

## Assessment of the First Way

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Having examined closely what Aquinas says in the First Way, what he meant and why he thinks it's true, it remains a fair question to ask whether the proof is successful. That is, are the premises of the argument true, and does it prove its conclusion? Aquinas's argument clearly relies on Aristotle's physics and cosmology for his understanding of motion and change, for these were the best scientific theories available at the time.

Since the time of Copernicus and Galileo, modern cosmology has shown that the earth does not rest at the center of a series of nested spheres whose combined rotation explains the apparent motions of the moon, sun, planets and stars. But the fact that the earth and the rest of the planets orbit the sun does not by itself undercut the physical underpinnings of the First Way. For the argument only requires that the changes and motions on the earth be the result of a common celestial motion which conceivably could be compatible with a system of moving causes centered on the sun instead of the earth.

Some have supposed that the modern understanding of motion discovered by Isaac Newton eliminates the need for a continuous moving cause to account for the continued motion of an object. Newton's First Law states that a body in uniform rectilinear motion or a body at rest will continue in motion or at rest until acted upon by an external force. This is a rather limited, theoretical postulate about spatial displacement; no objects in the real world ever behave according to the motion (or rest, for that matter) described by Newton's First Law. It does postulate the continued spatial displacement of an object in the absence of a moving cause by attributing it to the object's inertia. But the real value of Newton's First Law is that it requires that there be a force operative for any observed change in state. Stated negatively, it says that an

object remains in its present state (in motion or at rest) unless acted upon by an external force; stated positively, it postulates that whatever changes state is changed by some external force. Like the principle in the First Way, Newton's First Law asserts that whatever forces must be at work to bring about the change of state are external to the thing whose motion changes. Since, as we saw, motion for Aquinas is any change in state, this view essentially conforms to or fits under Newton's First Law: any change (in motion or rest) must be brought about by something (some force). Newton, like Aquinas, and following Aristotle, requires that what brings about the change must be other than what is changing.

There are, however, two fundamental problems in reconciling the First Way with modern physics. First, it seems that premise *(II)* is not true: not all motion or change (even purely physical motion) is caused by something other than what is changing. Rather, some things change of themselves through the exercise of intrinsic physical forces. According to modern physics, all physical changes and motion are the result of the four fundamental forces: gravity, the weak and strong nuclear forces, and electromagnetism. The objects or particles from which these forces operate bring about every physical change that occurs, either within themselves, or through interaction with other objects or particles. The motions of planets, stars and galaxies, as well as much of the natural motion on the earth are the result of the gravitational attraction between massive objects. The motions and changes which result from chemical reactions are ultimately reduced to the bonds between atoms sharing electrons, and are grounded in the electromagnetic force. The strong nuclear force keeps subatomic particles within nuclei bonded together, and releases tremendous energy when those bonds are broken, in nuclear fission within stars, reactors and bombs. The weak nuclear force brings about the radioactive decay of certain elements. In all of these cases, the physical changes do not come about from the continual action

of an external moving agent, as the First Way requires, but from the intrinsic capacities and tendencies modern physics identifies as fundamental forces.

Second, neither the individual physical motion or changes we observe, nor the motion of the universe generally, is the result of essentially subordinated chains. At most they are the result of temporally successive transfers of energy. This fact is a corollary or implication of the fact that physical change and motion result from intrinsic forces and not from the continuous action of *per se* causes. The motions we observe are displays of kinetic energy, but these are not the net output of simultaneously acting moving caused causes. Rather, the energy is part of a universal system in which the energy has been transformed, and is being transformed (through further interaction), but the total energy of which is being conserved. The sum-total of mass-energy in the universe is constant (or so it is believed) and the universe as a whole is a system of interchange between mass-energy in various states. The universe generally does not behave like a system of simultaneous moving gears or a train of rail cars, necessarily driven by an engine. Some parts of the universe we observe are in fact such systems, but our identification of these systems is relative to artificial frames of reference. Even the energy in such systems of simultaneous moved movers originated from the kinetic energy produced elsewhere on earth and can be traced back temporally through the formation of our sun and solar system, ultimately to the origins of the universe in the Big Bang. Whether this event must have a prior cause or not, its cause would be 'temporally,' or at least, successively prior. Even if all energy, and so motion, originated in the Big Bang (with or without a non-physical prior cause), this origin is not a *per se* cause, simultaneous with the motion we observe here and now, which is what the First Way requires.

Aquinas's First Way attempts to prove that there must be a first unchanging and motionless cause of change or motion in order to ultimately account for apparent motion on

earth. Given the physics and cosmology of Aristotle, he had good reason to think that the proof was demonstrative and successful. But now that we have better reasons to accept the contemporary understanding of physics and cosmology, it seems clear that motion is not always the result of the actuality of an object external to what changes, nor are changes ultimately the result of per se causes. Since key elements of the First Way have been discovered to be false by modern physics, the proof is not successful. It will have to await another treatment to investigate whether modern physics, which generally accepts the origin of the visible universe in a Big Bang, can generate a demonstration for a first cause of motion beyond physics. If a proof can be made for a non-physical cause of the universe based on modern physics, the First Way of St. Thomas Aquinas is not it, nor can Aquinas's argument provide the basis for it.