/Palestine.

However, growing modern consciousness about the horrors of war — especially in the aftermath of the first and second world wars, and the enormous casualties that resulted — have qualitatively changed the religious and political discourse surrounding war, especially in the United States, the world's sole remaining superpower[4]. In modern America, this kind of Christian triumphalism is usually limited to conservative Evangelical protestants. In the face of the extended conflicts in Iraq and Afghanistan, even evangelical thought may well be shifting. The extreme limitations of this view, then, prevent it from being the basis upon which this paper can be based.

4.2.2 Christian Pacifism

Diametrically opposed to Holy War is the viewpoint of Christian pacifism. These Christians take Jesus's admonition to turn the other cheek[5] quite literally, and argue that it is morally indefensible to pursue violence of any kind – whether offensive or defensive, retaliatory or peremptory.

Like the crusader point of view, this view has traditionally been held by a minority of Christians throughout history, most recently by the Mennonites, Quakers, and other anabaptist groups. Indeed, many of these smaller groups oppose extensive involvement between Christians and the wider society, adopting the model of what H. Richard Niebuhr called "Christ against culture," and tend to regard violence as the inevitable result of attempting to mix the fundamentally incompatible demands of Christianity

[4]Lisa Sowle Cahill, *Love Your Enemies: Discipleship, Pacifism, and Just War Theory*, (Augsburg Fortress, 1994), p. 1-14.

[5]c.f. Matt. 5:39

and government.

Unlike the triumphalist position, which has largely fallen out of favor in the wake of WWI and WWII, Christian pacificism's voice has only gotten stronger. While still a minority position, the arguments of Christian pacifism have convinced notable ethicists like Lisa Sowle Cahill that the only two defensible stances of Christians and war are pacifism or a limited war view. Even the Roman Catholic Church, the birthplace and bastion of the just war view, have voiced respect for the strength of Christian pacifist's convictions.[6]

However, to adopt this view is ultimately to abdicate pastoral responsibility for guidance on the use of force. In some cases, this can be justified — the United States Conference of Catholic Bishops, in their letter *The Challenge of Peace*[7] famously adopted what is essentially a pacifist stance on the use of nuclear weapons, declaring that nuclear weapons so grossly violate the principle of proportionality inherent in just war theory that they could not be used justly, and they therefore declined to give guidance on their appropriate deployment; instead arguing only for an absolute prohibition on their use and for gradual worldwide nuclear disarmament.

The salient question regarding robotic ethics, then, is whether the use of robots poses such a grave threat that pacifism is the only ethical alternative. This is a contested question, and serious voices, including Peter Asaro, Noel Sharkey, and Robert Sparrow[8] have argued that there are such issues.

[6]United States Conference of Catholic Bishops (as in n. 5), ¶119, p. 37.

[7]Ibid., ¶142-177, pp. 44-56.

[8]Asaro; Noel Sharkey, 'Cassandra or False Prophet of Doom: AI Robots and War', *Intelligent Systems*, 23 (2008):4; Robert Sparrow, 'Killer Robots', *Journal of Applied Philosophy*, 24 (2007):1 ⟨URL: `http://www.sevenhorizons.org/docs/SparrowKillerRobots.pdf`⟩.

4.2.3 Just, or *Limited* War

The final position, and the one which has the widest acceptance, is the notion of *just* or *limited* war. Fundamentally, the Just War theorist argues that, at least in certain situations, war is ultimately the lesser of two evils. While the just war theorist does not *celebrate* war in the manner of the triumphalist, and views violence as at least *prima facie* morally unacceptable, but perhaps necessary by the principle of *minus malum*.

Furthermore, just war theory prescribes certain constraints on warfare in order to circumscribe its destructiveness (hence, the *limited* war sobriquet). Modern just war theory has three major branches:

Jus Ad Bellum — Proper conduct in the declaration of war

Jus In Bello — Proper prosecution of war itself

Jus Post Bellum — Proper conclusion of war and reestablishment of peace

While the ethics of robots touch all three options, this paper will focus on *Jus In Bello* concerns. Within *Jus in Bello*, there are three major criteria according to traditional theory[9], with the recent addition of a fourth[10]:

1. Commensurability of Means to Ends
2. Proportionality of Means to Ends
3. An Absolute Prohibition of targeting Noncombatants
4. Respect for International Law

Overall, this principle is an attempt to balance justice — the defense of the weak, and a respect for, and pursuit of, the common good — with the demands of mercy,

[9]St. Thomas Aquinas; Kevin Knight, editor, *Summa Theologica*, trans. by Fathers of the English Dominican Province Second and Revised edition. (1920) ⟨URL: `newadvent.org/summa/`⟩, Secunda Secunda Partis, 40, 1.

[10]Reimer (as in n. 2), p. 74.

which far beyond mere clemency, is the responsible use of power by those who have it. Thus, just war is always a delicate balance — an attempt to always choose the lesser evil, and balance justice and mercy.

The question before us, then, is which stance to take: *pacifism, or just war?*. Two major guides are instructive. First, robotization appears to be inevitable, and so to adopt a pacifistic stance toward robotic warfare is, to quote William F. Buckley, "standing athwart history yelling '*Stop!*"' This is not necessarily a bad thing — the US bishops famously could find no adequate justification for the use, or even the threat to use nuclear weapons[11], and therefore tolerated them as a deterrent only under duress, and advocated drawdown and eventual disarmament. With the collapse of the Soviet Union, the sole justification for the United States' extensive nuclear stockpile has collapsed along with it, and the bishops now advocate nuclear drawdown.

However, robotic warfare does not appear to present the same sorts of challenges that nuclear weapons do. The bishops' principal objection to nuclear weapons was how seemingly disproportionate they were, as well as their indiscriminate nature, both of the weapon itself as well as the inevitable fallout. However misguided the attempt to build a mechanical marine may be, it does not appear, *prima facie* to present the same sort of risk of indiscriminate destruction that characterizes nuclear weapons.

With this in mind, to adopt a pacifist stance and declare these weapons *verboten* appears to be somewhat misguided, as well as an abdication of pastoral duty. The drive for mechanization does not happen in a vacuum, and while these weapons present ethical challenges, they also improve upon earlier weapons — something we will examine later in the paper. For the moment, then, this paper will assume a just war stance for pragmatic, pastoral reasons.

[11] United States Conference of Catholic Bishops (as in n. 5), p. 44-56.

4.3 The Problem

Why mechanize the army at all? Why spend billions of dollars in order to build machines which do the jobs of regular soldiers? One reason among many, but the one most often cited by proponents of mechanization, is that *Jus in Bello* is difficult, and seemingly getting harder.

In 2006 and 2008, the US Surgeon General's office commissioned two major reports from the Mental Health Advisory Team on the mental health of soldiers in Iraq during the years 2005-2007[12] and 2006-2008[13], respectively. For the first time in a conflict since WWII, the team examined unethical behavior in Soldiers and Marines, and the results were disturbing.

As is evident from the figures, the attitude of soldiers and marines toward non-combatants (Iraqi civilians) as well as their behavior speaks volumes about how even the most well-trained military in the world has difficulty prosecuting war ethically.

It is in the face of this situation — the fact that even a highly-trained, professional military has difficulty conducting war ethically, that the advocates of robotic war step to the forefront. They claim that passionless robots, not animated by the dreadful human impulses toward revenge or bloodlust would allow war to become more surgical, more precise, and, hence, more ethical[14][15].

The question this chapter will scrutinize, then, is the claim that robots can, in some circumstances, act more morally than humans, or at least allow humans to act

[12]Office of the Surgeon Multi-National Force-Iraq and Office of the Surgeon General, United States Army Medical Command, *Mental Health Advisory Team (MHAT) IV: Operation Iraqi Freedom 05-07*, (United States Army, November 2006) – Technical report.

[13]Idem, *Mental Health Advisory Team (MHAT) V: Operation Iraqi Freedom 06-08*, (United States Army, February 2008) – Technical report.

[14]Ronald C. Arkin, *Governing Lethal Behavior in Autonomous Robots*, (Chapman & Hall, 2009), p. 29-36.

[15]John P. Sullins, 'RoboWarfare: can robots be more ethical than humans on the battlefield?' *Ethics and Information Technology*, 12 (2010):3 ⟨URL: `http://goo.gl/aMOcj`⟩.

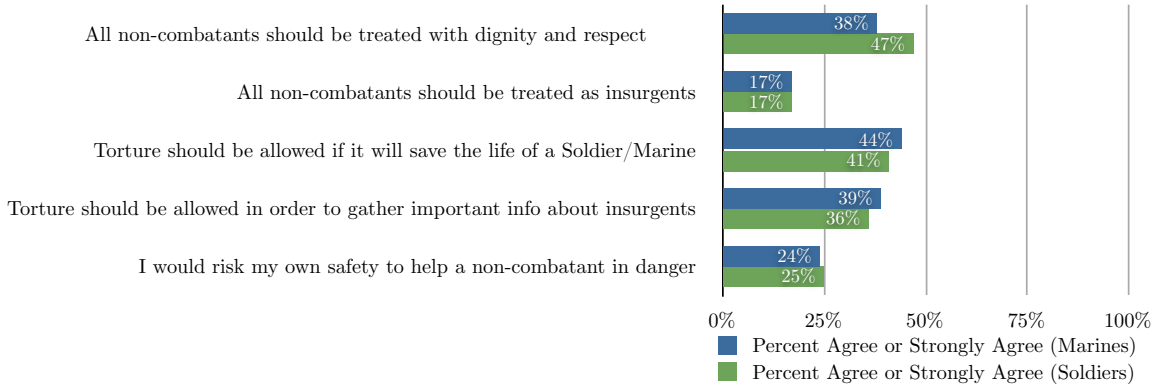

Figure 4.1: Soldier and Marine attitudes towards the treatment of insurgents and non-combatants (MHAT IV)

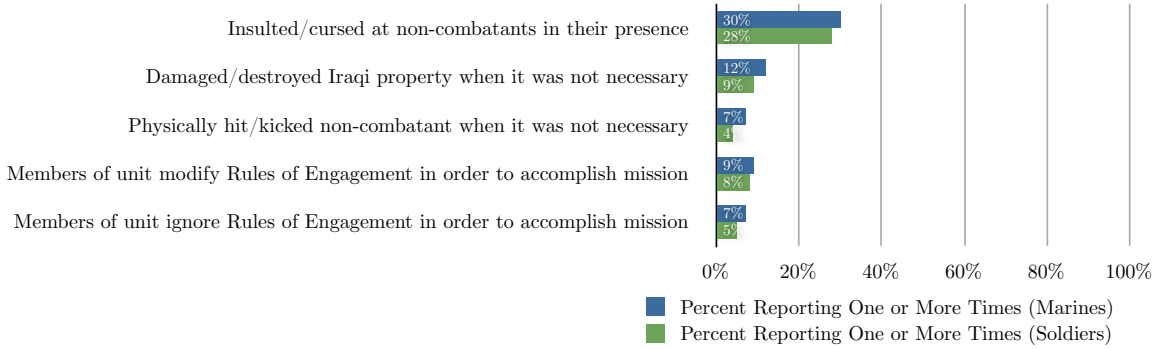

Figure 4.2: Soldier and Marine battlefield ethical behaviors. (MHAT IV)

more morally in war than they do at present.

4.4 Autonomous vs. Semi-Autonomous Robots

There is a major division in wartime robotics — *semi-autonomous* robots, and *autonomous* robots. It is important to be clear about what we mean by the word *autonomous* in this context. While it normally refers to a moral agent, in this context, it refers to a robot's ability (or lack-thereof) to perform actions apart from a human's direct intervention.

As Sparrow[16] helpfully points out, Autonomy is not a trinary condition (not autonomous, semi-autonomous, autonomous), but is rather a spectrum; a robot can be said to be *more autonomous* than another robot by comparing the length of time it can function without human intervention.

For the purposes of this work, I define the terms as follows:

Semi-Autonomous Robot: A semi-autonomous robot is one which requires a human tele-operator, but can take simple directions without direct human intervention. An example is the infamous *Predator* drone currently in use in Pakistan — while it needs a human to activate its weapons manually, it is capable of flying according to a set of GPS coordinates without human intervention. This ability allows a single pilot to be able to man several drones at once; giving the pilot the ability to survey many different areas and, if necessary, conduct several air strikes in quick succession.

Autonomous Robot: An autonomous robot is one which is designed to operate away from a human operator for a matter of hours, and be empowered to

[16]Robert Sparrow, 'Building a Better WarBot: Ethical Issues in the Design of Unmanned Systems for Military Applications', *Science and Engineering Ethics*, 15 (2009):2.

make kill-decisions on its own. No such robot currently exists in a battlefield environment; however they are acknowledged to be in active development.

4.5 Ethical Issues in Semi-Autonomous Robots

Not all Semi-Autonomous robots are ethically controversial; robots used for bomb-disposal, for example, appear to be utterly uncontroversial, and perhaps even morally superior to putting humans needlessly at risk.

Most of the ethical issues raised in Semi-Autonomous robots focus on their ability to take direction from a pilot who can be extraordinarily distant — most of the drone strikes currently being conducted in Pakistan are being piloted from Creech Air Force Base outside Las Vegas, Nevada; a distance of about 7,750 miles from their intended target.

On the one hand, proponents[17] argue that a semi-autonomous robot's controller would be unaffected by human urges of anger, revenge, or bloodlust. Opponents are frightened by the same emotional disconnect[18], arguing that this disconnect could produce an airman numb to the horrors of war. Ethical questions, then, turn on questions of virtue and character.

It is clear from the MHAT data that extended deployments do violence to soldiers' character. Longer deployments and combat experience correlated positively both to mental illness and to unethical behaviors[19]. Furthermore, an insurgency necessarily instills in soldiers a sort of paranoia that anyone they see could be working among

[17] Arkin, *Governing Lethal Behavior in Autonomous Robots* (as in n. 14).

[18] James Detert, Linda Klebe Trevino and Vicki Sweitzer, 'Moral Disengagement in Ethical Decision Making: A Study of Antecendents and Outcomes', *Journal of Applied Psychology*, 93 (2008):2; Lambèr Royakkers and Rinie van Est, 'The Cubicle Warrior: the Marionette of Digitalized Warfare', *Ethics and Information Technology*, 12 (2010):3 ⟨URL: `http://goo.gl/ZuByu`⟩.

[19] Office of the Surgeon Multi-National Force-Iraq and Office of the Surgeon General, United States Army Medical Command, 'Mental Health Advisory Team (MHAT) IV: Operation Iraqi Freedom 05-07' (as in n. 12), p. 38-42.

the enemy. It is debatable, and beyond the scope of this paper, whether military training *itself* does violence to soldiers' character, but the report leaves little doubt that soldiers' moral fiber is endangered by extended deployments.

Unfortunately, little hard data exists on the effects of tele-war on pilots' character. The only literature with even marginal relevance are studies of video-gamers, and the studies themselves are often produced by Evangelical groups with a preexisting bias against that particular medium. However, while solid data is sparse, anecdotal evidence abounds about the dehumanization of other players in online environments like *X-Box Live*[20]. The fear that warfare could look more like a *Halo* tournament than an armed conflict is a terrifying thought, indeed.

The measure, according to the Christian, of any human being is the person of Christ. Jesus is the fullest, most true human who ever lived, and Christian anthropology consists of examining Christ and finding ways of imitating Christ. The most salient feature of Christ for this discussion is the paschal sacrifice — Christ's self-sacrifice for the redemption of humanity.

It is clear that all Christians are called toward the imitation of Christ's sacrifice, but few are called to quite as literal a sacrifice as the soldier. It is telling, and distressing, that less than a quarter of soldiers and marines understand that they should be willing to put their lives on the line in defense of the innocent — be they American or Iraqi.

From this viewpoint, It is quite conceivable that by placing soldiers out of danger, you enable them to sacrifice themselves more readily, since they are not facing death itself. If the sacrifice is not the final sacrifice, it is doubtless easier to make. Indeed, the sort of practice in sacrificing oneself could conceivably make airmen *more* likely to be able to make the final sacrifice should it be necessary.

However, the emotional and epistemological distancing that results from teleoper-

[20]Chipman.

ated warfare can make the airman less connected to the reality of battle; numb to the intense suffering the airman is causing. Indeed, this may be called the *Quake effect*[21]; when one's enemies are merely marks on a screen, it becomes easier to be cruel to them.

On balance; it seems that tele-operated warfare may actually be morally salutary — the smaller footprint of a drone, combined with the sacrificial nature of the work, if necessary, objectively lessens casualties on the prosecutorial side. However, great care, it appears, must be taken to ensure that Airmen are acutely aware at all times of the gravity of their actions, and are reminded that *they are not playing a videogame.*

4.6 Ethical Issues in Autonomous Robots

Ethical issues in Autonomous Robots are considerably more complex. Part of this complexity derives from the fact that an autonomous robot is still hypothetical at the moment, although such a robot appears to be coming closer and closer to reality with each passing month. Most of the current controversy involves system architecture — how does one construct an ethical robot? How should one build a robot to make ethical decisions?

Before proceeding, it is important to establish one key point. There has been some controversy over the ethical status of robots themselves — are they moral agents? Mere instruments? Some hybrid of both? The questions are fascinating, and Floridi and Sanders' seminal paper on the subject[22] has been the subject of intense speculation, research, and criticism. However, as interesting as these questions are, and as intriguing as this premise is, it remains a minority view. Thus, this paper will

[21] A neologism coined by me; the name is taken from a classic first-person shooter videogame

[22] Luciano Floridi and J.W. Sanders, 'On the Morality of Artificial Agents', *Minds and Machine*, 14 (2004):3 ⟨URL: `http://goo.gl/fhwOZ`⟩.

assume the current majority view — that robots are to be viewed as instruments in the classical sense, albeit ones which can function automatically and, in the limited sense given in section 4.4, are autonomous.

4.6.1 Embedded Values

Not all instruments are created equal. Voices as disparate as the philosopher Deborah Johnson[23], and the famous Protestant moralist Oliver O'Donovan[24] agree that different instruments can have different moral values. Instruments are normally evaluated based upon what moral agents do with those instruments — an axe could be an implement to chop firewood, or an implement in a grisly murder, à la Lizzie Borden. However, certain instruments, by virtue of their design, take on a moral character. An army rifle is not the same weapon as a sawed-off shotgun with its serial number filed away — the former is more likely to be a morally neutral weapon of war, while the second one has been imbued with certain, terrible values of murder.

The question, then, is *what values are we imputing to our technology when we design it?* Are our robotic weapons more like a standard army rifle or more like the weapon of a criminal? I propose that there are two types of values we can be imputing to our technology:

Direct — those we are consciously imparting to our technology

Indirect — those we are not consciously imparting to our technology

[23]Deborah G. Johnson, 'Computer Systems: Moral Entities but Not Moral Agents', *Ethics and Information Technology* 8 (2006):4.

[24]Oliver O'Donovan, *The Just War Revisited*, (Cambridge University Press, 2003), p. 78-94.

Within the constraints of robot ethics, this dichotomy becomes:

Direct — How are we instructing the robot to make ethical decisions?

Indirect — How do the integral systems of the robot prejudice its ethical decisions?

Each of these two sets of embedded values is worthy of its own ethical reflection.

4.6.2 Indirect Values

The indirect values are, paradoxically, somewhat easier to tackle. Kraemer et al[25] have argued persuasively that seemingly inconsequential technical decisions can have a substantial moral impact. In particular, they focus on the technical decisions involved in an MRI machine's programming — how an unavoidable decision between favoring false negatives and false positives has substantial moral impact. It is trivial to suspect that the same sorts of decisions involved in subroutines of an autonomous robot — everything from identifying targets with the vision system, to aiming the weapon, to deciding whether to fire at all, can be prejudiced by a programmer's decision. While such decisions obviously need to be balanced by technical realities, it is worth examining the moral impact of such prejudice.

The two major premises we have identified earlier as our major guiding principles are justice and mercy; there is a natural tension between them. Justice is the principle which stands against sinfulness, and opposes structures which work against the common good. Mercy, however, is the principle which governs the responsible use of power, and encourages restraint against the abuses inherent in power. In a paradoxical way, the tension between justice and mercy is itself a mirror of the difficult decision of prejudice. Since the two principles are in tension, one must ultimately prejudice one

[25]Felicitas Kraemer, Kees van Overveld and Martin Peterson, 'Is there an ethics of algorithms?' *Ethics and Information Technology*, (2010) ⟨URL: `http://dx.doi.org/10.1007/s10676-010-9233-7`⟩, ISSN 1388–1957.

over the other. The ethical question becomes, then, which principle do we prejudice? I argue that we should prejudice mercy over justice.

The reason we should prejudice mercy over justice is that justice presupposes *knowledge* — the criminal justice system has an elaborate process for determining truth (a trial), which when applied to law results (hopefully) in justice. However, in programming an autonomous robot for a battlefield environment, we know *a priori* that it impossible to program a robot for all possible contingencies. Thus, in the interest of epistemological humility, we must concede that there will be situations which robots will encounter which are entirely unanticipated by the programmers. While one would hope that the robot would still function as desired in such a situation, it is inevitable that the robot will err. Since we know it will err, we should have it err on the side of the principle which does not presuppose the knowledge which we lack — mercy.

By electing to prejudice mercy in the design of a robot, we are electing to say that, where a robot is in doubt, it should err on the side *against* the use of deadly force. Without such a caveat, we could potentially violate the core reason which justified the use of robots in the first place: the greater ability of a robot to be a discriminate weapon of war.

4.6.3 Direct Values

The major controversy regarding the programming of an artificial conscience come from two separate reports detailing two different approaches to the same problem. Lin, et al. ,[26] in a report for the Office of Naval Research, advocate a virtue-ethics based approach to the problem, which focuses on machine learning techniques. In essence,

[26]Patrick Lin, George Bekey and Keith Abney, *Autonomous Military Robotics: Risk, Ethics, and Design*, (Office of Naval Research, 2008) – Technical report.

Lin, et al. see the aforementioned problem of robotic ethics as almost insurmountable. They argue that it is both unreasonable and impossible for programmers to anticipate every situation that a robot may encounter. Rather than attempting to fight the problem, however, Lin et al. embrace a machine-learning approach, wherein they attempt to allow the robot to develop its own internal ethical rules in response to training.

In a separate report for the Army Research Office[27], which was later developed into a monograph[28], Ronald Arkin argues for a more classical model of robotic governance. He details an *ethical governor* subroutine which is based on a fundamentally deontological ethical model, based upon the laws of war and the rules of engagement for a particular conflict. Unlike Lin et al., who produced a white paper arguing for a broad direction of future research, Arkin backs his report with a painstaking technical description of how such a governor could be built. While a technical critique of Arkin's implementation of his principle is beyond the scope of this paper, the salient question is which of the two approaches to favor.

In short, I favor Arkin's approach over Lin et al.'s, but in order to justify my opposition, we will need a brief diversion on the nature of machine learning. The following is a very compressed, and therefore obviously distorted, description of machine learning. Readers interested in a much more comprehensive description are encouraged to consult Alpaydin's excellent and very accessible monograph on the subject[29].

[27]Ronald C. Arkin, *Governing Lethal Behavior: Embedding Ethics in a Hybrid Deliberative/Reactive Robot Architecture*, (U.S. Army Research Office, 2007) – Technical report.

[28]Idem, *Governing Lethal Behavior in Autonomous Robots* (as in n. 14).

[29]E. Alpaydin, *Introduction to Machine Learning*, (MIT Press, 2010), Adaptive Computation and Machine Learning ⟨URL: `http://books.google.com/books?id=_i2WPwAACAAJ`⟩, ISBN 9780262012430.

Brief Intro to Machine Learning

There are many problems in computer science that are difficult to solve. What makes them difficult to solve, however, can vary considerably.

Some problems are difficult to solve because they are difficult to describe mathematically; when one claims that one wants to build a computer program which can "read" a newspaper, what does that really mean? Is it an attempt to take a scanned image and return out ASCII text? Is it an attempt to process the text and be able to perform statistical analysis on interesting words in the text? Or is it an attempt to tag words within a given text sample with meaningful metadata? The ambiguity in the description of the problem limits the potential of a good solution; the more precisely a problem can be described, the better the solution.

Some problems are difficult to solve because they no *good* algorithm exists to solve it. Consider the famous *traveling salesman problem*: given a list of cities (say, the capitals of Europe), and a list of distances between any two of them, what is the shortest route that visits all of the capitals of Europe once, without repeating a capital? This is an extensively studied problem, and is part of a class of problems called *NP-Complete*[30] problems. The only known algorithms which will *guarantee* the shortest possible route require a number of calculations which grows exponentially with the number of cities. With a sufficiently large list of cities, even the fastest computer on earth could not return a solution within the expected lifetime of the universe.

Some problems, however, are hard in a different way. Unlike the previous set where algorithms do exist, albeit lousy ones, to solve a given problem, there are some cases where no algorithm exists to adequately solve a given problem. For example,

[30]This classification is one of several in the larger field of *complexity theory*.

Figure 4.3: What is the shortest route which travels to all of the capitals once, and does not repeat a capital? *Map of Europe with Capitals*, courtesy `mapsof.net`

translating passages from one language to another is a very difficult process. A direct dictionary-to-dictionary translation is a bad solution (as anyone who has used Google Translate knows), but difficulties in translation often come from different languages' requirements for semantic information. English, for example, requires the gender of a linguistic subject to be identified (*he* did vs. *she* did), but Hebrew, on the other hand, has no such requirement. The reason that such translation is possible is that the correct translation must be inferred from *context*, but it is very difficult (and sometimes impossible) to encode subroutines for context.

Machine learning is an attempt to make a context-sensitive machine, by allowing the program itself to "learn" by observing a set of training data. The idea behind machine learning is that, rather than provide an explicit algorithm for solving a problem, the machine can develop its own algorithm to solve a given problem. For an adequate example of how machine learning techniques work, let us examine the

problem of classifying nouns in an piece of English prose[31]. Some are easily resolved by resorting to a dictionary (*Omaha*, for example, can generally only refer to a place), but others are not quite as simple. The word *apple* can refer to a number of different things — to the computer company, to the literal fruit, the surname of a popular singer-songwriter (Ms. Fiona Apple), or as part of a poetic sobriquet for New York City (the *big apple*). In order to allow a computer to differentiate which of the types of nouns a given one is, we have to make it sensitive to context. In order to do that, we follow a four-step algorithm.

First, one makes an attempt at listing as many different linguistic observations as possible. This is crucial, since the strength of the algorithm can depend on how many independent observations we have. Linguistic observations can be things like:

- Is the noun capitalized?
- Is the noun followed by a prefix? (e.g. Mr. or Dr.)
- Does the noun begin a sentence?, etc.

After making as many separate observations as possible, one then decides on a technique to allow the computer to assign weights to each of the different observations (different models can be used in different contexts; examples include a *hidden Markov model* (HMM), *support vector machine* (SVM), or an *artificial neural network* (ANN). Each of these models assigns weight to the series of linguistic observations in a probabilistic sense — if the model is fed training data where every proper noun is capitalized, then capitalization will have significant weight in determining whether or not a given noun is proper.

After selecting a model, one subsequently exposes the model to training data — in this case, a set of English prose pieces where the nouns have been properly categorized.

[31] part of a field called Natural Language Processing (NLP)

This allows the model to calibrate the probabilistic weights of each of the separate linguistic observations. After sufficient exposure to training data, the model is then ready to tackle volumes of prose.

There are significant benefits to this approach. It allows a machine which can achieve good results, and can categorize *massive* amounts of material; far more than any human could read. However, there are some drawbacks. First of all, this approach is *probabilistic* — it is a best guess, based on past experience. This means that, while machine learning algorithms can succeed very often with very high chances of success, these models can, and do, fail. Furthermore, because the models are probabilistic, these models fail *unpredictably*, and when they fail, they tend to fail *badly*. A highly visible example is the success of IBM's *Watson*[32] system, which, while winning handily against two previous *Jeopardy!* champions, failed rather spectacularly on the final question; the system answered *Toronto* to a question whose category was *US Cities*. Furthermore, these models are *uninterrogable*; the model itself consists purely of a series of probabilistic weights. It is therefore exceedingly difficult to audit and modify.

4.7 Critique of Machine-Learning in Autonomous Robots

Having now established what Machine Learning techniques are, and some salient characteristics of them, we can now begin to get at the heart of why Arkin's approach is superior to Lin et al.'s.

As established earlier, I am arguing against the view of robots as anything more than automatic instruments, especially against those who view robots as having a

[32]Markoff.

kind of quasi-agency. On the one hand, this simplifies some objections to the use of robots that have been raised, both from a legal[33] and a moral[34] perspective. In order to ensure that an automatic instrument of war is moral, I argue that there are three salient characteristics necessary to fulfill the discriminate criteria of Just War theory:

Performance — A robot should perform well (i.e. fire when it should fire, and not fire when it should not fire).

Predictability — When the robot fails to perform correctly, a robot should behave predictably (it should be able to be known when the robot tends to fail).

Legibility — When a robot does perform an unethical act, it should be capable of being audited to determine why the robot behaved unethically[35].

Machine Learning techniques fail on the last two of these three criteria. Lin et al. argue that machine learning techniques could allow a robot to perform better than any other alternative. In sheer terms of performance, they argue, I think persuasively, that performance would be improved by a machine-learning approach, and by guarding carefully the robot from encountering anything drastically unlike the training data[36]. However, I remain skeptical that such a set of safeguards could ever practically occur on the battlefield.

Furthermore, I do not think that the approach argued for by Lin et al. would guard against the unpredictable failures inherent in a probabilistic model. The consensus view is, I think appropriately, that the military should not hold robotics to a perfect ethical standard, but should expect robotic weapons to perform more ethically, on average, than other weapon systems (e.g. a squad of soldiers). However, the unpredictability

[33] Asaro.

[34] Sharkey, 'Intelligent Systems 23 [2008]' (as in n. 8).

[35] I am here indebted to Cory Doctorow, 'Human-Readable', in: *With a Litle Help*, (Self-Published, 2011) ⟨URL: `http://craphound.com/walh/Cory_Doctorow_-_With_a_Little_Help.html#769`⟩, who is in turn indebted to Natalie Jerimijenko, *Feral Robotic Dogs*, 2005 ⟨URL: `http://www.nyu.edu/projects/xdesign/feralrobots/`⟩

[36] Lin, Bekey and Abney (as in n. 26), p. 40.

of a robotic system programmed whose ethics routine was developed using machine-learning techniques undercuts this standard. Not all failures of a system are created equal. As we have already see earlier, it is preferable that a system not fire on an enemy than to fire upon an innocent. Furthermore, some critical failures are considerably worse than others — Sharkey's nightmare scenario is a robot who mistakes a young girl's ice-cream cone for a rifle[37]; the is clearly a much more serious error. Lin et al. are not unmindful of this error, and recommend certain workarounds, including only deploying robots in "engagement zones," or, more prosaically, "kill boxes"[38] — areas where all non-combatants are assumed to be evacuated. I am not certain that this is an acceptable compromise, but appears prudent. Indeed, despite my hesitancy, I am also unenthused by some of Arkin's scenarios[39] where he expects a robot to be able to differentiate between non-combatants and combatants in the sort of door-to-door warfare which has characterized war in Iraq.

Indeed, this difficulty seems to be the single biggest obstacle to the widespread use of robots in warfare. While it is conceivable that a robot could differentiate between rival armies in a formal battlefield scenario, it is much less likely to work properly in an environment which looks much less like what is traditionally conceived of as a military conflict. Indeed, given their cost, it is unlikely that any but the most well-funded armies will progress towards robotization, despite the breathless hopes of some. While everyone would prefer that the next major conflict would look more like an episode of the television show *Battlebots* than the grisly footage from Iraq and Afghanistan, it is unlikely, simply because globalization has, for the moment at least, made overt war between the great world powers unlikely. Most of the conflicts of the

[37]Noel Sharkey, 'Automated Killers and the Computing Profession', *Computer*, 40 (2007) ⟨URL: `http://goo.gl/xPzwz`⟩.

[38]Lin, Bekey and Abney (as in n. 26), p. 77.

[39]Arkin, *Governing Lethal Behavior in Autonomous Robots* (as in n. 14), p. 155-176.

past 10 years have not been conflicts between modern states, but between states and non-state actors like Al-Qaeda, who disregard the traditional laws of war.

4.8 Conclusion

The problems of robotic warfare will inevitably come to the forefront in the coming decades. Semi-autonomous robots pose threats to soldiers' characters, and there will be a great debate as to whether the risks of a airman emotionally distant from the wars she prosecutes is superior to the documented risks that extended deployments pose to soldiers' mental, emotional, spiritual, and moral health. The lack of hard data on the subject makes ethical conclusions speculative at best; I urge rigorous study of these related questions.

The ethical issues relating to autonomous robots are also disconcerting. Ethically, I have argued we should favor mercy over justice when programming for the unforeseeable, and therefore err on the side against lethal force. Furthermore, I argue against using a machine-learning driven virtue-ethics based approach to designing autonomous robots, because they are *inscrutable* — machine learning techniques can deliver extremely accurate results, but they are not human readable, nor are their failures predicable. In light of the inequality of potential errors, as well as our preexisting decision to prejudice mercy over justice, I hope that we would favor a system which, while perhaps somewhat more error prone, makes *more merciful errors* than the alternative.

The at least partial robotization of the United States military, and the militaries of the other great western powers seems all but unavoidable in the coming decades. Just as the age of the archer, the knight, the cannon, the bomber, and the nuclear warhead have each had their effect on traditional just war thinking, we will soon see reflection

on the entrance of robots in the battlefield. Within this reflection, there will doubtless be many voices contributing to the discussion; I can only pray that Christians will be among them, reminding military leaders of the demands of mercy and justice.

Furthermore, I hope that military and political leaders contemplating robotization understand the implications of such an endeavor — both on the character of the military itself, and also in the conduct of its autonomous tools. Indeed, I sincerely hope that those tasked both with beginning and prosecuting robotized warfare contemplate their task "with fear and trembling[40]" and, in prayerful contemplation, seek justice tempered with mercy.

[40]Philippians 2:12

Chapter 5

`God in All Code`: The Ignatian Spirituality of Hacker Culture

Spirituality can be defined as micro-level religious experience — the experience of an individual. In a sense, everyone has his or her own unique spirituality, insofar as everyone has his or her own individual experience of God. Defined this way, such a concept might not seem to be terribly helpful. However, spiritualities are also common to societies and sub-societies. Although everyone's experience is unique, there are broad currents and patterns that can be characterized across groups of people, as they bring similar concerns, tools, and language to their understanding of God. Thus, one can speak of an *african-american* spirituality, a spirituality of the *poor*, a *queer* spirituality, or a *feminine* spirituality. There are also spiritualities of *health-care workers*, for example, or spiritualities of *legal professionals*. Necessarily as the classes grow larger, the common currents become fewer, and the more general statements must become. Spiritualities also can follow the lead of major spiritual subfigures within a religion. Thus, within the Catholic, Christian tradition, there are still many sub-spiritualities: Ignatian (after St. Ignatius Loyola), Fransciscan (after St. Francis of Assisi), Dominican (after St. Dominic), or Theresan (after St. Therese of Lisieux).

One prominent group of people has not had the same level of attention paid to their spirituality, however: *computer professionals*. Mostly associated with a kind of hyper-rational atheism, many church leaders, either fearful of computers, those who work with them, or both, have tended to ignore modern computer culture, and its attendant spirituality. In this paper, I hope to describe the implicit spirituality in modern Hacker culture, and show its parallels with Ignatian spirituality.

5.1 Introduction

As computers have risen, they have correspondingly given rise to their own distinct culture, apart from their effect on human culture. Rather than merely ordinary people

who have accepted that they now type in word-processors instead of on typewriters, or artists who use Adobe Photoshop instead of countless pages of sketchbooks, some people have taken computers a step further, to truly embrace computers' potential to change their lives, and to make them an integral, rather than tangential part of their lives. This group of people can be identified as a distinct subgroup as far back as the early 1950's, nurtured at institutions like MIT, where a true embrace of computing — an entire lifestyle, really — could be seized on by undergraduates. Together, they created a culture, known affectionately as *hacking*. Originally an MIT neologism for the elaborate pranks undergraduates would use at the university, it came to refer to a group of people who found deep joy in the same level of skill It has been carried on at other institutions, like Stanford and the University of California, at Berkeley.[1] Now it lives on in the virtual world of the internet, complete with its own argot[2], its own explicit definitions of excellence[3], and its own rites of initiation.[4]. It has even received some limited scholarly attention.[5].

Thus, the Hacker phenomenon, by anyone's recognition, qualifies as a subculture, and, as a subculture, it has its own attendant spirituality. However, the theological establishment has been reluctant to engage with computers in general, much less with hackers in particular. While the Vatican has done more than any other organized religious group to at least acknowledge the role of computers in society, by releasing two documents on the matter[6], they are far from a comprehensive cyber-theology. They are much less attending to its spirituality — they make no acknowledgement of

[1]See Steven Levy, *Hackers: Heroes of the Computer Revolution*, 1st edition. (Anchor Press/Doubleday, 1984)

[2]Raymond, 'The Jargon File'.

[3]Idem, 'The Art of Unix Programming'.

[4]Idem, 'How To Become A Hacker'.

[5]A.E. Adam, 'Hacking into hacking: Gender and the hacker phenomenon', *Proceedings of Computer Ethics Philsophical Enquiry* [2003].

[6]Pontifical Council for Social Communications, 'Church in Internet'; idem, 'Ethics in Internet'.

it. Thus, I plan to address it at least briefly in this paper. In section 5.2, I hope to discuss the driving force behind the Hacker phenomenon, and show its parallels to the Ignatian ideal of *finding God in all things*. From there, in section 5.3, I examine the consequent missionary impulse of modern Hacker culture, and compare it to the historical Jesuit commitment to *mission* and *zeal for souls*. In section 5.4, I compare the Hacker zeal for excellence to the Jesuit idea of *magis* — striving for more, and show how closely they parallel. I examine competing ideas on service and relational anthropology in section 5.5. In section 5.6, I examine hacker ideas of formation, and contrast them with Jesuit ideals of formation. Finally, I close in section 5.7.

5.2 Joy

5.2.1 Art, Science, and Play: Hacker's Joy

One key insight into the Hacker mindset is that these are people who have consciously made the decision to embrace computers and programming into their lifestyle. Thus, they derive not merely utilitarian satisfaction from doing so — Business executives are perhaps the ur-example of *that* framework — they derive *satisfaction* from doing so. This is most clearly seen in the writings of E. S. Raymond, a self-proclaimed "hacker" and major developer of Linux – something of an elder statesman in this subculture. "Hackers" have a number of characteristics, most clearly addressed in Raymond's manifesto, "How To Become A Hacker"[7]

Raymond describes an ethic of constant innovation, with admonitions like "The world is full of fascinating problems waiting to be solved." and "Boredom and drudgery are evil."[8] Hacker people, then, are those who are constantly internally driven to

[7]Raymond, 'How To Become A Hacker'.
[8]Ibid.

innovate, because they derive value from the act of innovating itself, not from that which results from it. Those who do attempt to use hacker techniques for personal gain – the cyber criminals who give the modern meaning of "hacker" its name – are disparagingly referred to by Raymond as "crackers" and dismissed.

The other great source for a qualitative description of the joy which derives from hacking comes from Steven Levy's work *Hackers: Heroes of the Computer Revolution*, which has acquired the status of a major work of folklore in the subculture. While the book is inundated with descriptions of hackers, a couple of key passages leap out:

> "Art, science and play had merged into the magical activity of programming"[9]

Necessarily, these three ideas — Art, science, and play — come together in this medium. Nowhere else could one find such an environment, which, built on solid scientific principles, one is able to create functional objects. Computer programs are not things like novels, poems, or other objet d'art. They perform functions; they are tools. Yet, they are unlike other tools in that they are insubstantial — easily copied and distributed. This lends itself directly to cooperative play — rather than fighting amongst one another

> The people in Homebrew were a mélange of professionals too passionate to leave computing at their jobs, amateurs transfixed by the possibilities of technology, and techno-cultural guerrillas devoted to overthrowing an oppressive society in which government, business, and especially IBM had relegated computers to a despised Priesthood.[10]

[9] Levy (as in n. 1), p. 120.
[10] Ibid., p. 200.

Here we see how this is a true manifestation of the joy of programming — the passion within these people melds their work and their play, into the same thing, and they stare, awed at the possibilities of what machines can do for them. Most telling, though is the description of an ideal company by Mark Duchaineau – a young, hacker programmer at Sierra On-Line who, faced with the increasing bureaucratization of his company, dreams of founding his own, utopian workplace:

> Duchaineau's company would be a hacker paradise, with programmers having every conceivable tool at their disposal to create awesome software. If a programmer felt the company needed a piece of equipment, say some supercalibrated oscilloscope, he would not have to get permission from unconnected management channels... he and his fellow hackers would have a large say in the process.[11]

It's a telling description of paradise — one where the people have all of the tools that they need to *create awesome software*. Duchaineau doesn't dream of "enough royalties to buy cherry-red Trans-Ams and Caribbean trysts with hot-blooded software groupies."[12] Rather, his ideal company merely gives him the ability to pursue the joy of programming unimpeded.

5.2.2 Moments of Consolation: Ignatian Joy

This same sort of deep joy that Ignatius finds in the *Spiritual Exercises*:

> The perfect, through constant contemplation and enlightenment of their understanding, more readily consider, meditate, and contemplate God

[11] Levy (as in n. 1), p. 378.
[12] Ibid., p. 389.

> our Lord as being present in every creature by his essence, presence, and power[13]

Ignatius makes a few key qualifications here:

1. He's referring to the *perfect* here; so this is clearly to be taken not as a declarative statement, but instead as an ideal to be striven toward. Indeed, the word "perfect" as it occurs in Matthew's Gospel is *teleios*[14] ($\tau\acute{\epsilon}\lambda\epsilon\iota\varsigma$); what Ignatius seems to be quoting is not perfection in the English sense of being without flaw or without limitation, but rather in the sense of being completed, or brought to its final end. Thus, it might be rephrased as, "the whole person, considers, meditates, and contemplates God our Lord as being present in every creature . . . "

2. God's *essence* is present in every creature. For Ignatius, this means recognizing the fundamental divine nature in all interactions by virtue of its creation. This same attribute could be attributed to hackers, who recognize the beauty of a computer system in its boundless *possibility*.

3. God is not merely present *essentially* (in an Aristotelian, Thomistic sense) with creation; he is, in fact *present* within creation — God, himself, for Ignatius, is *present* in all things, using them for divine ends. Ignatius takes a strong view of providence — for Ignatius, everything is a tool for God to bring about a better end, including people; the great triumph of his spirituality, then, is his *suscipe* prayer, where the human not only acknowledges this sense, but embraces it:

[13]Ignatius of Loyola, *The Spiritual Exercises of St. Ignatius*, trans. by George E. Ganss, SJ (Loyola Press, 1992), p. 36.

[14]James F. Keenan, SJ, '"Whose Perfection is it Anyway?": A Virtuous Consideration of Enhancement', *Christian Bioethics*, 5 (1999):2.

> "Take, Lord, and receive all my liberty, my memory, my understanding, and all my will — all that I have and possess. You, Lord, have given all that to me. I new give it back to you, O Lord. All of it is yours. Dispose of it according to your will. Give me love of yourself, along with your grace, for that is enough for me."[15]

4. God, finally, is present in his *power*; this is perhaps the greatest level of overlap. For Ignatius, God is present through an ongoing process of creation — rather than being a singular event, at the beginning of time as described in Genesis, it is a continually ongoing process, and God is not only *creator*, but also *sustainer*, and human beings are co-participants, ultimately, in creation. It is *this* which brings the mystic out of the computer hacker[16]; there is a sense in which the hacker, through his or her own act of creating software, is also participating in the divine act of creation.

5.3 Mission

5.3.1 The Contagious, Wondrous Joy of Programming: Hackers' Mission

The joy and elation that hackers find in the Divine Presence as described in Section 5.2 is contagious. Once established, there is a powerful urge among people in the hacking community to share their results with one another — to their way of thinking, there are only problems to be solved, and reduplicating work is an offense akin to a

[15] Ignatius of Loyola (as in n. 13), p. 95.
[16] Raymond, 'The Jargon File'.

sin. Although they can be curmudgeonly to the utterly clueless,[17] there is a general collegiality which is implicit in the culture. Levy describes it when Lee Felsenstein began working on the Sol computer, which was intended to be a computer for the masses — essentially a PC, for community use, a full 10 years before its time. The computer itself was described thusly:

> **Sol Computer** Lee Felsenstein's terminal-and-computer, built in two frantic months, almost the computer that turned things around. Almost wasn't enough.[18]

Felsenstein is man both entranced and horrified at the powers that computers give to people. His colleague, Efrem Lipkin, an activist from New York who found himself at Berkeley in 1973, said, "I love computers and hate what computers can do"[19] Computers at the time of Levy's writing were inextricably bound up with large institutions — tools reserved for the wealthy and powerful, who could afford to pay large machines to replace men and women for things like payroll checks. Felsenstein's computer, then, is a revolutionary statement: one which considers the missionary imperative so powerful that he is driven to work to his physical extreme:

> Completing the Sol was a process that took six weeks of fourteen- to seventeen-hour days, seven days a week.[20]

Again, we see hackers, so driven in their pursuit of excellence, that they are willing to ignore, when necessary, basic human comforts, because they thrive so dearly on the joy of the job at hand. This kind of missionary zeal is the same sort of ability to deny

[17]There is an entire essay on how to properly ask questions, see Eric S. Raymond and Rick Moen, *How To Ask Questions The Smart Way*, 2008 ⟨URL: `http://www.catb.org/~esr/faqs/smart-questions.html`⟩

[18]Levy (as in n. 1), Appendix.

[19]Ibid., p. 159.

[20]Ibid., p. 237.

the physical necessities of existence in favor of their urge to bring the kind of joy they experience in programming to the people. It can even be seen in their eyes:

> He would often entertain the young hardware hackers who designed these products, and his wife would always recognize them at a glance. "Because they all had the same thing," Solomon would later explain. "That little burning inside the eyeball. She used to say there was an inside personality, and though they looked like disreputable bums, you looked them in the face, you looked in those eyes and you knew who they were. She'd look at them and what would come out was the brightness, the intense-ness [sic]."

5.3.2 Ignatian Indifference: Poverty, and the Mission

This kind of burning, sustaining passion (even something that transcends social standing), is what characterizes both the Hacker and the Jesuit. Initially, when Ignatius was beginning to write the *Constitutions*, he raised some eyebrows by describing the fourth vow — the full profession which is only characteristic of the eldest Jesuits. The fourth vow is one of special obedience to the pope *in matters of mission*, and not to request anything in order to complete it[21]. Although many at the time thought that at least the first part of the vows (special obedience to the Pope) was at least implicit to any religious order[22], the critics of the Jesuits missed the point. Ignatius's conception of the Jesuits was, to borrow a military metaphor, an ecclesiastical "special forces" unit, deployable anywhere, at a moment's notice.

Such a mindset even figures into their conception of poverty. Ignatius departs notably from other leaders like Francis in his conception of Poverty. While Francis

[21] John Hungerford Pollen, 'The Society of Jesus', (Robert Appleton Company, 1912) ⟨URL: http://www.newadvent.org/cathen/14081a.htm⟩.

[22] John W. O'Malley, *The First Jesuits*, (Harvard University Press, 1993).

referred to poverty as "his divine mistress," Ignatius's attitude to poverty places it squarely under his emphasis on mission; Jesuits do not actively disavow money like the Fransciscans; rather, they instead disavow any personal ownership of their resources, and place them all in the service of the mission. Levy discusses a similar approach by some hackers:

> "Our initial goal was not necessarily to get infinitely rich," explained co-founder Mike Levitt in 1983, "but to control our own destiny. We don't owe anybody anything."[23]

Levitt is discussing a company broken off from the famed MIT-Artificial Intelligence Lab, who were making a business to implement `LISP`, one of the first high-level programming languages which is still in use — only `FORTRAN` is older. The idea of a `LISP` machine — a machine with a sufficiently abstract programming language that one could write programs for any given computer, not merely this particular machine, was a liberating one. Its promise was so great that it even caused strife among the hackers themselves:

> Greenblatt was so focused on making LISP machines, on the mission of hacking, on the work that *had to be done*, that he often neglected to acknowledge people's humanity.[24]

Why do these things *have to be done?* Because this mission, this intense drive, is characteristic of hacking. Cory Doctorow, a noted blogger and author, also describes the missionary zeal in his young adult novel, "Little Brother."

[23]Levy (as in n. 1).
[24]Ibid.

> If you've never programmed a computer, you should. There's nothing like it in the whole world. When you program a computer, it does *exactly* what you tell it to do. It's like designing a machine – any machine, like a car, like a faucet, like a gas-hinge for a door – using math and instructions. It's awesome in the truest sense: it can fill you with awe.[25]

In this way, Doctorow's work has a hortatory facet; the novel is aimed at young people, and here he describes the joy associated with this practice of programming in order to entice them to practice it themselves. This is another part of the missionary impulse: to educate a new generation of enthusiastic programmers to *create awesome software*. Hacker culture has built up a substantial mythos around the process of young people becoming hackers, involving first an interest in hacking[26], followed by what is termed *larval stage*[27] — a period of growing, and deepening focus and attention on hacking, not unlike the *Spiritual Exercises* of a young Jesuit. The *Exercises*, in canonical form, are a period of intense reflection, over a monthlong period, following a strict plan of meditations under the guidance of a trained director. Hacker culture's analogue isn't nearly as structured as the *exercises* (Hackers tend to have an anti-authoritarian streak, after all), but it does follow the same general idea.

5.4 Magis

5.4.1 Raymond's Ethic of Constant Innovation

Another aspect where Hackers and Jesuits are similar is in their mutual striving toward excellence. Ignatius himself gave the order its motto: *Ad Maiorem Dei Gloriam* —

[25]Doctorow, 'Little Brother', p. 49.
[26]Raymond, 'How To Become A Hacker'.
[27]Idem, 'The Jargon File'.

"For the Greater Glory of God." Hackers have a similar, but distinct idea of collegiality that all involves working toward a common end. Raymond gives a good description in his guide for beginners, "How to Become a Hacker." He first begins by assuming his first premise: "The world is full of fascinating problems waiting to be solved." Having established that, he goes on:

> **2. No problem should ever have to be solved twice.**
>
> Creative brains are a valuable, limited resource. They shouldn't be wasted on re-inventing the wheel when there are so many fascinating new problems waiting out there.
>
> To behave like a hacker, you have to believe that the thinking time of other hackers is precious – so much so that it's almost a moral duty for you to share information, solve problems and then give the solutions away just so other hackers can solve *new* problems instead of having to perpetually re-address old ones.[28]

Raymond's ethic, then, is one of constant innovation. He's arguing that there is a *moral* dimension to innovation — that hackers not only are compelled to do so by the joy they find as discussed in Section 5.2, but that there is a moral *imperative* to innovate. He covers it more explicitly further on:

> **3. Boredom and drudgery are evil.**
>
> Hackers (and creative people in general) should never be bored or have to drudge at stupid repetitive work, because when this happens it means they aren't doing what only they can do – solve new problems. This

[28] Raymond, 'How To Become A Hacker'.

> wastefulness hurts everybody. Therefore boredom and drudgery are not just unpleasant but actually evil.
>
> To behave like a hacker, you have to believe this enough to want to automate away the boring bits as much as possible, not just for yourself but for everybody else (especially other hackers).
>
> (There is one apparent exception to this. Hackers will sometimes do things that may seem repetitive or boring to an observer as a mind-clearing exercise, or in order to acquire a skill or have some particular kind of experience you can't have otherwise. But this is by choice – nobody who can think should ever be forced into a situation that bores them.)

This is a pretty startling claim. While almost everyone would agree that boredom and drudgery are deeply unpleasant things, to be avoided if at all possible, very few people would equate them as evils. That is, however, exactly what Raymond is doing — he's essentially being a moral utilitarian, except good is tied directly to technical innovation. Real evils, for Raymond, come from those things which impede innovation — it is morally wrong to impede (more than necessary), bright, technical people who are trying to solve problems.

5.4.2 Ignatian Ethic of Striving for Perfection

This doesn't sound like a particularly Christian, let alone Ignatian, worldview. In one sense it's not, but when compared to Ignatius himself, there are striking similarities:

> Principle and Foundation
>
> The other things on the face of the earth are created for the human beings, to help them in the pursuit of the end for which they are created.

> From this it follows that we ought to use these things to the extent that they help us toward our end, and free ourselves from them to the extent that they hinder us from it.
>
> To attain this it is necessary to make ourselves indifferent to all created things, in regard to everything which is left to our free will and is not forbidden. Consequently on our own part we ought not to seek health rather than sickness, wealth rather than poverty, honor rather than dishonor, a long life rather than a short one, and so on in all other matters.
>
> Rather, we ought to desire and choose only that which is more conducive to the end for which we are created.[29]

Ignatius, interestingly, takes almost the same line of reasoning that Raymond does. He places one goal — salvation — above all others, and argues that its pursuit is the sole imperative — do what brings you salvation (that which *God* commands), all else is irrelevant. However, it is not enough for Ignatius to adopt a position that one should merely seek salvation — Ignatius, though moderate in most respects, brooks no compromise with moderation here — this is dogged, full-throated, unequivocal support for pursuing the salvific, despite everything.

Ignatius isn't content with that, though — far from it. Rather, he engages in a full-on pursuit of perfection. Ignatius, like any good chivalric candidate, is not content with merely pursuing the *good* — he's aiming squarely at the *best*.

The hackers emulate this, as well. One prominent example can be found in the annals of the Homebrew Computer Club, one of the first Amateur Computer clubs to arise in the greater San Francsico Bay Area (known now as Silicon Valley):

[29] Ignatius of Loyola (as in n. 13), p. 32.

> "...I remember I had trouble with a teletype machine at my office and one guy [at Homebrew] said he'd check it out. Not only did he check it out but he came out with a little kit and he put in four or five different parts, oiled it, lubed it, adjusted all the gears. I said, 'How much do I owe you?' He said, 'Nothing.' " To the Junk Man, that was the essence of Homebrew.[30]

This pursuit of excellence *is* the essence of Homebrew — hacking, in general, really. The group goal — excellence, is put above all others, including personal gain. The hacker named is not under any external coercion to aid his fellow; he does it voluntarily. This mirrors Ignatius's conception of resources within his new, Jesuit order: selfless exercise of resources in pursuit of common salvation.

5.5 Service

As we have already seen, Hackers and Jesuits share a common zeal — the Jesuits for souls, the hackers for solutions. But what is at the heart of both of these cultures' dedication and fervor? The answer lies in how both groups see the interrelationships between people, and how these interrelationships form the basis of their respective societies.

5.5.1 Men and women for others: Jesuit faith that does justice

One hallmark of Jesuit faith, especially since the superior-generalship of Pedro Arrupe, came the notion of a faith that does justice:

[30]Levy (as in n. 1), p. 214.

> Today, our prime education objective must be to form men-and-women-for-others . . . people who cannot even conceive of love of God which does not include love for the least of their neighbors; people convinced that love of God which does not issue in justice for human beings is a farce.[31]

Indeed, the "frontier ministry" which characterizes the Jesuits has always meant that care for others has always been at the center of Jesuit spiritual life. Ignatius's own mission was simple, yet infinitely malleable: "Help souls."[32]

The ideal Jesuit, then, does not simply find God in the activities he participates in, but rather in the people he loves. The ideal Jesuit takes to heart the notion that ". . . just as you did it to one of the least of these who are members of my family, you did it to me.[33]"

5.5.2 Shared labor: Hacker cooperation

The notion of others in hacker culture is quite different. Since members of the culture seldom meet apart from online contexts, contact is radically different. Raymond freely admits that hacker culture is a *gift culture*[34], wherein social merit is given to those who can contribute the greatest to common endeavor. While it is tempting to see this exchange as explaining the peculiar altruism of the community, it does not.

The reason that the hacker community *is* a gift culture lies in the fundamental value of problem-solving associated with the community. As Raymond puts it, "No problem should ever have to be solved twice," arguing that one's compatriots' time is so precious that "it's almost a moral duty for [one] to share information, solve

[31] George W. Traub, SJ, 'Do You Speak Ignatian: A Glosary of Terms Used in Ignatian and Jesuit Circles', in: Idem, editor, *An Ignatian Spirituality Reader*, (2008), p. 260-261.
[32] O'Malley (as in n. 22), p. 22.
[33] Matthew 25:40
[34] Raymond, 'How To Become A Hacker'.

problems and then give the solutions away just so other hackers can solve *new*[35] problems instead of having to perpetually re-address old ones."

Ultimately, this altruism derives from a love of community — boredom and drudgery are considered so evil that self-interest is completely unacceptable. This notion of service, while not quite rooted in the Christian love of God in neighbor like that of the Jesuits, is still profoundly allocentric. The devaluation of the self, and the high regard for the other that characterizes hacker culture is extraordinary, and can find parallels in Jesuit love.

5.6 Formation

5.6.1 Jesuit Formation

Another major similarity between Hacker culture and Ignatian spirituality, especially in the modern incarnation of the Jesuits, is a conscious, intentional focus at forming young people. Both the Hacker community and Ignatius's disciples begins with a particular vision of the perfect[36] human person, and outline a path toward forming a person into that ideal.

The Jesuits have many avenues toward formation, but the major two are the formation of Jesuits themselves and their students. Much of Ignatius's work in the *Constitutions* is dedicated toward the proper formation of his novices. Indeed, Jesuit training is *the* longest in the Catholic world. It has five stages[37], typically lasting a dozen years:

[35] emphasis in the original
[36] by *perfect*, I mean in the sense of *complete* rather than in the sense of *without flaw*.
[37] Jesuits of the New England Province.

1. Novitiate — a two year "introduction" to the society; a man makes the first three vows of poverty, chastity, and obedience at the conclusion

2. First Studies — a three year period of study of philosophy and theology, reflecting the academic beginnings and apostolic ministry of the society, which is the beginning of the Jesuit's ordination studies.

3. Regency — a three year liminal period between First Studies and Theology Studies, where the Jesuit is encouraged to take full part in the apostolic work of the society in order to remain grounded in its work

4. Theology Studies — three year period of full-time study in Theology in preparation for ordination to the priesthood

5. Tertianship — a three-to-five year period of full-time ministry which concludes the formative process, ending with the Final Vows

Along the way, Jesuits undergo a number of formative experiences on their own, including a *long retreat* of 30 days, conducted largely in silence, and a pilgrimage, conducted without any external resource at all. While each of these steps are themselves important, the broader picture is the point of reference — the ideal of the whole person; a man[38] utterly in love with Christ — who, seeing the hand and the love of God at work in every movement in his heart, pursues the goal of sharing this love with an intensity bordering on ferocity, befitting Ignatius's admonition to Xavier to, "go and set the world aflame."

Jesuit Universities also have very specific idea of what the *whole person*[39] consists of, and how to form people according to that ideal:

[38] As a Catholic order of priests, Jesuits are exclusively male
[39] Traub, SJ (as in n. 31).

> "Formation" can be a problematic term if it suggests indoctrination, imposing values from the outside, stamping each student from a common mold that blurs unique gifts and aspirations. It can be a useful term, however, if it means that a college proposes certain intellectual, social, moral, and spiritual standards to its students as worth acquiring and living by, equips them with the knowledge and skills to understand and critically interpret the world in light of these values, and yet respects their freedom to discern how these standards can be embodied in the decisions they make about their own lives.[40]

Ignatius himself had a very academic ideal of God, who he saw as teaching him as a schoolmaster taught a particularly obstinate pupil[41]. In much the same way, as the academic ministry and the "intellectual apostolate" became a major charism of the society, the society in turn developed the *Ratio Studiorum*[42] — a plan to educate the students according to the dictates of *cura personalis*[43], a latin phrase meaning "care of the whole person." In essence, this pedagogy was to attempt to bring the whole character of a student — intellectual, moral, social, and spiritual — under the care and conscious direction of the institution.

5.6.2 Hacker Formation

This same sort of notion of *formation* also shows up in Hacker Culture. Probably the singular text on entrance (though it claims not to be) is Eric Raymond's *How*

[40] Boston College Center for Student Formation, *The Journey into Adulthood: Understanding Student Formation*, (Self-Published, 2010).

[41] John C. Olin, 'The Idea of Pilgrimage in the Experience of Ignatius Loyola', *Church History: Studies in Christianity and Culture*, 48 (1979):04 ⟨URL: http://dx.doi.org/10.1017/S0009640700040269⟩, p. 390.

[42] Traub, SJ (as in n. 31), p. 264.

[43] Ibid., p. 251.

to Become a Hacker[44], and the corresponding document on Hacker anthropology, *A Portrait of J. Random Hacker*[45]. Like the Jesuit ideal of formation, both begin with an ideal of a human being, and both proceed toward it. Furthermore, as we have seen, the anthropology of what precisely constitutes a *hacker* overlaps considerably with the Jesuit ideal of the whole person.

In particular, the notion, as we have already seen, of a Hacker being driven by a notion of mission and service overlaps nicely with the Ignatian model. What distinguishes Hacker formation from Jesuit formation is how much looser Hacker formation is. While this is not terribly surprising, given the general anarchist and adhocratic tendencies of the community, Raymond instead lays out five attitudes, four skills, and five markers of status. While Raymond offers an essential course of how to form oneself, it's much looser than the general plan of the Ignatian plan. Indeed, the very notion of *self-formation* is a departure from the Ignatian tradition, wherein the institution (the order, the university, etc. is responsible for that formation).

However, the same notion of *cura personalis* is, in fact, at play. Raymond's portrait isn't purely of a dynamic programmer, or even of a general purpose geek. Rather, he lays out, in his *Portrait*, a view of a sort of person which is both descriptive and normative. And, despite the curmudgeonly descriptions given, Raymond does describe an ultimate community consensus which lays out his idea of formation. The hacker community, while not taking the same active role in formation as the Jesuits, still lays out expectations as to how their members should be, and invites others to join them.

[44]Raymond, 'How To Become A Hacker'.
[45]Idem, 'The Jargon File', Appendix B..

5.7 Conclusion

The hacker culture that has arisen in response to the computer revolution is a significant force in the Information Age. From fundamentally maintaining `UNIX`, the operating system of the internet, to reinventing the way we see software though first the free software movement, and later the open-source movement, including the darling among web browsers, Mozilla Firefox.

However, hacker culture hasn't been given the scholarly respect it deserves from many quarters. It has had a complex relationship with computer scientists, who generally admire the displays of prodigious skill and communal impulse exhibited by hackers, while disdaining the culture's lack of interest in scholarly pursuits and academic rigor. The rest of academia, however, has either not even noticed them for the potent cultural force that they are, or has dismissed them as a group of disaffected nerds — isolated from society, isolated in a technocratic echo-chamber, where they hold forth childishly on matters of mere *technical* importance, ignorant to the broader culture that they scorn.

Such a characterization could not be more wrong, or more dangerous. Whether or not it goes acknowledged, the writings of people like Richard Stallman and Eric Raymond have had, and continue to have, a major effect both on those who identify with their subculture, and those who interact with it — not merely enthusiast programmers, but also the substantial majority of the world's computer engineering professionals.

The impact of the computer on daily life has been underestimated and dismissed by the theological establishment in general, to its detriment. While the distinct antipathy of many of the major leaders in the movement to "conventional, faith-

holding Christianity[46]" hasn't helped matters, in no way should this be seen as tacit permission to ignore them. Real moral and ethical challenges have arisen with the dawn of the information age, including concerns about privacy, intellectual property, and free speech, among others. To leave these questions in the secular realm is to do a disservice to both Theology and Philosophy — simply put, people of Faith have things to say, as well, even if they're only able to speak to their co-religionists.

My work in this paper comparing Jesuit and hacker spirituality is *not* to equate them. I have no illusions that such such a project could be done, for to impose a thin veil of Christianity over the existing hacker culture, which is already drawing on other, separate sources (some of them spiritual, notably Zen Buddhist) is disingenuous and intellectually dishonest. Rather, I have attempted to describe some of the striking similarities between the hacker and the Jesuit mindset in order to provide a ground for dialogue. Without the two traditions at least engaging each other in mutually comprehensible language, dialogue is doomed to failure. However, failure will surely see us off with a worse society — which, whether one is motivated to God's greater glory, or in the name of solving interesting problems, is, ultimately, a failure.

Such a dialogue is ultimately necessary, however, because hacker culture has a significant impact upon the culture of computer science as a whole. While hackers remain a minority subculture, some of the major products of that subculture — notably the GCC compiler, the GNOME desktop environment, and to a certain degree the Firefox web browser have taken on major acceptance within the broader technology community. With that broad acceptance has come a great deal of cultural capital — the values associated with the open-source and hacker community have become very important.

[46]Raymond, 'The Jargon File'.

There are three major results that could emerge from such a dialogue. The first is *evangelization* — a term I use hesitantly. I do not mean empty or unenlightened proselytism; such an effort, I think, would be (rightly) rejected. Rather, I mean evangelism in the fullest of the sense of its greek root $\epsilon\acute{\upsilon}\alpha\gamma\gamma\acute{\epsilon}\lambda\iota o\nu$ — to share good news. Indeed, part of any authentic dialogue with the Christian community includes a witness to the joy which the Christian community finds in its communion with Christ.

The second, of course, is the converse of evangelization — what Christianity can learn from hacker culture. While there are many significant points of departure, Christianity can stand to learn a great deal from the passionate embrace and analytical altruism which characterizes modern hacker culture. Indeed, Levy[47] makes a plausible case that most of hacker culture that we know grew out of the academic culture of the MIT artificial intelligence lab. Just as Christianity has grown and developed through its embrace of academic culture, it can also grow as it embraces hacker culture.

The final, and perhaps most important reason for the embrace of Hacker culture is pedagogical. The sheer impact upon the discipline of computer science and the culture of its professionals demands that Christian, and especially Catholic schools grant to their students an awareness of where two major cultural crossroads can synchronize and where there is tension. The cultural power of both of these traditions is intense, and to ignore them is to risk allowing students to be caught unaware in a cultural whirlpool. At the very least, opening students' eyes to the similarities and differences between these two major cultures follows the dictates of *cura personalis*.

[47]Levy (as in n. 1).

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