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SECTION 1: Catholic Teaching about the Soul

1.1 INTRODUCTION AND BACKGROUND—WHAT ARISTOTLE HAD TO SAY ABOUT SOULS

Although, there are many questions to be asked in this chapter, unfortunately there may not be altogether satisfying answers. Many scientists and philosophers lump together mind, intellect, consciousness, soul, but are they the same? According to the [Catholic Encyclopedia](#), the soul includes intellect and also the so-called vegetative capacities (the unconscious). Catholic teaching is consistent with some scientific propositions, but not all. Since there is not yet a consensus explanation in science and philosophy about consciousness / mind, we cannot conclude that disagreement between Catholic teaching and some unvalidated scientific proposals means Catholic teaching conflicts with science.

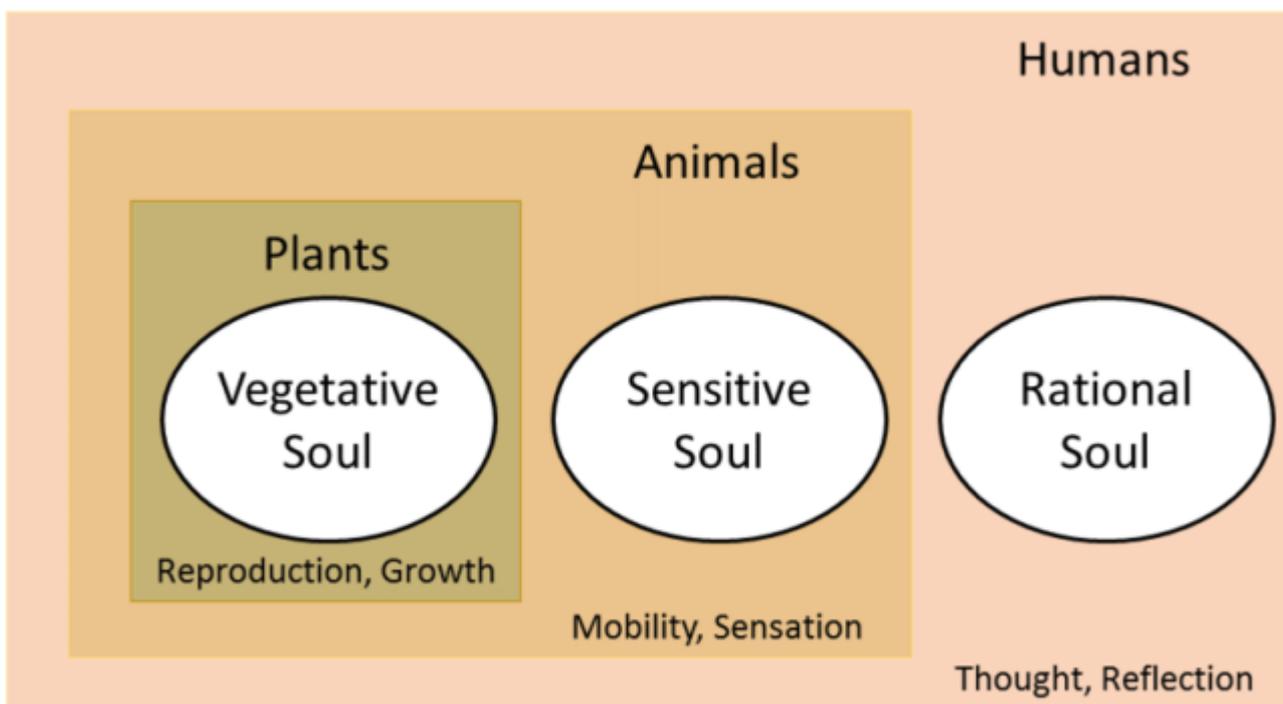
We'll review both theological and scientific proposals for intellect, consciousness and whatever else can be thought to comprise "the soul." An extended discussion is given [here](#) of Catholic ideas about soul.

The main thing to take away from such discussions is that the soul is immaterial; which is to say that it can't be weighed, measured or detected by any kind of instrument. Accordingly, most scientists (including me) will tell you that "soul" is not something that can be studied by science.

Let's turn to the ancient Greeks, to Aristotle, to get a more explicit picture of what the "soul" might be. According to Aristotle, "[substance](#)" tells you what a thing is. Substances have two attributes, **matter**—that of which the "thing" is composed, and **form**—that which gives it function, shape, organization, determines what it is—as I've tried to illustrate below:

angels— whence the much maligned medieval conundrum, “how many angels can dance on the head of a pin?”²

Let’s see how Aristotle applied these notions to living things. A living things can have form, but that form can change during its life: a caterpillar can metamorphose into a butterfly, an ugly duckling into a swan, a wastrel into a saint. So, how did Aristotle take account of such changing form? He termed the changing form of a living thing its “**soul**;” the soul is the organization of the living thing, how it functions and maintains itself. Further, Aristotle classified souls as “vegetative,” “sensitive,” and “rational,” as shown in the illustration below:



Aristotle’s Classification of Souls for plants, animals and humans
from [Wikimedia Commons](#)

Where does this classification take us with respect to souls for computers and robots? If you look at the attributes of a rational soul, they include “thought” and “reflection.” Now

“reflection” is the capacity to think about things, and in particular, to think about oneself, in other words to be self-aware. This self-awareness—“Cogito, ergo sum,” I think, therefore I am—is a necessary condition for consciousness, so it will be required for computers and robots if we are to say they have souls. Since moderns—scientists and philosophers who will have no truck with Aristotle or the Medieval Scholastics—say the soul is a meaningless concept, they will argue about whether computers and robots can be conscious, so that is the question we’ll examine in later sections.

And if we decide that computers and robots cannot be self-aware, be conscious, then we can conclude that they do not have souls. Before discussing what modern thinkers have to say about this, let’s hear from my favorite theologian/philosopher saint, St. Augustine.

1.2 WHAT ST. AUGUSTINE SAYS: THE SOUL IS IMMATERIAL AND IMMORTAL

“Such great and wonderful things would never have been done for us by God, if the life of the soul were to end with the death of the body.”

St. Augustine (Hippo), Confessions

Catholic teaching about the soul became firm with St. Augustine of Hippo (354-430 A.D.). His ideas about the soul, that it was immaterial and immortal, were derived from the following principles:

Since we are made in the image of God, and God is not material, so must be the soul:

“When speaking of God no one should think of Him as something corporeal; nor yet of the soul, for the soul is nearest to God.”

St. Augustine, Confessions

The soul comprises the rational faculty, thinking, and since thoughts are not confined to a

spatial location, neither should be the soul, and it is not, therefore, a body, i.e. material. Since the soul thinks and wills—directs for a purpose—but material bodies do not do this, the soul cannot be a material body.

A soul has moral principles, which a material body does not, so a soul cannot be a material body. Rather the soul and the body are distinct (but see below, in “What the Catholic Catechism Tells Us”), with the soul in command of the body as a rider is in command of a horse. There is a necessary connection between soul and body; they are dependent on one another. They are together one thing:

“Man is a rational substance consisting of soul and body”

—St. Augustine, The Trinity

St. Augustine makes a number of arguments for the immortality of the soul, from the notion that it is immaterial, that it is the repository of eternal truths (mathematical and logic) and therefore is also eternal, and from the nature of man’s relation to God (see the opening quote). For a more detailed account, see [the article](#) by Br. Justin Hannegan, OSB

One other important theory of how the mind works can be attributed to Augustine, the theory of “**Divine Illumination**”, that true knowledge comes from God:

“The mind needs to be enlightened by light from outside itself, so that it can participate in truth, because it is not itself the nature of truth. You will light my lamp, Lord.”

—St. Augustine, Confessions

Thus two can have the same knowledge, know the same thing because both have knowledge imparted by God:

“When I speak the truth, I do not teach someone who sees these truths. For he is taught not by my words but by the things themselves made manifest within when God discloses them.”

—St. Augustine, “De Magistro

1.3 WHAT ST. BONAVENTURE TELLS US: THE TRINITARIAN MODEL FOR THE SOUL

St. Bonaventure also held that Divine Illumination was the source of knowledge for intellectual creatures (humans), who were made as images of God. As creatures (created by God) who think, the ultimate objective of intellectual activity is to seek God.

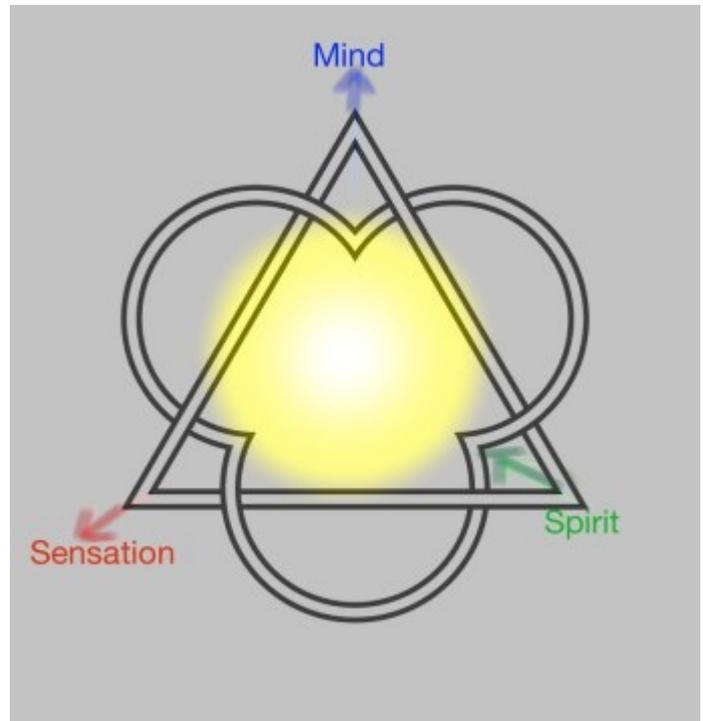
According to St. Bonaventure, the mind has three principal parts or roles:

“Following this threefold progress, our mind has three principal aspects. One refers to the external body, wherefore it is called animality or sensuality; the second looks inward and into itself, wherefore it is called spirit; the third looks above itself, wherefore it is called mind. From all of which considerations it ought to be so disposed for ascending as a whole into God that it may love Him with all its mind, with all its heart, and with all its soul [Mark, 12, 30]. And in this consists both the perfect observance of the Law and Christian wisdom.”

—St. Bonaventure, “[The Journey of the Mind into God](#),” Chapter 1, Art. 4.

This is illustrated at the right:

Another trinitarian interpretation of the soul is to say that it consists of memory, intellect and will. Here's an analogy I heard first from a recording of Fr. Bernard Groeschel on meditation: some of us can remember watching the television announcement that Pope St. John Paul II was elected Pope and that his name was Karol, Cardinal Wojtyla before he was elected (MEMORY); we know how the Pope is elected and what the office of the Bishop of Rome entails (INTELLECT); and we promised to follow his direction as leader of the Church (WILL).



St. Bonaventure's Trinitarian Model of the Soul
Trefoil Triangle from [Wikimedia Commons](#)

1.4 WHAT ST. THOMAS AQUINAS TELLS US: THE SOUL IS A SUBSISTENT ENTITY

“Therefore the intellectual principle, which we call the mind or the intellect, has an operation in which the body does not share. Now only that which subsists in itself can have an operation in itself. ... We must conclude, therefore, that the human soul, which is called intellect or mind, is something incorporeal and subsistent.

St. Thomas Aquinas, Summa Theologica, Ia, 75, 2

St. Thomas argues that the soul is a subsistent entity, that is to say, it exists in itself, not as an “epiphenomenon” of something material. Here’s something that is an epiphenomenon: surface tension, wetness, which proceeds from the properties of water and is a property, not a thing in itself. He comes to this conclusion because he notes that we can think—employ the intellect—without the body doing anything (but see below, Section 3, “What Science Fiction has to say”).

He also comes to the conclusion that the soul is not matter. Since man can know the nature of material things by virtue of his intellect, the intellect is not in itself material. If it were, it would not be able to “receive the forms” of material or bodily things, as the quote above is meant to demonstrate.

Since the soul is immaterial it does not decay, that is to say it is immortal. However, the soul, as the form of the body, is not a complete substance. It has a necessary relation to the body. Therefore the rational soul can not perform any of the activities it is meant to do—e.g. thinking, worshipping—in a state for which it was not designed, i.e. as a separate entity. Thus the soul after death, separated from the body, needs God to make it and the body one thing again.

1.5 WHAT THE CATHOLIC CATECHISM TELLS US: BODY AND SOUL ARE ONE

Much of Catholic teaching about the soul, embodied in the Catholic Catechism, derives from the works discussed in the preceding sections:

*“The human person, created in the image of God, is a being at once corporeal and spiritual....Man, whole and entire is therefore willed by God...soul refers to the innermost aspect of man, that by which he is most specially in God’s image: ‘soul’ signifies the spiritual principle in man...it is because of the spiritual soul that the body made of matter becomes a living, human body; **spirit and body in man are not two natures united but rather their union forms a single nature.**” [emphasis added]*
—“Catechism of the Catholic Church,” excerpted from paragraphs 362, 363, 365.

The Catechism emphasizes that there are not two separated entities, a material body and a spiritual soul, but that these two aspects are fused into one thing, the human being. However, there is an essential difference between these two aspects:

“The Church teaches that every spiritual soul is created immediately by God—it is not ‘produced’ by the parents—and also that it is immortal: it does not perish when it separates from the body at death “ [emphasis added] and it will be reunited with the body at the final Resurrection.”
—*loc.cit.* Par. 366

The physical body is inherited from the parents; the body is endowed by God at conception with a soul. Moreover, since the soul is immortal. It will be resurrected—reunited with the body at the last days.

1.6 NOTES

¹I depart from the classical philosophical definition of form here, where “form” is synonymous with “essence.” See [here](#) and [here](#). However, that definition does not accord with various different forms, as discussed in the first linked article (Catholic Encyclopedia), and it is also confusing, whence my departure from the classical usage.

²This question actually raises an interesting philosophical point: a point has no area but angels, being immaterial, occupy no area. The question is equivalent to “What is zero divided by zero,” which question mathematicians will tell us is not defined and is, therefore, without meaning.

SECTION 2: What Philosophers Say about Computer Souls

2.1 INTRODUCTION

Let’s start off on a light note. A long time ago when computers were still new (yes, it was that long ago), when I was at my first academic assignment, the head of the division dealing with computers gave a talk on artificial intelligence for computers. One of the humanities faculty in the audience put a question after the talk “*Would you want your daughter to marry one [i.e. a computer]?*”. Legend has it (I wasn’t there) that he answered “*Yes, if she loved him.*” Another version of this legend has it that someone shouted out after the question, “*Why not—his wife did.*”

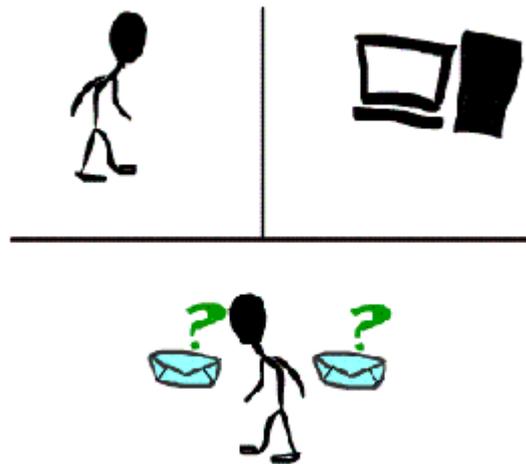
A necessary condition for computers or robots to have a soul is that they be self-aware, be conscious. If this is not possible, then there would be no way we could think that devices with “artificial intelligence” had souls. So, in this section we’ll focus on whether computers and robots can be self-aware. Another way of talking about this is to ask whether “Artificial Intelligence” (AI) is in fact possible, that is to say, whether computers/robots are intelligent—can think independently, outside a set of prescribed rules, algorithms. We’ll examine below the different answers to this question given by AI experts and philosophers.

2.2 TURING’S ARGUMENT FOR COMPUTER SOULS

“Theological Objection: *‘Thinking is a function of man’s immortal soul. God has given an immortal soul to every man and woman, but not to any other animal or to machines. Hence no animal or machine can think.’*

Rebuttal to Objection: *‘It appears to me that [The Theological Objection] implies a serious restriction of the omnipotence of the Almighty. It is admitted that there are certain things that He cannot do such as making one equal two, but should we not believe that He has freedom to confer a soul on an elephant if He sees fit? We might expect that He would only exercise this power in conjunction with a mutation which provided the elephant with an appropriately improved brain to minister to the needs of this soul.’*

2.3 Alan Turing, [Computing Machinery and Intelligence](#).



Turing Test for Computer Intelligence: observer asks questions of human (behind screen) and computer (behind screen). If questioner can't tell from the answers which is the computer and which the human, the computer has passed a test for intelligence.

Animation from [Wikimedia Commons](#)

Alan Turing was a founder of computer theory, how they work and what they can do. During World War II he led a group of English cryptographers to solve the German “Enigma Code.”

His life, an unhappy one, has been the subject of [books](#) and [plays](#).

He proposed a test to see if one could say computers were intelligent (see the animation above). His “Turing Test” is totally behavioristic: you have two input tables; behind one is a person, behind the other a computer. You ask questions at each table and on the basis of the answers decide behind which desk is the computer; if you can’t tell the difference, then by objective evidence the computer can think as well as a human can.

A number of objections have been raised to the Turing test as a measure of self-awareness. The best of these, I believe, is [John Searle’s “Chinese Room” analogy](#). Imagine you are in a large room containing many, many manuscripts and directions. A question in Chinese 你喜欢咖啡吗 (“Do you like Coffee?”) comes into the room and you go to the directions for answering that question. The instruction book lists the Chinese character you are to type out for this question: 是 (“Yes”). You don’t know Chinese, you don’t understand the characters, but the question is answered correctly. There is clearly no understanding of Chinese as a language, nor is the system (you and the room) conscious or self-aware. There have been arguments about the validity of this analogy (see [here](#)), but I believe Searle’s reasoning is valid. He makes the important distinction between grammatical, algorithmic reasoning—proceeding according to a set of rules—and semantics, intelligence— understanding the meaning of rules and terms by association.

2.3 DEGREES OF SELF-AWARENESS, INTELLIGENCE

Since there are degrees of self-awareness, consciousness, intelligence in living things, it follows that if computers can be self-aware, we might expect there to be degrees of consciousness and intelligence in machines generally. Such degrees of consciousness/intelligence have been nicely categorized by George Musser in [an article in AEON](#). His scheme is summarized in the table at the right (Musser gives 13 degrees; I haven't listed all of them):

LEVEL	EXPLANATION	ANIMAL EXAMPLE	HUMAN AGE EQUIVALENT	MACHINE EXAMPLE
0-ISOLATED	Has body, but no functions	inert Chromosome	---	Stuffed Animal
3-Adaptive	Learns new reaction	Earthworm	Embryo to 1 month	ELIZA
5-Executive	Selects goals, acts to achieve them, assesses own condition	Octopus	8-12 months	"Cog", Robot
7-Self-Aware	Knows that it knows, passes mirror test	Magpie	18-24 months	Nexus-6 ("Do Androids Dream of Electric Sheep?")
8,9-Empathic, Social	Conceives of others, has theory of mind, talks, can lie	Chimpanzee, Human	2-7; 7-11 years	HAL 9000 ("2001"), AVA ("Ex Machina")
10-Human	Passes Turing Test; creates cumulative culture	Human	12+ years	Six ("Battlestar Galactica")
11-Super-Conscious	Coordinates multiple streams of consciousness	Bene Gessetti ("Dune")	augmented	Samantha ("Her")

Table of Consciousness Levels From [George Musser](#)

Note that the last four machine (computer) examples are from science fiction stories, as is the last "animal" example. Note also—no notion of God as the ultimate super, super-consciousness.

2.4 ELIZA, A COMPUTER THERAPIST

Here's a Turing Test example: a computer program devised by Joseph Weizenbaum in the 1960's (MIT Artificial Intelligence Laboratory) to mimic a psycho-therapist.

ELIZA: HELLO. I AM THE DOCTOR. PLEASE TELL ME ABOUT YOUR PROBLEM. (Type in

complete sentences and always end your sentence with a period.)

patient: My mother makes me so mad sometimes.

ELIZA: CAN YOU GIVE ME AN EXAMPLE?

patient: She phoned me and expected me to drop everything.

ELIZA: TELL ME ABOUT YOUR FAMILY.

patient: I hate my parents.

ELIZA: WHY DO YOU HATE YOUR PARENTS?

patient: They won't let me go.

ELIZA: IS IT IMPORTANT THAT THEY WON'T LET YOU GO?

patient: I'm suffocating.

....etc."

People who have engaged this program report that they seem to have encountered a real therapist—they talk about things they would not bring up except to a therapist. So this program would probably pass a Turing test. But it's clear (I hope) that there's no self-awareness in the computer as the program proceeds. And whatever intelligence is manifested in the response is that of the programmer, anticipating and correlating stock phrases.

2.5 PHILOSOPHERS DIFFER ON COMPUTER CONSCIOUSNESS

Now certainly one has to answer the question "Can a computer be self-aware?" before

answering “Could a computer have a soul?”. AI experts and philosophers of mind (Dennett, Churchland) say yes to the first and refuse to discuss the second. Philosophers of mind (Searle, Penrose, McGinn) who say no to the first question would, of course, say no to the second. The division of opinion on whether computers can think/can be conscious is summarized in the following table, proposed by [Roger Penrose](#):

ATTITUDES TOWARDS ARTIFICIAL INTELLIGENCE (AI)	
Attitude	Proponent
STRONG AI: Computers can be programmed to be conscious	Dennett
WEAK AI: Computers can simulate mental processes, but cannot be conscious	Searle
NON-COMPUTABLE PHYSICALIST: Need New Physics; Intelligence is non-algorithmic	Penrose
MYSTERIAN: Consciousness is a thing unto itself; can't be explained by science/philosophy	McGinn

Attitudes towards Artificial Intelligence, from Roger Penrose

Daniel Dennett is an American philosopher who believes that consciousness is an illusion, that the only thing occurring is the electrical and biochemical action of neurons—that the brain functions very much as a “meat computer.” Dennett is a good example of the “mind emerges from brain” school of philosophers. Others in this school are Paul and Patricia Churchland and David Chalmers. Chalmers believes that there might be something in addition to physiology contributing to the workings of the mind (although he wouldn't say this something is the Holy Spirit). He struggles with *what* that something is. See [this panel discussion](#) in which Chalmers posits that there's a 42% chance that we live in a computer

simulation (shades of [The Matrix!](#)) and, in particular, see time 1:38 for the odds the panelists give of that being the case.

[John Searle](#) is an American philosopher of the mind who believes that consciousness is an “epiphenomenon” of biochemical and biophysical brain processes, very much like surface tension—wetness—is an epiphenomenon of the molecular structure of water. However Searle does not believe that consciousness can be a result of a computer-like mechanism (see the “Chinese Room” analogy above). Searle says that consciousness is a physiological property like digestion. See this [2014 interview](#).

[Roger Penrose](#) is a British mathematician and physicist who believes that consciousness is directly linked to quantum processes, and that until a satisfactory theory of quantum gravity emerges, there can be no truly complete theory of consciousness. Nevertheless, he and Stuart Hameroff, an anesthesiologist and physiologist, have proposed that [quantum effects in microtubules in neurons](#) give rise to consciousness. In his books, [The Emperor’s New Mind](#), [Shadows of the Mind](#), [Consciousness and the Universe](#), Penrose argues strongly that consciousness is not an algorithmic process. He uses Goedel’s Incompleteness Theorem and the Turing Halting Theorem to show that an algorithmic process can not generate theorems in number theory that a human could. There have been many objections to this argument (search: “Penrose Turing Halting Theorem”), so his reasoning has not convinced those in AI community that they are wrong in believing that a computer can be conscious or that the brain is a “meat computer.”

[Colin McGinn](#) is one of the new [“Mysterians.”](#) philosophers who believe that consciousness is a phenomenon that can never be understood scientifically because we are limited in our understanding.. He follows Chomsky and Nagel in the notion that there are things we cannot experience or “know” in terms of consciousness—if we’re color blind, we can never know what seeing “red” is like, even though we know all there is to know about the neurons affected, the wavelength of the light that excites the red sensation etc. As in Thomas Nagel’s

ground-breaking article [“What’s it like to be a bat,”](#) we can never have the same sensations as a bat and know what it’s like to perceive by supersonic echoes.

So, what’s the verdict? It seems the jury is hung. No argument presented has been strong enough to convince the others. My own judgment is inclined to that of the New Mysterians. It is a view that is compatible with religious belief, and the belief that at the top of a conscious scale is the consciousness of the Trinitarian God, in which all of Plato’s and St. Augustine’s ideal forms reside.

SECTION 3: Science Fiction Stories about Computer Souls

3.1 INTRODUCTION



A scene from the play “RUR” (“Rossum’s Universal Robots”-Capek, 1923) whence the term “ROBOT” for a

Science fiction abounds in tales of robots, androids and computers with intelligence. Isaac Asimov’s “Three Laws of Robotics” and his robot/android stories come to mind. And who can forget HAL 9000 in “2001.”

In this section I’ll focus on stories that deal with the notion of robots or computers having a soul, because these stories

mechanical man.
from [Wikimedia Commons](#)

come closer to defining soulhood than do many of the philosophers and scientists dealing with artificial intelligence.

Since philosophers and AI scientists have not given definitive answers about the souls of computers, consciousness and such, let's go to a realm where imagination holds sway, unlimited by hard facts. It will certainly be more entertaining (and possibly just as insightful) to hear what science fiction (SF) authors have to say about this. So let's suppose, as do SF authors, that consciousness is possible by some means or another for computers and robots and see what consequences might ensue concerning ensoulment

3.2 I WANT TO BE A COMPUTER WHEN I DIE

As a transition to considering machine intelligence, let's examine how SF treats the transfer of human intelligence or personality into computers or robots. Note that one theoretical physicist, Frank Tipler, in his book, *The Physics of Christianity*, posits that heaven will consist of personalities transferred to software as the universe reaches its end in an "[Omega Point](#)" singularity. Since it is a black hole type singularity, time is slowed down and the intelligences transferred to software thus have essentially an eternity to enjoy their virtual life.

Among the many SF stories that deal with transferred human intelligence, there is one by Norman Spinrad that especially focuses on the question of soulhood, [Deus X](#). Spinrad treats the question with respect, although his attitude to the Catholic Church is less than reverent (there is a female Pope, Mary I). Below is a summary of the plot, as given in McKee's excellent survey, [The Gospel According to Science-Fiction](#):

"...thousands of people exist in an artificial afterlife called 'Transcorporeal

Immortality', having copied their consciousness onto a worldwide computer network called 'The Big Board'...Catholic theologian Fr. Philippe de Leone argue[s] that this creation of an artificial soul, which cannot have true self-awareness, dooms the actual soul that is copied to damnation. Pope Mary I, hoping to settle the controversy, orders Fr. DeLeone to have his soul copied upon his death, so that his consciousness can argue against its own autonomous existence from the other side."

—As quoted in [The Gospel According to Science Fiction](#). p.43

Superficially, Pope Mary's plan seems to contain a paradox. If the downloaded Fr. de Leone changes his mind and says "yes, I am a real soul," how can we trust what an artificial soul might say? The solution to the paradox is that all of Fr. de Leone's beliefs have been downloaded to his program. If these beliefs are changed, it means that the entity in the computer has free will, and is thus autonomous and a real soul.

In the story Fr. DeLeone's soul is "kidnapped" (how do you kidnap a program?) by a group of downloaded personalities that wants to convince the Church, using Fr. de Leone's download, that they have a real soul. As McKee points out in his synopsis, there is a reverse Turing Test applied here. Fr. de Leone does change his mind, the downloaded personalities declare him a deity ("Deus X") and a new controversy arises: Church officials declare this deification to be blasphemy. To still the controversy, Fr. de Leone sacrifices his downloaded personality (dies), Pope Mary declares him a saint and recognizes that the downloaded souls are "real".

In my opinion, this is not a satisfactory exposition. I hold with the Catholic interpretation (see above) that souls do not function without a body and that a soul and body comprise one person.

3.3 THE CHURCH AND AI: ST. AUGUSTINE AS A COMPUTER— "GUS"

There are many SF works in which the Catholic Church plays a role. In some, the Church and

its teachings are treated with respect; in most, not so much. As Gabriel McKee points out in [The Gospel According to Science Fiction](#)

“SF, arising as it does from the secular humanism of the Enlightenment, is critical of religious institutions. SF frequently argues that if organized religion is to be a positive force in the future of humankind, it must change drastically to meet the spiritual challenges of the future.”

—Gabriel McKee, *op.cit.*, p. 183

A sympathetic view of how the Church might interact with artificial intelligence is given in Jack McDevitt’s fine story, [“Gus”](#). In this beautiful tale, the newly installed rector of a Catholic Seminary interacts with a computer simulation of St. Augustine of Hippo, purchased (the simulation, that is) to help students understand St. Augustine’s teachings. The Rector, Msgr. Chesley, is at first greatly displeased with Gus’s (the program’s) dicta:

“ ‘The thing must have been programmed by Unitarians’ Chesley threw over his shoulder. ‘Get rid of it’ ”

—“Gus” in *Cryptics*, p. 373.

The relationship between Chesley and Gus becomes warmer with time, as they discuss the problems of being a Catholic in today’s world:

*“ ‘Why did Augustine become a priest?’
Chesley asked.*

‘I wanted,’ Gus said, with the slightest stress on the first words, ‘to get as close as I

could to my Creator.' Thoughtfully, he added, *'I seem to have traveled far afield.'*

'Sometimes I think,' Chesley said, *'the Creator hides himself too well.'*

'Use his Church,' said Gus. *'That is why it is here.'*

'It has changed.'

"Of course it has changed. The world has changed.'

'The Church is supposed to be a rock.'

'Think of it rather as a refuge in a world that will not stand still.' "

—op. cit., p. 382,

Gus's sayings to the students become so unorthodox (he decries the dogma of the infallibility of the Pope and the Assumption of the Blessed Virgin Mary) that other faculty decided he should be downloaded to storage and traded in for a computer simulation of Thomas Aquinas (plus business software). Gus asks Msgr. Chesley to hear his Confession and then destroy him, so he can have peace:

" 'I require absolution, Matt.'

Chesley pressed his right hand into his pocket. *'It would be sacrilege,'* he whispered.

'And if I have a soul, Matt, if I too am required to face judgment, what then?'

Chesley raised his right hand, slowly, and drew the sign of the cross in the thick air. *'I absolve you in the name of the Father, and of the Son, and of the Holy Spirit.'*

'Thank you...There's something else I need you to do, Matt. This existence holds nothing for me. But I am not sure what downloading might mean.'

'What are you asking?'

'I want to be free of all this. I want to be certain I do not spend a substantial fraction of eternity in the storeroom.'

Chesley trembled. *'If in fact you have an immortal soul,'* he said, *'you may be placing it in grave danger.'*

'And yours as well. I have no choice but to ask. Let us rely on the mercy of the Almighty.'

Tears squeezed into Chesley's eyes. He drew his finger-tips across the hard casing of the IBM. *'What do I do? I'm not familiar with the equipment.'*

'Have you got the right computer?'

'Yes.'

'Take it apart. Turn off the power first. All you have to do is get into it and destroy the hard disk.'

'Will you—feel anything?'

'Nothing physical touches me, Matt.'

Chesley found the power switch...He found a hammer and a Phillips screwdriver. He used the screwdriver to take the top off the computer. A gray metal box lay within. He

opened it and removed a gleaming black plastic disk. He embraced it, held it to his chest. Then he set it down, and reached for the hammer. In the morning, with appropriate ceremony, he buried it in consecrated soil.”

—*op. cit.*, pp. 388-389

As always, I asked my wife to review this article. I asked her whether she was moved by the story of Gus. She replied, “*If it were St. Augustine on his death-bed talking to his confessor, yes; but a black plastic disc-never.*” Even though I was moved to tears when I first read the story, I raise the same objections as I did for downloaded human personalities: the Catholic teaching that soul and body are one.

3.4 DOES DATA HAVE A SOUL?



Commander Riker removes the arm of Data, the Android, to show he is only a machine.

from [Fandom](#)

For those who aren't Trekkies, Data is the android navigator in the second Star Trek series, [Star Trek: the Next Generation](#). He aspires to humanity and sometimes reaches and even surpasses that state. There is a problem, however, in that whether Data has a soul is never considered in any of the episodes, possibly because the word “soul” is anathema to writers and producers of popular entertainment. So in the episode, “[The Measure of a Man](#)”, the question “Is Data a sentient being” is asked, rather than “Does Data have a soul”.

The question is addressed in a [trial](#), to see if Data, as a “sentient being”, has the right to refuse to be disassembled for study and refitting.

Captain Picard acts in Data's behalf and Commander Riker, under duress, as the prosecutor. Riker attempts to demonstrate that Data is a machine by switching him off and taking his arm off:

"[Riker is doing his duty in the courtroom]

Commander William T. Riker: *The Commander [Data] is a physical representation of a dream – an idea, conceived of by the mind of a man. Its purpose: to serve human needs and interests. It's a collection of neural nets and heuristic algorithms; its responses dictated by an elaborate software written by a man, its hardware built by a man. And now... and now a man will shut it off.*[Riker switches off Data, who slumps forward like a lifeless puppet]

Commander William T. Riker: *Pinocchio is broken. Its strings have been cut.*" [The Measure of a Man, Quotes.](#)

Captain Picard [gives a stirring defense](#), arguing that the question of whether Data is conscious—self-aware—has not and cannot be settled, any more than whether one can be certain that another person is conscious except by external behavior. And finally the question of soulhood is addressed minimally:

"Captain Phillipa Louvois [The Judge]: *It sits there looking at me; and I don't know what it is. This case has dealt with metaphysics – with questions best left to saints and philosophers. I am neither competent nor qualified to answer those. But I've got to make a ruling, to try to speak to the future. Is Data a machine? Yes. Is he the property of Starfleet? No. **We have all been dancing around the basic issue: does Data have a soul?***[emphasis added] *I don't know that he has. I don't know that I have. But I have got to give him the freedom to explore that question himself. It is the ruling of*

this court that Lieutenant Commander Data has the freedom to choose." [notice the shift from "it" to "he"] *ibid.*

And so Data is left free, and the question of whether he has a soul, undetermined—as in the Scottish verdict, "Not Proven."

Whether Data has a soul is more difficult judgment than for the previous stories: Data has a body, and if his body is disabled then he, as a unit, doesn't function. This condition satisfies the Catholic teaching that body and soul are one. On the other hand, Catholic teaching tells us that the soul is given to us at conception by the Holy Spirit. Would we say that the Holy Spirit instills a soul into Data when the first circuit was implanted? I don't think so, but maybe I'm wrong. What do you think, Dear Reader?

3.5 FINAL THOUGHTS

It seems from the above that Catholic teaching has more definite things to say about ensoulment and what the soul is than do science and philosophy. There is much disagreement amongst the advocates of AI and philosophers about who and what might be endowed with consciousness and real intelligence, much less who or what might be given a soul.

If one defines a God-given soul as the capacity to wonder where we came from, what will happen when we die, who made all this and why, then I believe that is unlikely that computers, machine intelligence will have that ability, despite the science-fiction stories to the contrary. Nor will animals, even though they have intelligence in some degree. Could there be sentient beings with souls on extra-terrestrial planets? Possibly, and even the Church is interested in that possibility, as attested by a Vatican sponsored conference on the possibility:

“Just like there is an abundance of creatures on earth, there could also be other beings, even intelligent ones, that were created by God. That doesn’t contradict our faith, because we cannot put boundaries to God’s creative freedom. As Saint Francis would say, when we consider the earthly creatures to be our ‘brothers and sisters,’ why couldn’t we also talk about an ‘extraterrestrial brother?’ He would still be part of creation.”

—Fr. Gabriel Funes, Chief Astronomer to the Vatican, Osservatore Romano, 2014

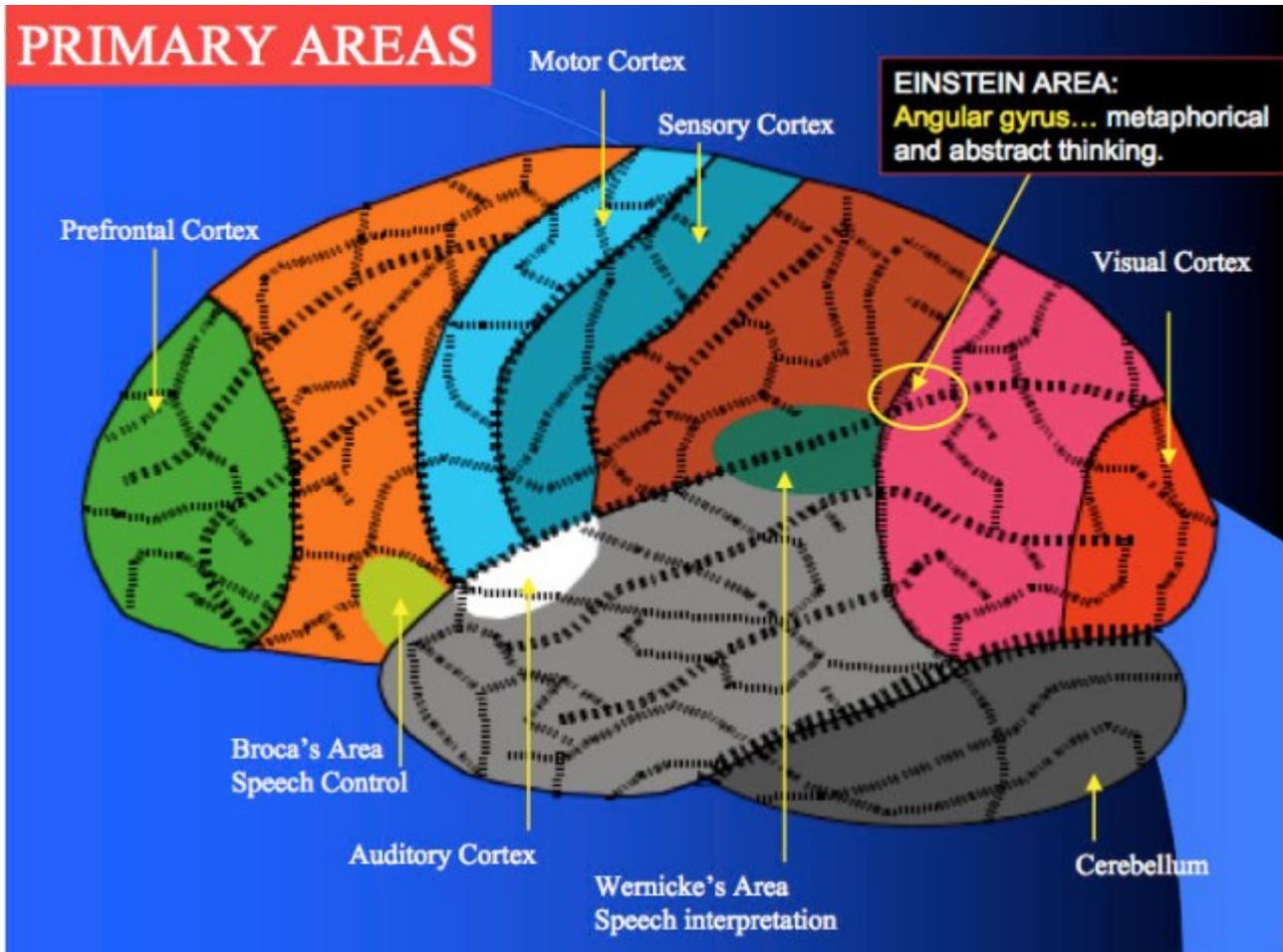
Well, maybe—but we’ll very likely not know in our lifetime.

SECTION 4: Science Background—Elements of Neuroscience

4.1 Why (Some) Scientists Say there is No Such Thing as a Soul

If one believes that everything can be explained by science (which I don’t), then only that which can be measured or observed in replicated experiments is “real”. Accordingly, many scientists regard the “soul” as a fictitious entity, since it is immaterial and has no measurable properties that can be observed in replicable experiments.

Rather than speaking of the soul, scientists focus on the mind as a function of what goes on in the brain. Such functions can be localized in various regions of the brain (see the figure below).



Brain Areas Controlling Different Functions
from [Wikimedia Commons](#)

The various actions governed by the brain can be localized by observing behavioral changes when different parts are injured or with modern imaging techniques: MRI, SPECT, PET scans.

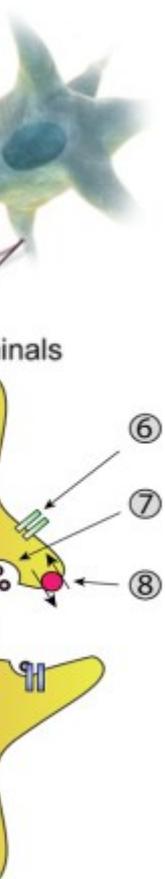
4.2 SCIENTIFIC MEASUREMENTS OF BRAIN ACTIVITY

“Interestingly, the average human brain weighs about 1.5 kilograms, has about 160 billion cells and about 100 billion neurons connecting the cells... One can look at the

brain and see the incredible complexities and the miracles of the Divine ...or one can respond ... that this has nothing to do with G-d. Some people will be inspired with belief in the Almighty; others will claim that somehow billions of cells and neurons working together can be created through random evolution."

—Rabbi Dr. Warren Goldstein, "Jewish World Review," 17 January 2014

The basic unit of the brain is the neuron, depicted in the figure below. The average human brain contains about 86 billion neurons. They act by release of chemicals (neurotransmitters) to adjacent neurons across a synaptic junction (gap) and thereby generate electrical signals, nerve impulses, that travel along nerve fibers and thereby generate electrical signals, nerve impulses, that travel along nerve fibers.

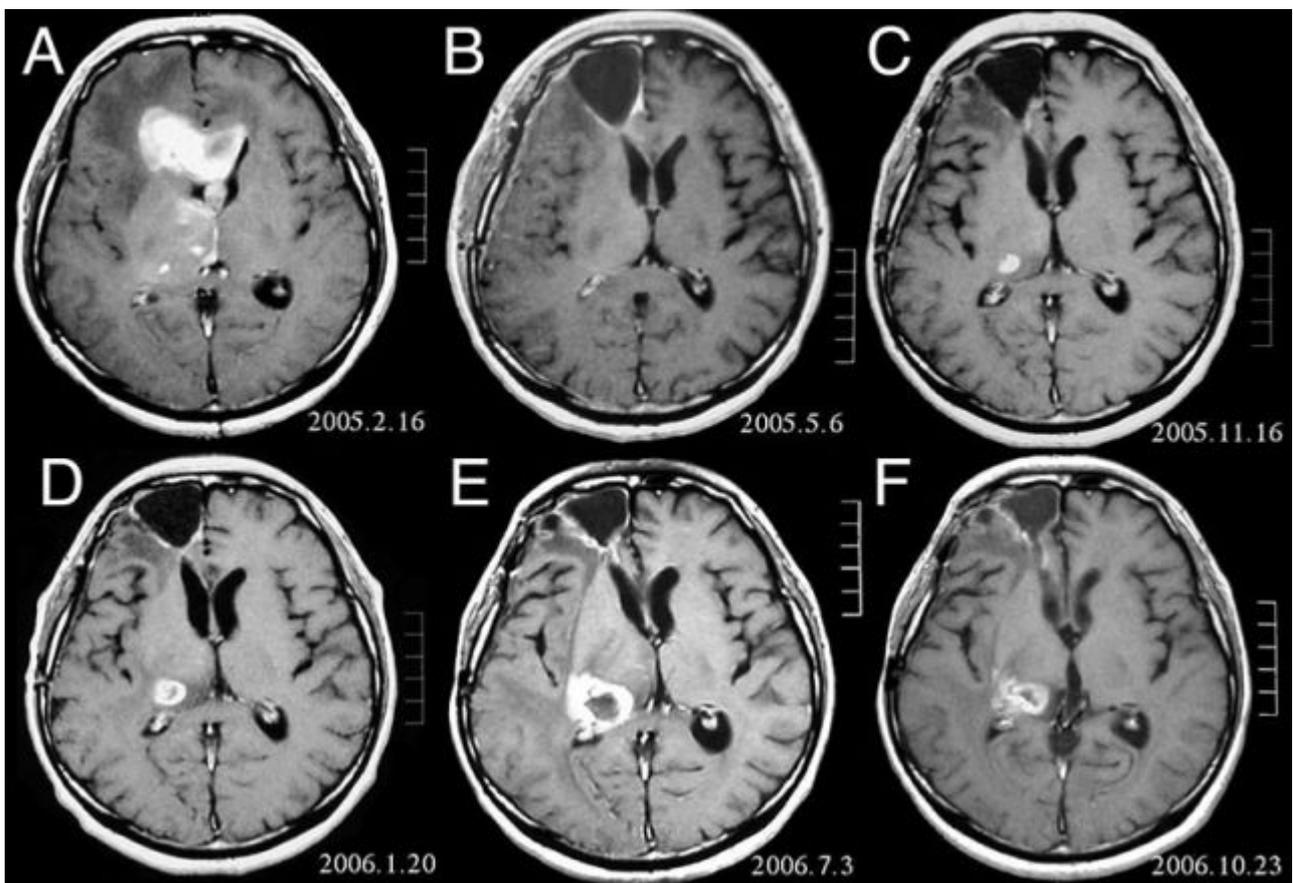


of a synapse between transmitter (A) and receptor (B) neurons.

receptor gate; 4. synaptic cleft (3/10,000 of paper thickness); 5. neurotransmitter molecule receptor;
receptor gate; 6. neurotransmitter molecules; 7. neurotransmitter molecule re-uptake pump.

Here's [a nice video](#) explaining in more detail how nerve transmission works.

Since there is electrical activity in the brain due to nerve impulse transmission, this can be measured by EEG ([ElectroEncephaloGraphy](#)) which can be used to detect abnormal brain behavior, as in epilepsy. The state of water in the brain, and the corresponding state of brain tissue—normal or abnormal—can be studied by [high resolution CAT](#) scans (x-ray tomography), or [MRI \(Magnetic Resonance Imaging\)](#)



MRI of Brain with Tumor

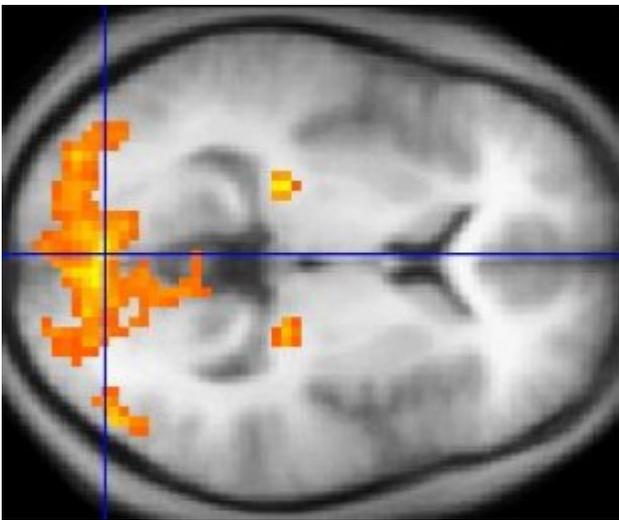
A: Feb 2005, before treatment;

B,C: Later in 2005, after treatment;

D,E: Recurrence and treatment with radiotherapy

F: Treatment with chemotherapy.

from [Wikimedia Commons](#)



Functional MRI scan of visual activity in occipital lobe of brain

from [Wikimedia Commons](#)

Chemical activity in the brain can be detected by [Positron Emission Tomography \(PET scans\)](#), [Single Photon Emission Computed Tomography \(SPECT\)](#), or [functional MRI \(fMRI\)](#). The first two techniques use radioactive tracers attached to molecules which will be metabolized (e.g. sugar molecules) at areas of localized brain activity. fMRI relies on increased blood flow to areas of the brain that are active; the blood contains oxygen molecules, which are paramagnetic and affect the MRI signal.

The picture at the left shows an fMRI scan of a subject watching “a complex moving visual stimulus and rest condition (black screen)”. The activation (yellow-orange) is shown against a “regular MRI corresponding to the brain region scanned.” The left-hand side of the image corresponds to the occipital region of the brain, where visual images are processed.

4.3 NEUROIMAGING AND THE RELIGIOUS EXPERIENCE

An interesting application of SPECT imaging is reported by Professor Andrew Newberg, Jefferson University Hospital. He showed, comparing images from religious (nuns, monks) and atheists, what brain regions and thus what brain functions are activated or deactivated by such religious acts as prayer, meditation, contemplation.

A detailed account of this is given in [Professor Newberg's web site](#) and [here](#); briefly, the account is this. When people with long experience in contemplative prayer (for example, Franciscan Nuns) pray, the frontal regions of the brain—the area of higher mental activity, forethought, etc—are activated and the parietal areas—which give a sense or orientation, bodily location—are deactivated. The latter result, according to Professor Newborn, corresponds to a feeling of losing self, of oneness with the environment, a feeling often associated with deep meditation and contemplation. On the other hand, the brains of atheists do not show such changes.

One point should be emphasized here. Although location of brain activity, locations correlated with function, can be found by these imaging techniques, such results in themselves do not give a complete understanding of mental activity, a proof that this activity is purely a consequence of material goings-on. It's very much as if we have a computer with unlabeled inputs and outputs. After some trial and error we discover that one output goes to a display, one input for commands to move a cursor, etc. We've determined location and function, but we do not have a complete picture of what goes on in the internal workings of the computer.

4.4 A FINAL THOUGHT

We can conclude, I believe, that scientific measurements, including modern imaging techniques—fMRI, SPECT, PET—show us where in the brain functions are performed and what electrical and chemical processes occur for such functions. However, they do not tell us why we know who we are, why “cogito ergo sum” is true for us, but not a computer.

