

# 1 Introduction

There is a great war raging. Western civilization is besieged. By “Western Civilization” I mean the civilization that grew out of the marriage between ancient Israel and classical Greece. First, the old traditions became intertwined in the writing of the *Septuagint*.<sup>1</sup> Then the two became one in Christianity, which required both traditions in order to express doctrine. Christians converted the declining Roman empire to the Faith, defended Europe against the onslaught of Muslim invaders,<sup>2</sup> and finally established a new civilization, among whose fruits are modern science<sup>3</sup> and laws respecting the rights of man. Western civilization has many enemies. Among them are any who would deny a key Hebrew idea, such as that man is made in the image of the Creator, and any who would deny a key Greek idea, such as that a sentence cannot be both true and false at the same time and in the same sense.

One enemy of Western civilization is a particular, modern form of atheism. New Atheists,<sup>4</sup> such as Richard Dawkins, deny both the Creator and the Aristotelian metaphysical<sup>5</sup> basis for understanding reality while claiming for themselves the mantle of science, much as the Soviet Communists did during the Cold War. The present talk is motivated by my interest in combating erroneous views about modern science. In the context of the great war and my general motivation, I point to the philosophical conflict concerning how things really are.

## 1.1 Ancient Israel and Creation

The story of the conflict begins in ancient Israel. The relevant idea from *Genesis* is that things have not always existed. God, Who is not a thing, initially created things. A new thing, such as a pot, might come into existence by transformation from a pre-existing thing, such as a lump of clay. However, according God’s revelation to the Israelites, there was in the past a beginning when the first things were created from nothing (ex nihilo), not by transformation. The fundamental distinction made by the ancient Israelites is between God and what God creates.

## 1.2 Classical Greece and Transformation

Another thread of the story begins in classical Greece. The early philosophers struggled to understand how things change, and their tradition culminated in the writing of Aristotle. Aristotle explained that for a thing to change is for what had existed only potentially in the thing to begin existing actually. The fundamental distinction is between actuality and potentiality. This distinction is the root of what has come to be called “Aristotelian metaphysics.”

## 1.3 Synthesis in Christianity

When, after having been lost for a time, Aristotle was reintroduced into the West by Saint Thomas Aquinas, he perfected the metaphysical theory so that it could explain not only change by transformation

but also creation ex nihilo. Aquinas showed how, even if there had been no beginning in time, there would still be creation ex nihilo at every moment in time.<sup>6</sup>

## 1.4 Misconceptions About Modern Science

Although Aristotle’s metaphysical theory naturally led to the emergence of modern science in the West,<sup>7</sup> Aristotle’s opponents in the present conflict ironically mount their attack under the banner of science. The self-proclaimed advocate<sup>8</sup> of science typically holds an erroneous view, *scientism*,<sup>9</sup> according to which everything that exists

1. The *Septuagint* is the first translation of the *Tanakh* (what Christians call the *Old Testament*). The translation, into Greek, was made before the Christian era. [Vander Heeren \[1912\]](#) provides a detailed overview. [Ratzinger \[2005, 2007\]](#) comments on the marriage of Greek and Hebrew culture in the writing of the *Septuagint*.

2. [Belloc \[1938, Chapter 4\]](#) gives a concise overview of the circumstances leading up to the First Crusade.

3. The terms “science” and “scientific” are by etymology misleading. In Latin, the verb “scire” means “to know,” but what we call a “scientific theory,” is in many cases something that can never be known as a truth. There are, of course, truths in modern science; primarily, these are *observational* truths: Every repeatable observation is a truth of modern science, a truth at least in the sense in which the observation was historically repeatable, and so a viable theory must explain that. Further, a scientific theory that refers only to perceptible things might in principle be known as a truth, if it be a descriptive theory, such as the arrangement of the bones in the human body. However, a scientific theory that refers to something imperceptible, like the electron, might some day be superseded by a new theory making no reference to the imperceptible thing. Its existence in reality is therefore not certain, and so the theory referring to it cannot be known as a truth. There are many who would argue that the electron’s existence is certain, but arguments for scientific realism have problems. [Chakravartty \[2016\]](#) gives an overview of scientific realism and its problems.

4. “New Atheism” is a term widely used to refer to ideas popularized by Richard Dawkins, Sam Harris, Daniel Dennett, and Christopher Hitchens in the first decade of the 21st Century. [Feser \[2008\]](#) devotes a whole book to the refutation of the philosophical errors of the New Atheists.

5. The word, “metaphysics,” originates from the order of the books in the traditional list of Aristotle’s writings. His writing on the distinction between act and potency came after (meta) his writing on nature (physics). These days, any theory about what lies at the root of being or of change is called “a metaphysical theory.”

6. Aquinas shows how we cannot know by observation whether the universe have a finite age. Only revelation can give us certainty that time began. (I note that even a successful theory like the Big Bang cannot give us certainty that time began.) However, Aquinas also shows that God creates the universe ex nihilo at every moment in time. So creation ex nihilo does not require a beginning in time. That is, God could create the universe such that it always existed, if God wanted to. See the translation of the *Summa Theologiae* by the [English Dominican Fathers \[1920, I, Q45, A1, and I, Q46, A1\]](#).

7. [Feser \[2014, Chapter 1\]](#) points out that Aristotle’s middle ground between the apparent extremes of the Eleatics and Heraclitus is precisely what is needed for something like modern science to work. More generally Aristotle developed the idea that a physical thing has a nature that can be discovered through sense experience. The incorporation of these ideas into Christianity through Aquinas and the systematic investigation of miraculous claims (as opposed to natural happenings) laid the groundwork for the emergence of modern science in the West.

8. Bill Nye, for example, is one of the most famous advocates of science. Yet in advocating not merely science but scientism, he makes a philosophical error. Bishop Robert Barron appears in a short movie in which he talks about Bill Nye’s scientism: [https://www.youtube.com/watch?v=SH\\_Njsa0zVQ](https://www.youtube.com/watch?v=SH_Njsa0zVQ).

9. Arguably the initial, definitive use of the word, “scientism,” is given by [Sorell \[1991\]](#). My definition is essentially the one given by [Hutchinson \[2011\]](#). There



is describable by modern science. He also typically holds a dubious view, *scientific realism*,<sup>10</sup> according to which an imperceptible thing proposed as part of a scientific theory is certain to exist. We shall see in what follows how Aristotelian metaphysics provides arguments at least against scientism, and I shall argue also against scientific realism. First, however, we must explore the key Aristotelian distinction, which allowed Aquinas to form a synthesis of the Judeo-Christian idea of creation and the Greek explanation of change.

## 2 The Actual and the Potential

Aristotle advanced the distinction between the actual and the potential. He seems to have done this initially in order to explain both the reality of change and the reality of permanence.

### 2.1 The Eleatics

In the Greek colony of Elea in Southern Italy—and before the time of Socrates—Parmenides and Zeno<sup>11</sup> appear to have held that change is unreal. The general idea is that in any change something new arises; what is new did not exist before the change. Denying that creation of anything new takes place, the Eleatics, at least on a common interpretation of their writing, saw no way to explain the appearance of the new feature. So they denied that the senses are adequate to the understanding of reality and insisted on the unreality of change. The Eleatic view is arguably more subtle than what appears in this characterization, but even in classical Greece the Eleatic view was taken by some to be simply the rejection of the reality of change.<sup>12</sup>

The debate over the reality of change continues today. Like the apparent view of the Eleatics, a common view among physicists is that although time is real, the *passage* of time is an illusion.<sup>13</sup> The universe is imagined as a four-dimensional space, one of whose dimensions is called “time.” The time dimension is handled differently from the spatial dimensions in general relativity, and so time in that sense is regarded as perfectly real (and, at least in each particular reference frame, distinct from space). However, the *passage* of time is like what the Eleatics called “change” and is now commonly regarded as unreal.

### 2.2 Heraclitus

In Ephesus—and before the time of Socrates—Heraclitus appears to have held that everything is in flux, and nothing is permanent. As for the Eleatics, there is some debate about what Heraclitus actually thought. Nevertheless, Plato and Aristotle took him to affirm the reality of change and to deny the reality of any permanence. The view attributed to Heraclitus is in a sense the opposite of the apparent Eleatic view, in which there is only permanence and no change.<sup>14</sup>

## 2.3 The General Theory

Aristotle proposed that there are not only real actualities in a thing but also real potentialities in the thing. Change occurs whenever a potentiality in a thing becomes actual.

### 2.3.1 Example: Silly Putty

If I have a spherical ball of silly putty, then it is potentially flat. If I squash the ball, the potential flatness becomes actual.

## 2.4 Causal Powers and Laws of Nature

A so-called “law of nature” is not what makes things behave as they do. Rather, every thing by nature has certain potentialities and some powers to actualize potencies in other things. A law of nature is what we propose in order to summarize the interactions of things according to their natures.

## 3 Efficient and Final Causality

Efficient cause is to final cause as the actual is to the potential.

## 4 Formal and Material Causality

Formal cause is to material cause as the actual is to the potential.

## 5 Existence and Essence

Existence is to essence as the actual is to the potential.

are many arguments against scientism. See, for example, Thomas Nagel’s argument from the problem of qualia, or subjective experience. Nagel’s view is summarized here: <http://www.nybooks.com/articles/2017/06/08/how-to-imagine-consciousness>, in his response to a comment by a professor Black. Note that Nagel is an atheist, though he is out of favor with the typical modern atheist, whose materialism takes the form of scientism. Feser [2014], in the introductory chapter of his book, summarizes all of the main arguments against scientism.

10. Chakravartty [2016] gives an overview of scientific realism and the problems associated with it.

11. Zeno wrote many paradoxes, but what is commonly presented as “Zeno’s paradox” is that idea that one cannot travel from point A to point B along a straight line. First one would have to reach the midpoint C between A and B, but, before that, one would have to reach the midpoint between A and C, etc. The infinite regression was intended to show the absurdity of local motion. Zeno, like Parmenides, appeared to deny both the reality of all change and the multiplicity of beings.

12. Palmer [2017] makes an interesting argument from Plato’s *Parmenides* both for the subtlety of Parmenides’ view and for the common misconception about what his view really was. In any event, Aristotle argues for the reality of change, whether against Parmenides himself or against the common misunderstanding of what Parmenides’ view actually was.

13. Carroll [2015], for example, thinks that the “flow” of time from past to future is an illusion. Smolin [2013], however, regards the passage of time as real.

14. Graham [2015] gives an overview of scholarship on Heraclitus.



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