

Flourishing Ethics

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Abstract. This essay describes a new ethical theory that has begun to coalesce from the works of several scholars in the international computer ethics community. I call the new theory ‘Flourishing Ethics’ because of its Aristotelian roots, though it also includes ideas suggestive of Taoism and Buddhism. In spite of its roots in ancient ethical theories, Flourishing Ethics is informed and grounded by recent scientific insights into the nature of living things, human nature and the fundamental nature of the universe – ideas from today’s information theory, astrophysics and genetics. Flourishing Ethics can be divided conveniently into two parts. The first part, which I call ‘Human-Centered FE,’ is focused exclusively upon human beings – their actions, values and characters. The second part, which I call ‘General FE,’ applies to every physical entity in the universe, including humans. Rather than replacing traditional ‘great ethical theories,’ Flourishing Ethics is likely to deepen and broaden our understanding of them.

Key words: Aristotelian ethics, computer ethics, cybernetics, cyborg ethics, entropy, good and evil, information ethics, infosphere, just consequentialism, robot ethics

Who accepts nature’s flow becomes all-cherishing;
Being all-cherishing he becomes impartial;
Being impartial he becomes magnanimous;
Being magnanimous he becomes natural;
Being natural he becomes one with the Way

From *The Tao Te Ching*, Ch 16, tr. by P. Merel

The needs and the complexity of modern life make greater demands on this process of information than ever before.... To live effectively is to live with adequate information. Thus, communication and control belong to the essence of man’s inner life, even as they belong to his life in society.

Norbert Wiener, *The Human Use of Human Beings*

Introduction

A shift in ethical perspective

In his book *The Structure of Scientific Revolutions*, Thomas Kuhn (1962) made his famous distinction between ‘normal science’ and ‘revolutionary science.’ Normal science, he said, is much like ‘puzzle solving’ in which one treats entrenched scientific theories as trustworthy givens. Then one tries to design experiments, conduct observations, provide explanations,

and make predictions in ways that conform to the entrenched theories. Revolutionary science, on the other hand, occurs when a number of ‘anomalies’ begin to creep into the results of experiments and observations. Some predictions do not come true and the old theories fail to provide satisfying explanations.

During a period of revolutionary science, instead of engaging in everyday puzzle solving, some scientists begin to question the entrenched theories and look for alternatives to explain the anomalies more successfully. At the time of Copernicus, for example, the old earth-centered, spheres-within-spheres Ptolemaic astronomy had become complex and unwieldy. In addition it was not very successful at explaining and predicting the observed behavior of certain heavenly bodies. Copernicus’s new astronomy shifted the assumed center of the universe from the earth to the sun and (with some help from Galileo and Kepler) effectively eliminated many of the anomalies. It also decreased the complexity and unwieldiness of predictions and explanations. The Ptolemaic theory still was able to yield reasonably good results in most cases, and there were, of course, major religious objections to the Copernican view. Thus astronomers continued to use the old theory for some time, although they eventually adopted the newer theory in

spite of religious objections because of its scientific potency, including its ability to resolve Ptolemaic anomalies.

Ethics is not science, but it shares with science the overall goal of making sense of human experience. Just as science tries to explain, predict and systematize our experience of the natural world, so ethics tries to make sense of our moral lives.¹ During the past three thousand years, a number of powerful and highly respected ethical theories have emerged within various cultures around the globe. Some of the most influential theories are associated with great philosophers like the Buddha, Lao Tse and Confucius in Eastern societies, and Aristotle, Aquinas, Bentham and Kant in Western societies (to name a few examples). These and other ‘great ethical theories’ do indeed systematize and make sense of the moral lives of the people and communities who believe in them and treasure them. The theories are deeply ingrained in the fabric of their home cultures, and they help to provide profound and lasting meaning to human lives. In the present essay, I briefly describe a new ethical theory that has begun to coalesce from the writings of several scholars in the international computer ethics² community. It is still a new theory that needs careful systematic development, but it has deep Aristotelian roots and includes some ideas similar to those in Eastern philosophies like Taoism and Buddhism. It also has strong ties to today’s scientific understanding of life, human nature and the fundamental nature of the universe. The new theory, which I call ‘Flourishing Ethics’ because of its Aristotelian roots,

includes *a shift in perspective* that resolves some significant ethical anomalies and provides new tools to meet future ethical challenges. It seems likely to deepen and broaden our understanding of the world’s great ethical theories, rather than simply to replace them.

Flourishing Ethics has two major components:

- (a) *Human-Centered Flourishing Ethics*, henceforth ‘Human-Centered FE,’ which is focused exclusively upon human beings
- (b) *General Flourishing Ethics*, henceforth ‘General FE,’ which applies to every physical entity in the universe, including humans.

Flourishing Ethics as a whole can resolve at least three anomalies associated with traditional ethical theories:

1. *Rejection of all ethical theories but one* – Enthusiastic believers in one or another ethical theory often claim that their particular theory is *the only correct theory*. This dogmatic view is held by advocates for a variety of *different* theories. Extremists among such dogmatists are willing – through political action or even by violence – to force everyone else in the world to adopt the specific theory that they happen to favor. Loss of respect and understanding among individuals and cultures can be the result.
2. *Troublesome cases* – Even the most respected ethical theories have *particular cases* that they are unable to handle well. For example, Kantian critics of utilitarianism sometimes describe situations in which *terrible injustices* can result from adherence to utilitarian principles. Similarly, utilitarian critics of Kantianism point to cases where telling a lie or breaking a promise would prevent horrendous consequences; while telling the truth or keeping a promise, which Kant’s theory always requires, would cause *catastrophic results*.
3. *Difficulty coping with non-human agents* – New kinds of ‘agents’ are beginning to emerge from the Information Revolution and genetic engineering. These agents include, for example, cyborgs (part human, part machine), robots, ‘softbots’ (software robots), and genetically engineered ‘super humans’. Such new agents do not fit well into the ‘great ethical theories’, because those theories primarily address old-fashioned human agency. But non-human agents have only just begun to act more like our children and less like our puppets (Chang 2006, Markoff 2006), so additional ethical tools and concepts will be needed to determine their appropriate roles.

¹ For an excellent discussion of this point see Baumrin (1988).

² The term ‘computer ethics’ was coined by Walter Maner in the mid 1970s to refer to that field of research that studies ethical problems “aggravated, transformed or created by computer technology” (Maner 1978). The field itself had been founded already by Norbert Wiener in the late 1940s and early 1950s, although no one at that time, including Wiener himself, viewed it as a separate field of research, so it was not given a name. Later thinkers coined other terms to refer to computer ethics in Maner’s sense; for example, ‘information ethics,’ ‘cyberethics,’ ‘ICT ethics’ (information and communication technology ethics). In the present essay, the term ‘information ethics’ will be used in *a very broad sense* to cover ethical issues associated with many different ways of storing, processing and transmitting information, including for example telephones, telegraph, radio, television, photography, computers, information networks, DNA, and so on. The field of computer ethics, in Maner’s sense, is viewed here as a subfield of information ethics in this broad sense. Luciano Floridi and his colleagues at Oxford University’s Information Ethics Research Group use the term ‘information ethics’ as a name for the specific metaphysical foundation of computer ethics that they have been developing. In the present paper, I use the convention of ‘small caps’ (thus, INFORMATION ETHICS) whenever I am referring to Floridi’s specific foundation for computer ethics, rather than the broader field of information ethics upon which this essay is focused.

Traditional ‘great ethical theories’ are subject to one or another of these anomalies; but Flourishing Ethics can resolve all of them. Flourishing Ethics also can provide helpful new insights into the traditional theories – deepening and broadening our understanding of them.

A note on method

The philosophical method employed in the present essay is “minimalist” in the sense of Occam’s razor:

when multiple competing theories have equal predictive powers, the principle [of Occam’s razor] recommends selecting those that introduce the fewest assumptions and postulate the fewest hypothetical entities. It is in this sense that Occam’s razor is usually understood. (*Wikipedia*, accessed July 2006)

One of the primary goals of the present essay is to see how far one can go toward the establishment of a foundation for Flourishing Ethics while at the same time assuming, as far as possible, *only what science assumes about the world and the physical entities within it*. Thus, for example, human beings are *at least* physical information processing entities that obey the laws of mathematics and physics. Humans may be much more than that (for example, some may wish to say that humans “have a ghost in the machine,” to borrow a phrase from the British philosopher Gilbert Ryle (1949)). The method adopted here, though, is to assume that humans and other entities in the universe are at least what science says they are, while recognizing that others may wish to add ‘ghosts in machines’ or other ‘nonscientific’ entities and qualities. This and similar ‘Occam-like’ assumptions will be employed and noted in the paragraphs below.

Human-Centered Flourishing Ethics

Aristotelian roots of Human-Centered FE

Because Aristotle was the greatest scientist in his own time, he had an unusual opportunity to support his ethical theory with scientific insights into human nature and the nature of the universe. Of special interest is the thoroughgoing way in which he integrated his ethics, not only with his social and political philosophy (which one would expect), but also with the powerful new sciences that he had just developed; namely, his physics and his biology. These sciences grounded Aristotle’s explanation of animal behavior, which – when combined with his new theory of reasoning – led to his accounts of human purpose, human action, and

human virtue.³ The result was one of the world’s great ethical theories, still powerful and influential more than two thousand years later. Given its focus upon *human flourishing*, and its integration with a scientific understanding of human nature and the nature of the universe, Aristotle’s ethics can be considered a very early version of Human-Centered FE.

Like Aristotle’s ethics, today’s emerging Flourishing Ethics is more integrated with scientific accounts of human nature and the universe than are most other ethical theories. Thus, for example, it is supported and informed by cutting-edge ideas from today’s astrophysics, cybernetics, genetics, neuropsychology and computer science.

Another significant similarity between today’s Flourishing Ethics and Aristotle’s theory is its *compatibility with cultures around the globe*. A person does not have to be an ancient Greek to admire virtuous behavior in Aristotle’s sense of this term. So people from Asia, Europe, Africa, the Americas and other parts of the world can respect, and aspire to become, someone who is courageous, temperate, friendly, and virtuous in many other ways described by Aristotle (in his *Nicomachean Ethics* and *Eudemian Ethics*). Today’s Flourishing Ethics too, like Aristotle’s early version, is *compatible with many cultures*, and yet it is not simply a version of ‘galloping relativism’ or unwarranted permissiveness.

Aristotle’s familiar account of the virtues and vices – the ‘means’ and ‘extremes’ of human character – will *not* be a central concern here. Instead, we will be especially interested in his assumption that *the purpose of a human life is to flourish as a human being by doing excellently what humans are especially equipped to do*. For Aristotle, given his famous definition of man as “the rational animal,” it follows that flourishing as a human requires *reasoning excellently*.⁴

Aristotle, of course, did not use present-day terms like ‘cybernetics,’ ‘feedback,’ ‘input,’ or ‘output.’ Nevertheless, his explanations of animal behavior and of human action, as well as his account of the purpose of a human life, include a number of ideas remarkably similar to those used by Norbert Wiener in the mid twentieth century when Wiener laid the foundation for information ethics. (See Section ‘Norbert Wiener and the birth of information ethics’ below.) Aristotle’s theory of animal behavior, for example, treats animals as *information-processing entities*.⁵ Indeed, he dis-

³ See Aristotle’s *On the Movement of Animals, On the Soul*, and *Nicomachean Ethics* VII. And see especially Bynum (1986).

⁴ For an insightful account of Aristotle on flourishing, see Cooper (1975), e.g., pp. 16 and 89.

⁵ It is assumed here that Aristotle considered animals to be *at least* information-processing beings. This is sufficient for our purposes. In keeping with Occam’s Razor, we need not tackle the question of *what else* animals might be.

tinguishes animals from plants by their ability, unlike plants, to perceive. Every animal, he said, has at least the sense of touch, and so every animal receives into its body information from the external world. After perceptual information enters an animal's body, it is processed in ways that depend upon the animal's physiology. The processing of such information typically triggers behavior that is characteristic of the kind of animal in question. Aristotle explores this 'triggering' process in his account of the so-called 'practical syllogism,' which functions within an animal very much like a conditional 'if ... then' operator functions within a modern computer.⁶ In summary, then, the physiology of an animal, according to Aristotle, determines: (1) the kinds of perceptual information that the animal can take in, (2) how this information is processed within the animal's body, and (3) what the resulting animal behavior will be (Aristotle, *On the Movement of Animals*).

The most sophisticated information processing in the animal kingdom, according to Aristotle, occurs within human bodies. In particular, the kinds of information processing that Aristotle called 'theoretical reasoning' and 'practical reasoning' include what we, today, call 'comparison,' 'pattern recognition,' 'concept formation,' 'inductive reasoning,' 'deductive reasoning,' 'evaluating,' 'decision making,' and much more. The capacity to engage in such rational thinking Aristotle called *nous* or intellect; and the successful application of *nous* to the task of selecting virtuous actions (that is, actions performed in the right way at the right time for the right reasons) Aristotle called *phronesis* (practical judgment or practical wisdom). These activities of theoretical and practical reasoning, according to Aristotle, are – or at least must be accompanied by – the bodily manipulation of 'phantasms' (residual perceptual images). As I have written elsewhere,

Aristotle is committed to the view that thinking involves the presence and manipulation of phantasms. His explanations of memory, recollection, concept acquisition, inferring and deliberation all require phantasms. And since phantasms are bodily entities, he seems committed to the view that thinking *is* – or at least requires – a physiological process. (Bynum 1986, p. 124)⁷

⁶ See Bynum (1986), Chapter VII.

⁷ There are certain passages in the Aristotelian corpus that appear to contradict this interpretation of Aristotle, but the interpretation presented here is consistent with the overwhelming majority of Aristotle's relevant works and passages. Compare the opening of *On the Soul* 403a6ff and a later passage in that same work 429a23ff. For the purposes of the present essay, it does not matter whether reasoning *is* the manipulation of bodily entities or merely *requires the presence* of such manipulation.

Crucial to the flourishing of human beings is the fact that these bodily processes (manipulations of 'phantasms') generate *meaning* in the semantic and emotional senses of this term. Precisely what meaning is and how it is generated from bodily processing of physical information ('Shannon information' in today's language; see below) are among the most challenging questions in all of philosophy. No philosopher has yet developed a complete and fully satisfying theory of meaning; and decades may pass before such a theory finally is developed. Nevertheless, it was clear even to Aristotle that physical manipulation of information inside of a person's body is – or generates – theoretical and practical reasoning, thereby empowering human beings to set goals, manipulate nature, and govern their own actions in an endless variety of ways. These capacities distinguish humans from other animals and make it possible, *in the context of society*, to achieve knowledge, virtue, and wisdom – and thereby flourish.

For Aristotle, what contemporary philosophers would call 'autonomy' – the capacity to deliberate about possible actions and then act upon the results of deliberation – is central to fulfilling the overall purpose of a human life (to flourish by doing excellently what humans are especially equipped to do). The autonomy of human beings makes them self-creators in at least two senses: by choosing their actions, one by one, humans continually create and adjust their own ethical characters – and their own lives and personal identities as well. For Aristotle, to flourish is to do these things excellently. *Autonomy, then, is the key to human flourishing.*

By itself, however, as Aristotle clearly saw, *autonomy is not sufficient for flourishing* because human beings are *fundamentally social* and they cannot flourish on their own.⁸ Knowledge and science, wisdom and ethics, justice and the law are all *social achievements* requiring communication and interaction within a community of autonomous beings. *Given an appropriate society*, though, an autonomous human being can flourish in a wide diversity of ways – as a diplomat, teacher, philosopher, farmer, builder, midwife and so on. There are many different cultures and societies in which such human flourishing is possible.

Much more can be said on this topic,⁹ but enough has been presented for purposes of the present essay. The goal here is to describe, briefly, the Aristotelian roots of the emerging theory that I call 'Flourishing Ethics.' Let me summarize by emphasizing the following points:

⁸ See, for example, Aristotle's *Nicomachean Ethics*, IX, 9.

⁹ See my forthcoming book, tentatively entitled *Flourishing Ethics: An Ethical Theory for the Information Age*, which is currently being written.

1. In Aristotle's ethics, *human flourishing* is central.
2. Human beings are *social* animals. Only in the context of society can human beings flourish.
3. The *nature* of any living being, according to Aristotle, is determined by what that being is especially equipped to do, to *flourish* as a being of that kind is to do those things excellently and continuously.
4. It is the nature of a human being to reason theoretically and practically using intellect and practical judgment (*nous* and *phronesis*). To acquire genuine knowledge via theoretical reasoning and to act autonomously and justly via practical reasoning is to flourish as a human being. Because humans are social beings, they can only achieve these things in a social context.
5. The key to excellent practical reasoning, and therefore the key to being ethical, is the capacity to deliberate well about one's overall goals (using *nous*), choose a wise course of action (via *phronesis*), and carry out that action. For Aristotle all these activities require at least the physical manipulation of information within a person's body.¹⁰

Norbert Wiener and the birth of information ethics

The American philosopher/scientist Norbert Wiener played a leading role (with others, such as John von Neumann, Claude Shannon and Alan Turing) in creating the technology and the science that launched the Information Revolution (see Conway and Siegelman 2005). In addition Wiener, who had a Ph.D. in Philosophy and a rare gift of foresight, anticipated – in books, articles and speeches during the 1940s and 1950s – many of the enormous ethical and social impacts of information technology. The result was the creation of a new academic subject, which today is called ‘computer ethics’, or more generally ‘information ethics’.¹¹

¹⁰ Many interpreters of Aristotle would add that *nous* and *phronesis* require the presence of a spirit or non-material soul. Certain passages in the Aristotelian corpus would support this additional assumption and certain ones would contradict it. Fortunately, for our purposes, this additional “ghost-in-the-machine” assumption is unnecessary; and we do not need to enter into this centuries-old debate.

¹¹ In his books, articles and speeches, Wiener provided a ‘treasure trove’ of information ethics comments, examples and analyses (Wiener 1948, 1950, 1954, 1964). The ethical issues that Wiener analyzed, or at least touched upon, decades ago included topics that are still considered ‘contemporary’ today – ethical issues involving information networks and globalization, virtual communities, teleworking, computers and unemployment, computers and security, computers and religion, computers and learning, computers for persons with disabilities, responsibilities of computer professionals, the merging of human bodies and machines, ‘agent’ ethics, artificial intelligence, and a number of other topics as well. (See Bynum 2000, 2004, 2005, 2007)

(At the time, Wiener did not think of himself as creating a new academic subject, and so he did not give it a name.) Of special interest in the present essay will be the metaphysical foundation that Wiener presupposed for information ethics, plus his account of human nature, his account of the nature of society, and his view of the role of information in all of these.

During the Second World War, Wiener and his colleagues created a new branch of science that Wiener named ‘cybernetics,’ from the Greek word for the steersman or pilot of a ship. He defined cybernetics as *the science of information feedback systems and the statistical study of communications*. Wiener viewed human beings, and indeed all other animals, as ‘cybernetic systems’ whose internal parts communicate with each other in ways that include ‘feedback’ to monitor their own activities. Such cybernetic activities enable animals to maintain internal bodily stability and also interact with the external world to fulfill their desires and goals.

Wiener's foundation for information ethics is very Aristotelian, even though there is no evidence that he explicitly based himself upon Aristotle.¹² The similarities are striking between Aristotle's accounts of animal behavior and human action, on the one hand, and Wiener's explanations of animal behavior, human action, and machine agency on the other. Like Aristotle before him, Wiener used the science of his day to help understand human nature and thereby derive an account of purpose in a human life. Of course, the science in Aristotle's day was his own biology, physics and psychology, while that of Wiener included late nineteenth and early twentieth century sciences, such as, relativity, thermodynamics, statistical mechanics, Darwinian biology and his newly developed science of cybernetics.

Both Aristotle and Wiener described animals, including humans, as beings that take in information from the outside world, process and store it in ways dependent upon internal bodily structure, and adjust their behavior to take account of past experience and new information. Like Aristotle, Wiener saw an intimate relationship between *the information processing nature* of human beings and the *purpose* of a human life. For Wiener, as for Aristotle, the overall purpose of a human life is to *flourish as a person*; and to achieve this purpose, one must engage in a diversity of information processing activities, such as perceiving, organizing, remembering, inferring, deciding, planning, and acting. Human flourishing,

¹² Indeed there is evidence that Wiener considered Aristotle's biological writings to involve mostly categorizing. (Wiener, 1950, p. 78)

then, is utterly dependent upon internal information processing:

Information is a name for the content of what is exchanged with the outer world as we adjust to it, and make our adjustment felt upon it. The process of receiving and of using information is the process of our adjusting to the contingencies of the outer environment, and of our living effectively within that environment. The needs and the complexity of modern life make greater demands on this process of information than ever before.... To live effectively is to live with adequate information. Thus, communication and control belong to the essence of man's inner life, even as they belong to his life in society. (Wiener 1954, pp. 17–18)

Wiener contrasted information processing in humans with that of other animals, and he noted the importance of bodily structure. Consider his comparison of humans with ants:

I wish to show that the human individual, capable of vast learning and study, which may occupy about half of his life, is physically equipped, as the ant is not, for this capacity. Variety and possibility are inherent in the human sensorium – and indeed are the key to man's most noble flights – because variety and possibility belong to the very structure of the human organism.

While it is possible to throw away this enormous advantage that we have over the ants [and the rest of the animal kingdom], and to organize ... [an] ant-state with human material, I certainly believe this is a degradation of man's very nature, and ... a waste of the great human values which man possesses. ... if the human being is condemned and restricted to perform the same functions over and over again, he will not even be a good ant, not to mention a good human being. (Wiener 1954, pp. 51–52; bracketed words added for clarity)

...

Cybernetics takes the view that the structure of the machine or of the organism is an index of the performance that may be expected from it. The fact that the mechanical rigidity of the insect is such as to limit its intelligence while the mechanical fluidity of the human being provides for his almost indefinite intellectual expansion is highly relevant to the point of view of this book. (Wiener 1954, p. 57, italics in the original)

According to Wiener, just as individual animals can be viewed as dynamic, cybernetic entities, so

communities and societies can be analyzed in a similar way:

It is certainly true that the social system is an organization like the individual; that it is bound together by a system of communication; and that it has a dynamics, in which circular processes of a feedback nature play an important part. (Wiener 1948, p. 33)

In Chapter VIII of *Cybernetics*, Wiener noted that societies and groups can be viewed as *second-order* cybernetic systems because their constituent parts are themselves cybernetic systems. According to Wiener's cybernetic understanding of society, the processing and flow of information are crucial to the nature and the functioning of the community. Communication, he said, is "the central phenomenon of society" (Wiener 1950, p. 229).

Wienerian ethical theory

Although Wiener did note, in some of his writings, that there is a need for ethical rules to cover "systems involving both human and mechanical elements" (i.e., cyborgs), and although he also expressed concern about machines being permitted to make ethical decisions in place of humans, he did not propose anything in his writings that could be construed as 'machine ethics' or 'cyborg ethics.' Instead, his explicit discussions of ethical theory remained focused upon *actions* and *values* of human beings. Thus, in the opening chapter of the first edition of *The Human Use of Human Beings*, Wiener said:

That we shall have to change many details of our mode of life in the face of the new machines is certain; but these machines are secondary in all matters of value that concern us to the proper evaluation of human beings for their own sake....The message of this book as well as its title is *the human use of human beings*. (Wiener 1950, p. 2, italics in the original)

Wiener's explicit ethical theory, therefore, is a version of Human-Centered FE, since it focuses exclusively upon humans. Nevertheless, his underlying metaphysics, and some comments he made about cyborgs and decision-making machines, provide an excellent foundation for General FE, which applies to everything in the universe. (See Sections 'Wiener on the new role of machines in society,' 'The metaphysics of Wiener's information ethics' and 'Wiener on good and evil' below.)

Wiener often discussed ways to defend or advance *human values* in light of new developments in

information and communication technology. Some of those values included *life, health, security, knowledge, opportunity, abilities, happiness, peace*, and most of all, *freedom* (not freedom in a right-to-vote political sense, but freedom in the sense of *autonomy* – making choices and carrying them out in pursuit of one’s chosen goals). A good human life, according to Wiener, is one in which the creative and flexible information-processing potential of human physiology enables people to reach their full promise in variety and possibility of autonomous action. At its best, such information processing leads to “man’s most noble flights.” Of course, different humans have different interests and various levels of talent, so one person’s achievements will be different from another’s, and it is possible to lead a good human life in a vast diversity of ways – for example, as a public servant or statesman, a teacher or scholar, a scientist, engineer, musician, farmer, tradesman, and so on. Like Aristotle, Wiener viewed human autonomy as the power to continually create and adjust one’s personal identity, one’s life and one’s moral character.

Wiener’s conception of the purpose of a human life leads him to state what he calls “great principles of justice” upon which a society should be built – principles that would maximize a person’s ability to flourish through variety and flexibility of human action. For easy reference to these ‘great principles’ let us call them ‘The Principle of Freedom,’ ‘The Principle of Equality’ and ‘The Principle of Benevolence.’ (Wiener himself does not assign names.) Using Wiener’s own definitions yields the following list (Wiener 1950, pp. 112–113):

THE PRINCIPLE OF FREEDOM – Justice requires “the liberty of each human being to develop in his freedom the full measure of the human possibilities embodied in him.”

THE PRINCIPLE OF EQUALITY – Justice requires “the equality by which what is just for A and B remains just when the positions of A and B are interchanged.”

THE PRINCIPLE OF BENEVOLENCE – Justice requires “a good will between man and man that knows no limits short of those of humanity itself.”

In addition to these three “great principles of justice,” Wiener added a fourth principle in order to protect freedom from an oppressive government or society. Let us call it ‘The Principle of Minimum Infringement of Freedom’:

THE PRINCIPLE OF MINIMUM INFRINGEMENT OF FREEDOM – “What compulsion the very existence of

the community and the state may demand must be exercised in such a way as to produce no unnecessary infringement of freedom.”

After introducing these ethical principles in *The Human Use of Human Beings* (Chapter VII, 1950), Wiener did not elaborate upon them or provide examples, either in that book or elsewhere, to explain or illustrate in detail how his readers should interpret them or apply them to cases. The Principle of Freedom and the Principle of Minimum Infringement of Freedom seem intended to *maximize the opportunities for all humans to exercise their autonomy as they strive to fulfill their chosen goals and human potential*. This requires a social context that provides security for the protection of life, limb and property, as well as opportunities to apply one’s talents to projects of one’s choice. The Principle of Benevolence calls for *respect for each person’s effort to flourish* and, perhaps, positive actions to help others flourish. The Principle of Equality entails that, for any two people, A and B, *if it is ethically permitted for A to treat B in a certain way, then, in ethically similar circumstances, it is permitted for B to treat A in a similar way*. (One is left wishing that Wiener had developed this part of his theory more fully.)

Ethical relativism and multiple societies

Given Wiener’s view of the purpose of a human life, it is possible to flourish in many different societies and communities. Wiener clearly believed that human potential can be fulfilled to various degrees, with some societies providing less infringement upon creative and flexible human action than others. In *The Human Use of Human Beings*, he discussed a number of societies and social structures including, for example, Eskimo society, the caste system in India, feudalism, despotism, fascism and American representative democracy (see, for example, Wiener 1950, pp. 59–61). He reserved his harshest criticism for “communities ruled by despots” like the fascist states of the first half of the twentieth century; and he expressed his belief that if a democracy, such as the United States, were actually to live up to its ideal of freedom for all, it could become a model community for achieving human flourishing. He also made it clear, in *The Human Use of Human Beings*, and elsewhere, that he thought the American society of the mid-twentieth century fell far short of this ideal.

If one accepts Wiener’s account of human nature and a good society, it follows that *many different cultures, with a wide diversity of customs, religions, languages and practices, can provide a conducive context for human flourishing*. Indeed, given Wiener’s

view that “variety and possibility belong to the very structure of the human organism,” one would expect and encourage the existence of a broad diversity of cultures around the world to maximize the possibilities for human choice and creative action. The primary restriction that Wiener would place upon any society is that it should provide a context in which humans can realize their full potential; and he believed this to be possible only where significant autonomy, equality and human compassion hold sway.

So-called ‘ethical relativists’ often point to the wide diversity of cultures in the world – with various religions, laws, codes, values and practices – as evidence that there is no global ethics, no underlying universal ethical foundation. But Wiener can offer a compelling response to such sceptics. Given his account of human nature and the purpose of a human life, *Wiener can embrace and welcome the rich diversity of cultures, laws, norms and practices that sceptics and relativists are fond of citing; while, at the same time, advocating some underlying ethical principles for all societies and cultures – namely, his ‘great principles of justice.’* These can provide a minimum ethical foundation that can be supplemented and enriched by a wide diversity of traditions, practices and additional values.

Moor on computer ethics and ‘Just Consequentialism’

Until very recently, the information ethics ideas of Norbert Wiener were essentially unexamined by computer ethics scholars.¹³ As a result, significant contributions were made to computer ethics, independently of Wiener, during the 1970s through the 1990s. One of the most important of these achievements is the influential computer ethics theory of James Moor, which he developed and refined in the 1980s and 1990s (see, for example, Moor 1985, 1998, 1999). Although it was not based upon Wiener, Moor’s computer ethics theory is compatible with Wiener’s ‘great principles of justice’, under at least one reasonable interpretation of them. Because of this, Moor’s theory can be viewed as a version of Human-Centered FE. It includes a clear, practical method of case analysis, as well as an effective and innovative theory of justice (‘Just Consequentialism’).

Moor divides computer ethics into two kinds of activity:

1. Examination of the social and ethical impacts of computing technology (including hardware, software and networks)
2. Formulation and justification of policies for the ethical use of computing technology.

Of special interest in the first kind of activity is the identification of ‘*policy vacuums*,’ which arise when computing technology makes it possible to do new kinds of things. Because those new things have not been done before, there are no ‘policies’¹⁴ to help determine whether one should do them. Just because we *can* do them, that does not mean that we *should* do them. According to Moor, policy vacuums are not unique to computing, but they occur much more often with computing technology than with other technologies, because of the ‘*logical malleability*’ of computers, which makes them nearly ‘universal tools’ that can perform almost any task.

In Moor’s second kind of computer ethics activity – ethically justifying policies – one begins by clearing up any relevant ambiguities, then devising a set of possible new (or altered) policies to fill a ‘policy vacuum.’ Moor intentionally selected the term ‘*policies*’ instead of ‘*rules*’:

Rather than using “policies” I could use “rules.” But ethical rules are sometimes regarded as binding without exceptions. A system of exceptionless rules will never work as an ethical theory, for rules can conflict and sometimes exceptions must be made because of extraordinary consequences.... I prefer using the word “policy” because I want to suggest modification may be necessary in cases of conflict or extraordinary circumstance. (Moor 2006, p. 104)

Given a set of possible policies, one tries to identify a subset of *just* policies to fill the vacuum. A just policy, at a minimum, will apply to everyone equally:

When we act ethically, we are acting such that anyone in a similar situation would be allowed to do the same kind of action. I am not allowed to have my own set of ethical policies that allow me to do things that others in a relevantly similar situation cannot do. Ethical policies are public policies. (Moor 2006, p. 104)

To be publicly advocated, a policy must be ‘impartial,’ and Moor (1999, p. 68) employs the ‘blindfold of justice’ test from Bernard Gert (1998) to identify such policies. The details of Gert’s impartiality test need not concern us here. For our purposes we need only note that the Moor/Gert test of impartiality

¹³ Since the early 1950s, Wiener has been known, among computer professionals, as an early and important ‘*computers and society*’ thinker. His information ethics ideas, however, were not extensively examined by computer scientists or by computer ethics scholars until 1999. (See Bynum 2000)

¹⁴ According to Moor, “Policies are rules of conduct ranging from formal laws to informal, implicit guidelines for action.” (Moor 1999, p. 65)

selects policies that also would be compatible with Wiener's Principle of Equality – "what is just for A and B remains just when the positions of A and B are interchanged."

The result of this process will be a set of possible policies, some of which can be publicly advocated as *just* by all rational, impartial people; others would be rejected as *unjust* by all rational, impartial people; and some, perhaps, would be *debatable*. In order to determine which specific policies would be ethical, all of those that pass the justice test *must still be evaluated and compared based upon their likely consequences*. The consequences that Moor has in mind are what he calls "core goods," including "the goods of autonomy":

At the core, humans have similar kinds of values, i.e., what kinds of things they consider to be goods (benefits) and what kinds of things they consider to be evils (harms). In general the core goods include life, happiness and autonomy and the core evils include death, unhappiness, and lack of autonomy. By "happiness" I mean simply pleasure and absence of pain....Obviously, humans do not share all their goals in common. But no matter what goals humans seek, they need ability, security, knowledge, freedom, opportunity and resources in order to accomplish their projects. These are the kinds of goods that permit each of us to do whatever we want to. For brevity I will call this set of goods "the goods of autonomy" or simply "autonomy." (Moor 1999, p. 67; see also Moor 1998)

In evaluating the consequences, we must "take the ethical point of view" and consider the good of others, at least to the extent of not harming them unjustifiably. This is similar to Wiener's Principle of Benevolence; though Wiener, perhaps, would interpret his principle more proactively as a requirement to do good for others in addition to avoiding unjustifiable harm to them.

Moor's concern to preserve and advance 'autonomy', defined in terms of 'core goods,' is similar to Wiener's concern to preserve and advance 'freedom.' Moor defines 'autonomy' as doing "whatever we want to," consistent with justice, and in pursuit of the same human values that Wiener advocates and defends in his information ethics writings.

Like Wiener's information ethics theory, Moor's Just Consequentialism is very Aristotelian:

The combined notions of human life, happiness, and autonomy may not be far from what Aristotle meant by "human flourishing". Thus, from an ethical point of view, we seek computing policies that at least protect, if not promote, human flourishing. (Moor 1999, p. 66)

The basic components of Human-Centered FE

The ethical theories of Aristotle, Wiener and Moor are versions of Human-Centered Flourishing Ethics. There are, of course, significant differences among them, but all three theories make *human flourishing* a primary focus of ethical consideration, and all three identify *autonomy* as a necessary condition for flourishing. To flourish, human beings must be in charge of their own lives – deciding what to do, carrying out their decisions and taking responsibility for them, creating and adjusting their personal identities and moral characters, choosing and creating their lives, one action at a time, striving to achieve their full promise in variety and possibility of action. Wiener called this 'freedom.'

All three theories also recognize that humans are *social beings* who cannot flourish on their own. To live happy, meaningful lives, they must live together in communities – sharing experiences, challenges, common values – working to create or preserve a social context in which security, opportunities, knowledge, resources, and the other 'core goods' are available in the community. Without 'core goods', even autonomous human beings could not "achieve their full promise in variety and possibility of action", and so they could not flourish.

Finally, all three theories recognize the need for *justice* in society. Aristotle's social virtues, Wiener's Principles of Equality and Benevolence, and Moor's Just Consequentialism all recognize that the good of each person must be respected and taken into account in a way that can be rationally justified. The laws and traditions of society should be just in this sense.

Resolution of anomalies

Given this understanding of Human Centered FE, the first two of the three anomalies described in Section 'A shift in ethical perspective' above can be resolved:

Resolution of Anomaly 1: *Rejection of all ethical theories but one* – Human-Centered FE provides an ethical core that can be combined with a rich variety of traditions, practices, customs, beliefs and values to make life meaningful and fulfilling in a wide diversity of communities and cultures around the globe. It is consistent, for example, with a Kantian emphasis upon autonomy and respect for the worth of every person, and it is sympathetic with the utilitarian's concern for happiness and pleasure, since these are normally necessary for human flourishing. Rather than rejecting every other ethical theory or moral tradition, Human-Centered FE can embrace and welcome a diversity of theories and traditions that foster human freedom, equality and benevolence.

Resolution of Anomaly 2: *Troublesome cases* – As illustrated by Moor's 'just consequentialism' version

of Flourishing Ethics, if one avoids dogmatic adherence to a single theory, ‘troublesome cases’ that resist resolution when viewed from the perspective of one ethical tradition can be resolved with the aid of two or more traditions working together.

Limitations of Human-Centered FE

Sympathetic critics of Human-Centered FE would acknowledge the above-described advantages and positive qualities of the theory. At the same time, they may point out, nevertheless, that limiting one’s ethical concerns to the flourishing of human beings is *too restrictive*. It is simply ‘common sense,’ they might argue, that the welfare of other beings in addition to humans is an ethically relevant consideration. So, for example, inflicting unnecessary suffering and misery upon non-human members of the animal kingdom is ethically unacceptable.

Harsher critics of Human-Centered FE would use more negative language. They might say, for example, that limiting ethical concerns to *human* flourishing is a selfish and arrogant kind of ‘speciesism,’ which unnecessarily and unwisely places an artificial wall between humans and the rest of nature. Yes, such critics might say, we *should* be concerned with human flourishing, but we also should care for the welfare of other members of the animal kingdom, or even all living things. Some people would even say that human beings should respect and care for all of nature, living or not.

These are important points about the appropriate scope of ethics; and, fortunately, Human-Centered FE is *only a part* of the General Theory of Flourishing Ethics (General FE), *which does take account of these and other valid criticisms*. In the remaining pages of this essay, General FE will be explained and related to the above-described criticisms with the help of metaphysical and cybernetic ideas from Norbert Wiener, as well as recent developments in physics, biology and communication theory. Of special interest will be Wiener’s assumptions about the ultimate nature of the world, his account of *natural good and evil* built into the fabric of the universe, and his discussions of ethics for cyborgs, robots and other new kinds of agents. Also of interest will be the claim of contemporary physics that the universe is, ultimately, made out of information.

The general theory of Flourishing Ethics

Wiener on the new role of machines in society

Before 1950, Wiener’s social analyses dealt with communities consisting primarily of humans or other

animals. From 1950 onward, however, beginning with the publication of *The Human Use of Human Beings*, Wiener assumed that *machines will join humans as active participants in society*. For example, some machines will participate along with humans in the vital activity of creating, sending and receiving messages that constitute the ‘cement’ which binds society together:

It is the thesis of this book that society can only be understood through a study of the messages and the communication facilities which belong to it; and that in the future development of these messages and communication facilities, messages between man and machines, between machines and man, and between machine and machine, are destined to play an ever-increasing part. (Wiener 1950, p. 9)

Wiener predicted, as well, that certain machines – namely electronic computers with robotic appendages – will participate in the workplace, replacing thousands of human factory workers, both blue collar and white collar. He also foresaw artificial limbs – cybernetic prostheses – that will be merged with human bodies to help persons with disabilities, or even to endow able-bodied persons with unprecedented powers. “What we now need,” he said, “is an independent study of systems involving both human and mechanical elements.” (Wiener 1964, p. 77) Today, we would say that Wiener envisioned societies in which ‘cyborgs’ (humans merged with machines) will play a significant role and the world will need ethical policies to govern their behavior.

A special concern that Wiener often expressed involved machines that learn and make decisions on their own. He worried that some people, blundering like sorcerers’ apprentices, might create agents that humans are unable to control – agents that could act on the basis of values which humans do not share. It is risky, he noted, to replace human judgment with machine decisions, and he cautioned that a prudent man

will not leap in where angels fear to tread, unless he is prepared to accept the punishment of the fallen angels. Neither will he calmly transfer to the machine made in his own image the responsibility for his choice of good and evil, without continuing to accept a full responsibility for that choice. (Wiener 1950, pp. 211–212)

...

the machine ... which can learn and can make decisions on the basis of its learning, will in no way be obliged to make such decisions as we should have made, or will be acceptable to us. For the man

who is not aware of this, to throw the problem of his responsibility on the machine, whether it can learn or not, is to cast his responsibility to the winds, and to find it coming back seated on the whirlwind. (Wiener 1950, p. 212)

Wiener noted that, to prevent this kind of disaster, the world will need ethical rules for artificial agents, as well as technology to instill those rules effectively into the agents.¹⁵

In summary, then, Wiener foresaw future societies living in what he called the “Machine Age” or the “Automatic Age.” In such a society, machines will be integrated into the social fabric, as well as the physical environment. They will create, send and receive messages, gather information from the external world, make decisions, carry out those decisions, reproduce themselves, and be merged with human bodies to create beings with vast new powers. Wiener’s predictions were not mere speculations, because he himself had already designed or witnessed early versions of devices, such as game-playing machines (checkers, chess, war, business), artificial hands with motors controlled by the person’s brain, and self-reproducing machines, such as non-linear transducers. (See especially Wiener 1964)

Wiener’s descriptions of future societies and their machines elicited, from others, various questions about those machines: Will they have minds and be conscious? Will they be ‘alive’? Wiener considered such questions to be vague semantic quibbles, rather than genuine scientific issues. He thought of machines and human beings alike as physical entities with capacities that are explained by the ability of their parts to interact with each other and with the outside world. The working parts of machines are ‘lumps’ of metal, plastic, silicon and other materials; while the working parts of humans are exquisitely small cells, atoms, and molecules.

Now that certain analogies of behavior are being observed between the machine and the living organism, the problem as to whether the machine is alive or not is, for our purposes, semantic and we

are at liberty to answer it one way or the other as best suits our convenience. (Wiener 1954, p. 32)

Answers to questions about machine consciousness, thinking, or purpose are similarly semantic choices, according to Wiener; although he did believe that questions about the ‘intellectual capacities’ of machines, when appropriately stated, could be genuine scientific questions:

Theoretically, if we could build a machine whose mechanical structure duplicated human physiology, then we could have a machine whose intellectual capacities would duplicate those of human beings. (Wiener 1954, p. 57)

In his 1964 book, *God and Golem, Inc.*, Wiener expressed skepticism that machines would ever duplicate the complex structure of the human brain, because electronic components were too large and impossible to cram together like the neurons packed into a human brain. As the above quotation indicates, though, he did leave open at least the theoretical possibility that machines would someday be created that could equal or exceed human intelligence.

The metaphysics of Wiener’s information ethics

The Flourishing Ethics theories of Aristotle, Wiener and Moor are all focused upon *human* actions and *human* values. Wiener provided as well (see Section ‘Wiener on the new role of machines in society’) examples and commentary on the desirability of *ethics for robots and cyborgs*. Though he did not develop any ethical principles for such non-human agents, Wiener did presuppose a metaphysics that can ground a system of ethics for non-human agents (see Section ‘Wiener on good and evil’ below).

Wiener’s metaphysics assumed that *information is physical* – that it is subject to the laws of nature and is measurable by science. The kind of information that Wiener had in mind is sometimes called ‘*Shannon information*’ – named for Claude Shannon, who had been a student and colleague of Wiener’s at MIT.¹⁶ Shannon information is the kind that is carried in telephone wires, TV cables and radio signals. It is the kind of information that digital computers process and DNA encodes within the cells of all biological organisms. Although Shannon information *can* be a means for conveying semantic contents – like sense,

¹⁵ A New York Times article in May 2006 (Chang 2006) described a NASA planet rover currently under development: “While some safety rules might be explicitly programmed – the equivalent of telling a child ‘Do not cross a busy road’ – the scientists also will put in programming that allows the robot to learn its behavior through trial and error. ‘You’d essentially set up a playground where the robot can perform these simple behaviors.... It’s a lot like what children do’.... the technology could be ready for a rover to explore the rockier regions of the Moon in a few years.”

¹⁶ Shannon and Wiener were among the founders of information theory, and Shannon became known as the founding father of the mathematical study of information.

reference and connotation – it need not do so,¹⁷ and in the overwhelming majority of cases it does not do so. Wiener was very clear about his belief that such information, even though it is physical, is *neither matter nor energy*. Thus, while discussing thinking as information processing in the brain, Wiener noted that the brain

does not secrete thought “as the liver does bile”, as the earlier materialists claimed, nor does it put it out in the form of energy, as the muscle puts out its activity. Information is information, not matter or energy. No materialism which does not admit this can survive at the present day. (Wiener 1948, p. 155)

According to Wiener’s metaphysics, although matter-energy and Shannon information are different physical phenomena, neither can exist on its own, each requires the other. So-called ‘physical objects’ – including living organisms – are actually persistent patterns of information in an ever-changing ‘flow’ or ‘flux’ of matter-energy. Every physical process is a mixing and mingling of matter-energy with Shannon information – a creative ‘coming-to-be’ and a destructive ‘fading away,’ as old patterns of matter-energy and information fade and new ones emerge. Metaphorically expressed: Shannon information and matter-energy mix and swirl in a ‘cosmic dance,’ giving birth to objects and relationships, which constitute all that ever was or ever will be, till the end of time. This view of the fundamental nature of the universe is reminiscent of metaphysical ideas in a number of philosophical traditions. For example, Wiener’s matter-energy and information are much like Aristotle’s ‘matter’ and ‘form.’ According to Aristotle, all objects consist of both, and neither can occur without the other, so if all form is lost, no individual object can remain. Similarly, the mixing

¹⁷ Especially worthy of note here is the fact that human thought (and possibly that of certain other animals) includes the processing of information that is *not merely* “Shannon information” – not merely the kind of information that DNA encodes and digital computers process. Thinking by human beings (and possibly other animals) involves *meaning*, and there are many theories of meaning, including sense and reference, semiotics, and hermeneutics, to mention only a few examples. Exactly what meaning is, and how Shannon information can encode it and “carry” it from place to place and from thinker to thinker is one of the most challenging and complex questions in philosophy, linguistics, psychology, social theory, and many other disciplines. Decades are likely to pass before we have a deep systematic account of the nature of meaning and how Shannon information can function as its “carrier.” It seems clear, however, that the human central nervous system must process Shannon information in order to acquire, interpret, understand, manipulate and convey *meaningful* information. Future robots, softbots, and other “new agents” certainly will process Shannon information; but it remains to be seen whether they also will make use of *meaningful* information like humans do.

and mingling of matter-energy and information in Wiener’s universe seem much like the blending of yin and yang in the ‘flow of the Tao,’ and suggestive of the creative/destructive ‘cosmic dance’ of the Hindu god Shiva Nataraj.

Another aspect of Wiener’s metaphysics is his account of human nature and personal identity. Human beings (and all other living organisms), according to Wiener, are *patterns of information persisting through changes in matter-energy*. Because of biological processes within a person’s body, such as, breathing, eating, drinking, perspiring and so on, virtually all the atoms and molecules that make up someone’s body are exchanged for new ones from the surrounding environment every few years. In spite of this continuous exchange of matter-energy in a person’s body, the complex organization or *form* of the person – the pattern of Shannon information encoded within – is maintained to preserve life, functionality and personal identity. As Wiener poetically said,

We are but whirlpools in a river of ever-flowing water. We are not stuff that abides, but patterns that perpetuate themselves. (Wiener 1954, p. 96)

...

The individuality of the body is that of a flame ... of a form rather than of a bit of substance. (Wiener 1954, p. 102)

To use today’s language, humans are ‘information objects’ whose personal identity is tied to information processing and persisting patterns of information, rather than to specific bits of matter.

Support from today’s physics

The metaphysics that underlies Wiener’s information ethics anticipated recent developments in physics. According to the so-called ‘theory of everything,’ which has emerged from physics during the past two decades, the universe is fundamentally informational. Every so-called ‘object’ or physical entity is, in reality, a persisting pattern of relationships and processes that amount to the flow of digital, ‘yes/no,’ ‘on/off’ information (Shannon information). This account of the nature of the universe originated with Princeton physicist John Wheeler (see, for example, Wheeler 1990); and it has been refined and supported by many scientific experiments during the past decade. One important discovery, for example, made by physicist Jacob Beckenstein, who had been a student of Wheeler’s, is the so-called ‘Beckenstein Bound,’ which sets an absolute limit upon the amount of Shannon information that can be contained in a given amount of space (Beckenstein 2003).

Because of recent scientific developments like these, Wiener's assumptions about the fundamental nature of the universe, from the 1940s and 1950s, have been confirmed and elaborated by contemporary physics. Indeed, scholars like MIT's Seth Lloyd now are able to publish books that describe, in careful scientific detail, the mixing and mingling of matter-energy and information that continually creates everything in the universe. (See Lloyd 2006)

Wiener on good and evil

In his information ethics writings, Wiener regularly mentions "good and evil". Sometimes the evil to which he refers is the result of malevolent, negligent, or foolish human beings. At other times, however, the evil to which Wiener refers is a *natural evil* – an evil that is *built into the very fabric of the universe*. In the Second Edition Revised of *The Human Use of Human Beings* (e.g., 1954, Ch. 2), Wiener refers to *entropy* as "the devil" – an "arch enemy" of all order and structure in the universe – the ultimate cause of death, disease, decline, decay, destruction, and pain – a relentless threat that eventually will destroy everything that anyone might value. Because of this, *it is good to resist or decrease entropy*.

What is entropy? In the Nineteenth Century, while striving to develop more efficient heat engines, physicists and engineers discovered entropy, which they described as a measure of "lost heat" – heat that can no longer do useful work. It later became clear that entropy applies to all physical entities and processes, and not just to heat transformations within engines. Thus, in every physical object or process, 'free energy' (energy that can bring about physical change) can never increase and will almost always decrease. This is a result of the Second Law of Thermodynamics – a fundamental fact about the nature of the universe, which causes all physical objects and processes in the universe to tend toward chaos and destruction as entropy increases and the amount of free energy within them diminishes.

In the last half of the Twentieth Century, it was discovered that entropy is also a measure of 'lost' Shannon information. The conversion of useful free energy to useless 'entropic energy' is the result of the loss of available Shannon information.¹⁸ Because of the relentless loss of information in accordance with the second law of thermodynamics, every pattern or structure in the universe eventually will decay into

chaos and homogeneity. Dissolution and destruction, then, will be the ultimate fate of every physical entity – even priceless works of art, magnificent buildings, living organisms, ecosystems, civilizations, mountain ranges, earth and moon and stars. In this sense, *increasing entropy* (i.e., loss of available Shannon information) *can be seen as the greatest natural evil*, threatening everything that humans hold dear – indeed, *destroying everything that any being could value*.

Happily, according to Wiener, this 'ultimate fate of everything' can be resisted and put off for a very long time, perhaps for millions of years, in certain small pockets of the universe like the region of the earth. This remarkable circumstance is made possible by the fact that *the earth teems with beings that increase order and structure locally*, and thereby locally increase available Shannon information – decreasing entropy locally even as they increase it in the universe as a whole. Such beings take in information and small bits of matter-energy from other regions of the universe (e.g., from the sun). On earth, and in its nearby space-time region, several kinds of 'local-entropy-decreasing' beings exist:

1. *All Living Organisms* – All living organisms, because of the Shannon information encoded in their genes, and because of the structures and processes within their bodies, are repositories and generators of local Shannon information. By living and growing they actually *increase* the amount of available information – and so, *decrease* the amount of entropy – in their local region of the universe. This 'anti-entropy' effect is multiplied dramatically when living beings reproduce themselves. The more they flourish, the more they decrease entropy – natural evil – in their local region of the universe. Because they decrease natural evil locally, *it is good when living organisms flourish*.
2. *Animals* – Animals, of course, are living organisms, so they share with plants the anti-entropy impact described in 1 above. But animals have an *additional means of decreasing local entropy*; namely, the cybernetic *information processing and feedback mechanisms* which Aristotle and Wiener described in such detail. Animals use small amounts of Shannon information and energy from perception, kinesthesia, memory, and other information processing activities to maintain the structure and function of their own bodies, and to bring *additional order and structure* to their environments. The more that animals flourish, therefore, the more they locally decrease the natural evil of entropy. *Thus, it is good when animals flourish*.

¹⁸ 'Lost' Shannon information is *not* actually destroyed, rather it is converted to useless 'invisible' entropic information that is dispersed into the quantum mechanical background of the universe. See Lloyd, 2006, pp. 40–41.

3. *Human Beings* – People are members of the animal kingdom, so they share all of the entropy-reducing abilities just described in 1 and 2 above. In addition, humans have the special information processing capabilities that Aristotle called “theoretical and practical reasoning.”¹⁹ These special capabilities give humans *tremendous power to add order and structure, and thus information, to their local region of the world*. When humans flourish, therefore, they dramatically reduce entropy locally. *It is, therefore, a very good thing indeed for humans to flourish.*
4. *Communities, Societies, and Civilizations* – Wiener argued that human communities should be considered “second-order cybernetic systems” because their members are themselves cybernetic systems. Second-order cybernetic systems with large numbers of first-order cybernetic members *dramatically decrease local entropy* beyond what individual members could do by themselves. This is crucial to the flourishing of human beings, because when humans join forces in communities – especially communities which uphold Wiener’s “great principles of justice” (or Moor’s “Just Consequentialism”) – their ability to generate and acquire meaningful information, and live fulfilling and meaningful lives, is increased exponentially. *It is a very good thing indeed, therefore, for such human communities to flourish.* They make life profoundly fulfilling, and they dramatically decrease evils locally, such as death and disease, chaos and disorder.
5. *Ecosystems* – Most animals and plants live together in specific environments like river valleys, rain forests, deserts, and so on. There, they typically interact in ways that bring about a ‘balance of nature.’ In this happy circumstance – an ‘ecosystem’ – a complex, dynamic pattern of animal, plant, and ‘land’ interactions creates *even more local order and structure* than the individual animals and plants could bring about on their own. When such ecosystems flourish, the natural evil of entropy is reduced significantly in the local environment. *It is therefore very good when ecosystems flourish.*
6. *Information Processing Machines* – Today’s information processing machines manipulate Shannon information and thereby add much order and structure to the communities in which they function. They reduce local entropy significantly. When future ‘artificial agents,’ such as cyborgs, robots and softbots gain sophistication, and act much more like our children and much less like our

puppets, they will participate more and more in communications and decisions that form the ‘cement’ that binds society together. They will gather information about the world; store, sort and access it; make decisions and carry them out – even more so than their primitive cousins do today. As a result, local entropy will be reduced dramatically. It therefore will be *very good for well-behaved information processing machines to flourish* as active participants in society.

If one agrees with Wiener that entropy is the greatest natural evil, it follows from the above discussion that a major goal of ethics should be, not only the flourishing of human beings, but also the flourishing of plants, animals, ecosystems, just societies, and even cybernetic machines, because they decrease entropy locally, even as they increase entropy in the universe as a whole. This startling result indicates that *the overall focus of ethics can and should be shifted away from the narrow anthropocentric goal of only human flourishing to the broader, and more reasonable, goal of the flourishing of life, ecosystems and just civilizations, even well-behaved cybernetic machines that participate in the very fabric of those civilizations.* For decades, environmental ethicists have advocated a shift in perspective very much like this, although they normally did not include artificial agents and other cybernetic machines in their ethical considerations.

Given the above described ‘theory of everything’ from today’s physics (see Section ‘The metaphysics of Wiener’s information ethics’), it even makes sense for people to include in their ethical purview *every structured entity – every ‘information object’ – in the universe.* This is so because all structured objects, according to that theory, are repositories of available Shannon information – *the very opposite of entropy*, with its loss of information and the resulting chaos and destruction. This broadest of all possible ethical purviews, which values every information object and structure in the universe, has been advocated by Luciano Floridi and his colleagues in Oxford University’s Information Ethics Research Group (See, for example, Floridi 1999, 2003, 2006; Floridi and Sanders 2004a). Floridi and his Oxford colleagues have completed a ‘Flourishing Ethics shift’ in their ethical perspective and thereby created the first version of General FE.

Floridi’s INFORMATION ETHICS²⁰ theory

The shift of perspective made by Floridi and his Oxford Group places at the center of ethics, *not* the

¹⁹ As explained in Section ‘Aristotelian roots of Human-Centered FE’ above, these processes *are* – or at least require the *presence* of – bodily manipulation of of Shannon information.

²⁰ In the present essay, as indicated above, I use ‘information ethics’ in small caps (INFORMATION ETHICS) to refer to Floridi’s specific theory, which is different from, and more specific than, the very broad field of research that I am calling ‘information ethics.’

actions, values, and characters of human agents, but instead the *evil (harm, dissolution, destruction – i.e., entropy) suffered by the recipients of the action*. By interpreting every existing entity in the universe as an ‘informational object’, Floridi is able to shift the ethical perspective from an ‘agent-based’ (and *human-based*) theory to a ‘patient-based,’ non-anthropocentric theory:

[All] entities will be described as clusters of data, that is, as informational objects. More precisely, [any existing entity] will be a discrete, self-contained, encapsulated package containing

- (i) the appropriate data structures, which constitute the nature of the entity in question, that is, the state of the object, its unique identity and its attributes; and
- (ii) a collection of operations, functions, or procedures, which are activated by various interactions or stimuli (that is, messages received from other objects or changes within itself) and correspondingly define how the object behaves or reacts to them.

At this level of abstraction, informational systems as such, rather than just living systems in general, are raised to the role of agents and patients of any action, with environmental processes, changes and interactions equally described informationally. (Floridi 2006, pp. 9–10)

With this approach, every existing entity – humans, other animals, plants, even non-living artifacts, electronic objects in cyberspace, pieces of intellectual property, stones – can be interpreted as *potential agents* that act upon (physically affect) other entities, as well as *potential patients* that are acted upon by other entities.

The set of all such entities – that is, everything that exists, everything that has being – Floridi has named “the infosphere”. The overall goal of Floridi’s INFORMATION ETHICS is to foster the flourishing of the infosphere and all the informational objects within it. ‘Good’ is defined as anything that preserves or improves the infosphere, and ‘evil’ becomes its opposite; namely, anything that damages or impoverishes the infosphere.

Unlike Wiener’s metaphysical foundation for his information ethics, which is based upon Shannon-information entropy and the laws of physics, Floridi’s INFORMATION ETHICS has a different understanding of ‘entropy’ and presupposes a Spinozian metaphysics:

IE [that is, INFORMATION ETHICS] suggests that there is something even more elemental than life, namely *being* – that is, the existence and flourishing of all

entities and their global environment – and something more fundamental than suffering, namely *entropy*. The latter is most emphatically *not* the physicists’ concept of thermodynamic entropy....

IE holds that *being/information* has an intrinsic worthiness. It substantiates this position by recognizing that any informational entity has 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. (Floridi 2006, p. 11)

Floridi has achieved a milestone in Flourishing Ethics: the first General FE theory, which completes the full ‘shift’ from human-centered agent ethics to an ethics that values and embraces all of reality.

Flourishing ethics: An ethical theory for the information age

The above-described ‘shift’ in ethical perspective, which began a generation ago among environmental ethicists and was recently completed by Floridi and his Oxford research group (IEG), is a major addition to the newly coalescing theory (movement?) that I have called ‘Flourishing Ethics.’ I believe that Flourishing Ethics has significant potential to develop into a powerful ‘global ethics’ – one that is rooted in the ultimate nature of the universe and all the entities that inhabit it – one that will shed new light upon ‘the great ethical theories’ of the world, while providing novel insights and contributions of its own. Let me pull together some of the key ideas explained above and put them into a more unified perspective.

Resolution of anomalies

The three anomalies with which we began in Section ‘A shift in ethical perspective’ above, can all be resolved by Flourishing Ethics. Indeed, as noted in Section ‘The basic components of Human-Centered FE’, Human Centered FE by itself provides a resolution of the first two anomalies. The General Theory of Flourishing Ethics also can resolve the third anomaly:

Resolution of Anomaly 3: *Difficulty coping with non-human agents* – Wiener noted the need for new ethical tools to cope with robots and cyborgs, and Floridi has already developed, in some detail, a promising theory (INFORMATION ETHICS) that seems likely to address that need very successfully. (see Floridi and Sanders 2004b)

Respect for the world’s great ethical traditions

Civilizations and societies add meaning and purpose to life; and they dramatically decrease and resist the evils of entropy, such as chaos, decay, disease, death

and dissolution. Great ethical traditions embedded in the world's major civilizations help people to organize, systematize, and make sense of their moral lives; and they provide assistance, as well, to people struggling with life's most difficult challenges. To the extent that ethical traditions help people to achieve these worthy goals, they can be endorsed and applauded from the perspective of Flourishing Ethics. Of course, so-called 'traditions' like Taoism, Confucianism, Buddhism, Hinduism, Thomism, Utilitarianism, Kantianism, and so on, are all in reality complex and diverse 'families' of theories and practices. Many of their specific beliefs and practices would be compatible with the General Theory of Flourishing Ethics and some would not. A detailed comparison of Flourishing Ethics and the world's great ethical traditions (which cannot be offered here for obvious space and time reasons²¹) would shed light on the traditional theories and simultaneously deepen and broaden our understanding of Flourishing Ethics.

The ethical worth of non-human entities

Ethical theories in the Western tradition, since the time of ancient Greece, for the most part, have placed *individual human beings* – their characters, their actions, their pleasures and pains – at the center of ethics. These 'anthropocentric' theories view human beings as the most important beings in the universe, aside from God or the Gods. Some traditions have even viewed the entire universe as created on behalf of human beings, who allegedly were granted the right to control and make use of all creatures and plants on the face of the earth. From the point of view of Flourishing Ethics, it is not unreasonable to place a strong emphasis upon the flourishing of human beings and their societies, because they are, as far as we know, the most efficient sources of decreased entropy and increased good in our tiny region of the vast and expanding universe. On the other hand, besides humans and their communities, there are other intrinsically good entities in the universe, as explained in Section 'Wiener on good and evil' above. Flourishing Ethics takes these into account as well. Non-human animals, plants, ecosystems, even certain machines decrease entropy in their local regions of space-time, and thereby preserve and increase the good. Even 'inert' objects like stones, mountains, planets, stars and galaxies are persisting patterns of Shannon information. Flourishing Ethics fosters respect for all of these sources of the good.

²¹ See my forthcoming book, tentatively entitled *Flourishing Ethics: An Ethical Theory for the Information Age*.

Humans as 'care takers' and 'fellow travelers' in the universe

In recent years, environmental ethicists and feminist ethicists have led the shift *away from* seeing humans as 'lords of the universe,' who treat all non-humans as 'others' – as objects to be subdued, dominated and exploited. This 'us-over-them' approach establishes a 'false wall' that alienates humans from the rest of creation. Instead, humans should see themselves as *care takers*²² aiding the flourishing of all beings that resist or even reduce the entropic evils of decay and chaos. Aristotle saw clearly that human beings are part of a natural continuum, for they are closely related to other members of the animal kingdom, and indeed to all other living things. In addition, Wiener pointed out that cybernetic machines can have so much in common with humans and other animals that they blur traditional distinctions between living and non-living, as well as thinking and non-thinking beings. In addition, Floridi (2003), in completing the shift to General Flourishing Ethics, argued that 'informational objects', such as the Internet, databases, web sites, electronic texts, chat rooms, softbots, robots – even stones, mountains, planets and stars – merit at least a minimum of ethical respect.

The shift in perspective made by Flourishing Ethics brings human beings back into the fold with the rest of the universe. It eliminates human estrangement from nature. It views humans, like all other beings, as fellow participants in the creative unfolding of the cosmos – as fellow travelers in the cosmic river of flowing information.

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²² For a promising explanation of how the 'care taker' role can be understood, see Luciano Floridi's forthcoming paper "Global Information Ethics: The Importance of Being Environmentally Earnest" (Floridi forthcoming), especially the discussion of 'ontic trust.'

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