## 5 LIFE

### *Flat or Full?*

Using commonsense knowledge of the world around us leads to two unexpected conclusions, at least from the point of view of modern materialism. One is that we can have practical certainty about many things apart from scientific research and opinion. The other is that the human intellect must be immaterial and capable of knowing immaterial things. Both these conclusions leave people steeped in modern materialism stupefied. How can any modern educated person not believe in the superiority of science? For a scientist not to believe this is tantamount to abandoning science. Not to believe that all reality is explainable in material terms is to retreat to the fanciful ideas of a prescientific world. Still, I maintain that not only are these two conclusions true, but also that the arguments for them are sound.

The arguments offered so far for the common experience of humanity and the immateriality of the intellect do not exhaust our armamentarium. Central to human inquiry, as well as to the biological sciences, is the question of life. Every biology textbook addresses the issue. For centuries, some of the most expansive thinkers in the Western world posed the following questions: How does one define life, and how can one know what is an ade-

quate definition of life? Does a person need a textbook to learn what is life? Perhaps returning mentally to southern Indiana can help.

### *Seeing Life: Standing Still in the Snowy Woods*

Heavy snows are somewhat uncommon in southern Indiana, but they do occur. They were always occasions of delight for me, as I would put on coat, hat, and boots and head into the woods. The woods during a heavy snow are largely an unseen world. The large flakes drift down through the trees while the branches and brush hang heavy with the snow, as if a large amount of whipped cream was just dabbled on them. The snow chokes everything. Here and there bits of brown twigs and brush poke through, and the green needles of the few pines provide one of the few contrasts with the dominant white blanket. Occasionally, among the flakes, larger aggregations of snow fall from the branches above. The cold bark of the trees lends its roughness to the cold of the air and the starkness of the landscape. The silver water of the creek cuts through the white and provides one of the few sounds one hears. If one moves away from the creek a bit, the snow hushes the sounds of movement.

Silence and stillness remain the unmistakable marks of the woods under snow; no sound or movement seems to penetrate. I experienced something similar in Mammoth Cave when the tour guide had everyone be quiet while he turned off the lights; the silence was broken only by someone unable to hold back his giggles. In the snowy woods, silence and stillness were dominant, or so it seemed. If I leaned against a tree and stood still for several minutes, small sounds, nearly inaudible at first, would punctuate the silence. Chickadees stir above in the branches or alight on the ground below. They would flit to and fro, scratching about the ground looking for some unseen morsel, interacting with other chickadees, or puffing out their feathers into an instant parka against the cold. Other songbirds would appear and do the same. Squirrels might jump through the branches or climb off a tree trunk and forage with their quick, jerky movements. They nervously pause and look about, tails twitching, then resume their business. If I was lucky and the sky overcast enough to make the light sufficiently dim in the trees, a great horned owl might float through the snow-covered branches, moving

from one perch to another. After a time, the snowy woods would become quite alive. What caught my attention was movement. Chickadees and other birds, squirrels, and owls all move. Movement prompted discernment into the nature of the moving thing. What grabbed me most was that their movement was a directly intentional movement, discernibly different from the passive falling snow or the running water. The wind pushed the snow or the water ran down a slope, its course determined by rocks or fallen trees.

No one has captured the silence and sounds of a snowy scene in the woods better than Robert Frost describing his horse in "Stopping by Woods on a Snowy Evening." Here my own experience is echoed:

> He gives his harness bells a shake,
> to ask if there is some mistake.
> The only other sound's the sweep,
> of easy wind and downy flake.[1]

The horse is a cause of sound, while the snow is passively moved by the wind. Movements by animals are concentrated centers of self-effort. Life actively moves itself, as opposed to the passive movement of inanimate things.

No matter where one goes, the common experience of movement as a sign of life is the same. Living in Minnesota thirty-five years later, my children experience the same. So common in fact is the observation that life moves itself that our parks announce it; in a park within the city where I work hangs a sign by a pond that reads, *Look for any signs of movement in the water; can you see any types of life?* Most little children pick up immediately the truth that life moves itself. Like adults, they seem attuned to this occurrence. My own children on many occasions discover a worm or insect in the grass. "Poke it with a stick to see if it moves and or is dead," they say. Back in Indiana, wandering, I wondered about some object. Was it a dead branch or an animal lying there? I walked toward it. If it jumped up and ran away, it was alive.

Yet not all living things exhibit the same type of movement. Humans build many different things; they have language, discuss ideas; write philosophy, music, and plays; they play sports; and they believe in things higher, such as God, and have various religions. This is different from other species

1. Frost, "Stopping by Woods on a Snowy Evening."

in the world. There are similarities, but there are also profound differences. Animals may build things, but a given animal typically builds one thing one way. Robins build nests in only one way. On closer observation, they seem to build in a preprogrammed manner. No one has ever experienced an animal understanding the principles of structural engineering. Humans, by contrast, have large and diverse ways of communicating. Humans are generalists, animals are specialists. Human beings are rational and intelligent; they grasp the generic nature of things.

Still, the movement of animals is impressive compared to plants. Animals move about and are active, while plants seem to sit and grow. Humans occasionally "vegetate," that is, sit around eating all day like plants, but this behavior is likened to plants precisely because plants have a lower level of internally motivated movement. Movement is a basic characteristic of life. As such, ancient and medieval thinkers could not fail to notice its centrality to life itself, and they sought to construct a framework for understanding the universe.

### *What Is life? Life Moves (Completes) Itself*

Modern biology texts define life with such phrases as "that which reproduces itself," "that which grows or eats and excretes waste," or "that which metabolizes."[2] All these are particular instances of change, or movement, in the broad sense of the term. They just never quite seem to get to the most generalizable observation of life as that which simply moves (changes) itself.

In the thirteenth century, Thomas Aquinas answered the question "What is life?" by taking a journey from nonliving things to the ultimate source of all reality, God. Thomas develops the basic observation made by human beings that life has a principle of self-movement – it moves itself.[3] Movement is the old term for change; in modern usage, it is the ability to change oneself. The term for this is immanence, taken from an immanent

2. See, e.g., Raven et al., *Biology*, 2–3.

3. *SCG* IV.11; *De Potentia*, q. X, 1c; *ST* I, q. 18, a. 1, c; I, q. 18, a. 2c. Specifically, a living thing is that which at its very core being, or substance, has the ability to move (or change in modern terminology) itself. The outward sensible manifestation of this substance is self-movement or self-change. For further discussion regarding levels of immanence in things, see also Toma, "Dionysian/Thomistic Framework," 87–113.

as opposed to a transitive verb.[4] A transitive verb needs another to complete it. An intransitive or immanent verb needs no other to complete it — it completes itself. St. Thomas noticed that the greater the immanence, the more interior it is to the organism, without reliance for the completion of its change on anything external to itself. He spoke of organisms as being more alive, the more internal the movement to the organism.[5] The ultimate self-moving act is intelligence, because in the highest of beings it does not need to rely on external things. In God, intelligence is the same as his existence and is who he is.[6]

The analysis of life based on movement naturally leads to the notion of the hierarchy of being.[7] The movement of nonliving things is a pure transfer of external motion to another. The most primitive living beings are plants,[8] where a transient interior action produces growth and reproduction. Next up the hierarchy are animals, defined by possession of the life of sense. In animals, sense experience terminates in the memory and not in an exterior thing like a new plant. The animals' experience of the world begins to resemble a type of union with what is known. Above animals, there are human beings with a rational intellect. While humans still depend on that which is outside of them to *begin* to think, the actual understanding is something interior. It is a purely interior act. Its product is the thing understood, and the image the knower has of himself. An intellect allows one to exist as a person, a being fundamentally ordered to another in relationships (e.g., friendship) and union. Later, I argue that the interior nature of human knowledge points to even higher beings who need nothing outside of themselves to know. Ultimately, the perfection of life is in God, who is his own cause and whose understanding is exactly the same as his infinite being.

It will probably surprise most modern readers that a medieval philosopher was able to gain profound insights into the nature of life without the experimental apparatus of modern science. A careful reading of Thomas

4. Sheen, *God and Intelligence*, 106–7.

5. *ST* I, q. 18, a. 3c.: "A thing is said to live in so far as it operates of itself and not as moved by another, the more perfectly this power is found in anything, the more perfect is the life of that thing."

6. *SCG* I.44–45.

7. *SCG* IV.11. 4.

8. Plants are simplest, according to St. Thomas. I ask the reader to wait until chapter 7 regarding such organisms as bacteria and protists, known as and called simpler by modern science.

Aquinas's *Summa contra Gentiles* shows that in Thomas's thought there is a synergy between implicit human understanding and analytical philosophy, which refines common experience into precise distinctions. Thomas uses this refined understanding to gain insight into the loftiest truth of Christianity, the life of the Trinity.

Thomas begins with the observation that we did, namely, that living things change and complete themselves. In other words, they are their own source of change. Just like children poking insects in the grass or investigating a novel object in the distance to see if it moves, the common criterion for life is self-movement. All people, both young and old, are fascinated by this observation: pulling the fish out of the water and watching it flop, watching horses run, or waiting for the snake to move in the cage at a zoo.

Another corollary of self-movement is self-maintenance.[9] Every day, you get up in the morning, eat breakfast, brush your teeth, go to school or work, learn and do things, eat two more times, play with your family, go to bed. You are working to maintain yourself. And *you* are initiating the change in yourself. Living things are their own source of change.

If the definition of life is that which moves itself, those things that change themselves in a deeper interior manner, particularly in completing themselves, are higher life forms.[10] In the modern conception of life, it does not make much sense to talk of higher or lower forms of life, except in terms of molecular or morphological complexity. Yet our common sense – or, better, common experience of life – indicates that higher forms of life are in some sense more perfect. The World Series, the Super Bowl, and the Olympics display this fact. Athletes of all types compete in the Olympics to see who performs best, and they rightly receive recognition because they show the perfection of their sport. The writer or the scientist who wins the Pulitzer or Nobel Prize does the same. They are recognized as the highest or greatest because they approximate perfection.

The same is true for natural life. To the degree a living thing can change and complete itself without another, it is more alive.[11] The more *independent*

9. Aquinas, *Commentary on Aristotle's De Anima* III.230–34.

10. *SCG* IV.11.1. "The higher a nature the more intimate [immanent, or interior] to the nature is that which flows from it."

11. *ST* I, q. 18, a. 3c.

or *internal* the organism is, the higher its form of life. So basic is this idea of self-movement to life that we do not even have in English a distinct word for those things that are nonliving. We understand living things and then define anything less as "*non*living" or inanimate. These observations, refined by empirical-philosophical analysis, led Thomas to distinguish three types of material life: plants, animals, and humans.[12] Nonliving things (subatomic particles, atoms, molecules, water, air, rocks, minerals, the sun, moon, and stars) are non-self-movers, collectively called "minerals" in the ancient and medieval world.[13]

### *Life from the Bottom Up: A Natural Hierarchy*

The ancients called nonliving things minerals, but they were limited in their knowledge of nonliving things to earth, air, fire, water, rocks, minerals, and such. Today, many more nonliving things are known. A billiard ball hits another and transfers motion to it. The ball that will receive the motion is passive. It stays put until moved by another, which received its motion from another, and so forth. Where does the rock skipping across the water get its movement? From the thrower. The water hit by the rock gets its motion from the rock. Thomas uses the example of fire igniting wood.[14] It is transferred externally to the wood as the heat of one flame causes the wood to burn when it is near enough to it. St. Thomas notes two key points.[15] First, the fire gains nothing as it is completed in the wood, but the wood gains heat. Second, the wood does nothing actively to ignite itself but is ignited by the external action of the fire. The change of nonliving things arises from something external and is completed in something external.

Does modern science agree?[16] Take, for example, Isaac Newton (discussed in chap. 2), who is considered the father of classical mechanics. He

12. *SCG* IV.11.1.

13. The sun, moon, and stars were actually thought of as higher forms of material beings. I make my statement as if they had the understanding of these celestial objects as we have presently with our discoveries of modern science.

14. *SCG* IV.11.2; Toma, "Dionysian/Thomistic Framework," 87–113.

15. *SCG* IV.11.2.

16. Toma, "Dionysian/Thomistic Framework," 87–113.

formulated the famous three laws of motion that are taught in basic physics courses everywhere:[17]

1. Every body persists in its state of being at rest or of moving uniformly straight forward, except insofar as it is compelled to change its state by force impressed
2. The alteration of motion is ever proportional to the motive force impressed; and is made in the direction of the right line in which that force is impressed
3. To every action there is always an equal and opposite reaction: or the forces of two bodies on each other are always equal and are directed in opposite directions

Some distinctions are necessary to answer the question of agreement between Newton (science) and St. Thomas (philosophy). When it comes to nonliving matter and change of place (local motion), these laws are only somewhat consistent with the teaching of St. Thomas. When St. Thomas talks about change or motion, he is speaking about all forms of change, including local motion and change of quality or change in substance (coming to be and passing away).[18] Newton, however, restricts his analysis of motion to an idealized local motion, or change of place, and begins with the concept of inertial motion. With respect to local motion, Newton's concept of acceleration would approximate to Aquinas's understanding of the causes of local motion (it's not clear that Aquinas or Aristotle had a doctrine of acceleration).

St. Thomas held that for local motion to occur, a continuous force needs to be applied through the medium of motion.[19] This is a divergence from Newton's first law. If a shot arrow leaves the bow, the motive force is applied to the arrow through the medium (air). Newton, in contrast, held that the medium is a source of friction and does not transmit motive force. Thus, once an object is accelerated or set in motion, it will remain that way unless another force alters it. This represents a major difference between the two thinkers. But despite the differences of opinion on the simple motion of bodies,

17. Newton, *Mathematical Principles of Natural Philosophy*, 13–14.
18. Aquinas, *Commentary on Aristotle's Physics* III, lec. 1–5.
19. Aquinas, *Commentary on Aristotle's Physics* VII, lec. 3.

described by Newton's first law of motion, both Aquinas and Newton might agree on the cause of acceleration, as set down in Newton's second law.

Thus while there may be certain fundamental differences between these two thinkers, insofar as they do overlap, they could arguably agree on the general idea that nonliving things display for the most part an essential exteriority in their actions (the arrow's motion is imposed from without and terminates in the target, again exterior to it). In *this* sense, Newtonian ideas are simply more precise and mathematized descriptions of certain external actions, the motion per se of nonliving things. Similarly, modern science, having adopted the general view of forces from Newton, adopts this idea of external actions as well.

By the early 1900s, the Einsteinian theories of relativity and the theories of quantum mechanics began to supplant the Newtonian universe. Einstein posited space-time as the absolute reference for physical motion, not space or time by themselves, as did Newton.[20] Quantum mechanics is a body of information about the behavior of subatomic particles (and larger objects as well). I say more these more later, but the general observation that nonliving things interact by external influence is still valid in both fields. They are simply more sophisticated and precise understandings of our universe than Newton had. For instance, Einstein's work might ask, Which object is in motion and with respect to what frame of reference?[21] Quantum mechanics might show the probabilistic nature of our knowledge of the interactions of subatomic particles.[22] Chemistry is concerned with topics of atomic and molecular interactions, or precisely how a thing like fire transfers its heat to a piece of wood. It still deals with external actions but gives more precise descriptions of the mechanisms of the external change. In this respect, chemistry is the science of the mechanism of certain external actions.[23] None of this denies that inanimate things are not centers of self-change, however. Inanimate objects are not self-moving; that is, their actions end in another.

Modern physics and chemistry describe types of external actions. Objects are passive and only change if another changes them. Modern astro-

20. Greene, *Fabric of the Cosmos*, 68–75.

21. Greene, *Fabric of the Cosmos*, 51–80.

22. Heisenberg, *Physicist's Conception of Nature*, 34–42.

23. Toma, "Dionysian/Thomistic Framework," 87–113.

nomy tells us of incredible instances of these inanimate forces changing things: black holes destroying other stars, supernova explosions devastating regions of galaxies, high-intensity irradiation of planets, giant asteroids wiping out living beings such as the dinosaurs, our own moon with blisteringly hot areas in the sun and extremely cold regions in the shade of rocks, and the Big Bang itself, with the universe expanding faster and faster into a lonely void. Objects jostle and get farther and farther apart. Eventually, things will expand so far that few interactions will be possible.[24] The inanimate world of physics, chemistry, and astronomy reveals a universe expanding into a cold darkness driven by the mechanistic jostling of objects acting under external actions. Nonliving matter exists only for itself in a hostile expansion into a void.

Once living beings enter, the picture changes. Plants are the most basic level of life.[25] Why plant a garden? To wait for the plants to grow and produce seed and fruit, which in turn yields food. In large measure, nonliving things — $CO_2$, sunlight, inorganic nitrogen, phosphorus, and sulfur — cannot be turned into nutrients needed with a net gain in energy for the system. Plants can accomplish such a transformation. They draw in compounds from outside themselves, transform them inside, and cause themselves to grow and reproduce.[26] Inside, something radically different from the outside is made and organized into a plant tissue. There is a transient interiorization of action.[27] A plant enlarges or augments itself, and it produces another plant. A tree grows larger every year, and the end of this growth is simply to make itself more of a plant. As seeds are produced, the plant produces another plant, but this second plant is finally, totally separate from its parent; the action of a plant terminates in something exterior, the new plant. These ends — growth and reproduction — are determined by nature.[28] There is no freedom in what a plant does. Therefore, in plants, there is life at its most basic function of giving life to another of the same kind. Nevertheless, in plants, nonliving matter is fundamentally reorganized into something

24. Perlov and Vilenkin, *Cosmology for the Curious*, 125–41.

25. *SCG* IV.11.3. Again, I ask the reader to please wait until chapter 7 for a discussion regarding such things as bacteria and protists.

26. *SCG* IV.11.3.

27. *SCG* IV.11.3.

28. *ST* I, q. 18, a. 3c.

radically different: life. Matter is reoriented at its most basic level from a purely passive state existing only for itself and becomes, through the plants' offspring, that which is given (life from the parent) and that which is received (to the offspring). Life becomes a gift.

In this aspect of parents and offspring, we begin to see perhaps the deepest truth of things alluded to above. Union is productive of a third. It is not the fanatical absorption of two in each other that is the highest perfection of union, but rather their complete self-giving and union precisely in a third.[29] The perfection of life at the vegetative level — the production of offspring — gives us an insight into this. In material living things, physical union is for the sake of another.[30] How this plays out in intellectual union remains to be seen. Nevertheless, in a plant there are the beginnings of life, but not the perfection of life. Life can be much greater.

Animals are the next higher forms of life, both in modern science and in Thomas's system based on everyday human experience. Animals display something plants do not. They run, play, and traditionally performed much of our human labor. There is a kind of quickening in animals, and they approximate us humans to a much greater degree than plants do. This partly explains human affection for them, since people do not walk their plants or play fetch with them.

What makes animals different from a plant? In a word, they can sense: they see, smell, hear, taste, and touch.[31] Because they can sense things, they can perceive sensible objects: those objects having colors, odor, and so on. This power to know sensible objects allows them to fear or like certain things. If emotions are the aversion or attraction (affection) to things sensed, then animals have emotions.[32] They like people who feed them and care

29. Staniloae, *Holy Trinity*, 21–27. See also Damascene, *Christ the Eternal Tao*, 252–53.

30. This obvious truth needs restating in our pleasure-soaked society. Specifically, sexual reproduction is first and foremost for the sake of producing offspring. Aside from the self-evident nature of this fact, any review of biology texts will state the same; i.e., sexual reproduction is for the survival of the species, or the production of gametes (sex cells: sperm and eggs) is for the purpose of producing more offspring, or similar phrasing. The pleasure derived from it is secondary. While it may be pretty certain that higher animals other than humans derive pleasure from sexual reproduction, it is by no means certain with lower animals. But they do engage in this activity precisely to produce offspring.

31. *SCG* IV.11.4.

32. *ST* I-II, q. 22.

for them. They fear those who abuse them. The power of sensing and the desire (attraction or affection) or fear that comes from it are characteristic of animals. Animals also remember the things they like or fear; they have memory.[33]

Heliotropism may be cited as a counterexample to this generalization.[34] Doesn't the sunflower move with the sun? In fact, many plants do, and plants can "smell" and "hear" in a certain manner, too.[35] They also seem to remember these sensations. How, then, do we distinguish plants from animals?

We define a thing from what we know best.[36] Children learn what is gray based on black and white, not the other way around. Gray is a greater or lesser amount of black or white. Nectarines are a hybrid of peaches and plum. We define a nectarine from the two fruits from which it is derived, which we know better. Electricity in a wire is called a current, named after flowing water, which we know better. All knowledge proceeds by comparison with what we know better. We define sense based on what we, who are part animal, do. We sense. Sensing is the ability to know a sensible thing.[37] Once again, sensible things are made of matter; they have height, length, depth, and weight, and they exist in space and time. The general term for such a thing is an individual, as defined previously: that which is extended in space and time. Thus what an animal senses is *this* flower, *this* tree, *this* bowl of food, *this* dog, *this* human, or, going back to triangles, *this* particular triangle (not the idea). They know *this* individual sensible thing. The dog knows his master as *this* thing that cares for and feeds him. It has affection for a particular human being, but it does not know humanity or what it means to be a human. It doesn't know generalities or what a thing is, just *this* thing giving pleasure or pain. It is the lowest type of knowledge, knowledge of the

33. *SCG* IV.11.4.

34. The common observation that a plant turns toward the sun and tracks with it throughout the day.

35. Chamovitz, *What a Plant Knows*, 27–48, 71–89. This book is a fascinating account of the sensory capabilities of plants. Many aspects of their sensing capabilities appear to be similar to those of animals. But as the author admits up front, the term "sensing" is not exactly applicable in the same way in both plants and animals. As I will discuss, I think the key difference is that a plant does not *know* an individual.

36. Aristotle, *Physics* I, 315.

37. Aquinas, *Commentary on Aristotle's De Anima* II, lec. 5–12; III, lec. 2–3.

individual. This is what sensing is in its pure form, taken from our experience of the empirical world.

Plants "sense" in a much different manner.[38] They detect light, odors, and such for the purpose of their growth and reproduction. They detect the sensory stimulus itself and do not know per se the object that gives the sense. Their "memory" is similar. It moves toward the last place of the stimulus. They don't remember the individual thing. No one has ever seen a plant have joy or sorrow toward an individual.

But the dog has memory in a larger and more important way. It remembers the object of sense as a real individual that gives pleasure or pain, not as the plant that again has a memory of simply the "region" of "pleasure" or "pain." St. Thomas notes that in animals there is a deeper level of interiorization, or self-movement. Like plants, animals grow and reproduce; that is, they can vegetate. When animals sense, however, they begin using things external to them, the objects sensed, and the action of sensing ends in their memory. So in the case of animals, there is an action beginning on the outside — perceiving something sensible — that ends, is completed, on the inside, as a memory of the external thing.[39] A plant's action completes itself in something exterior, the new plant. With animals, there occurs a deeper action of self-movement, which is movement that does not depend totally on another. Sensing completes interiorly in the memory as a more intense type of self-movement; it is one step more independent of that which is outside itself, precisely because the animal stores the memory inside, remembering this or that *thing* as pleasurable or painful.[40]

The memory of an animal broadens the life of the animal to things outside of itself. This is another level of living beyond oneself, in contrast to mere reproduction in plants. In animals, there are the beginnings of true knowledge that we introduced in our discussion of the intellect. Knowledge

38. Chamovitz, *What a Plant Knows*.

39. *SCG* IV.11.4; *ST* I, q. 18, a. 3c.

40. This includes "lower" animals as well such as insects and fish. I use "lower" here in the common parlance; scientists would consider both of these as higher organisms. In scientifically lower organisms such as flatworms and rotifers, the answer to the question of whether they have memory is less clear. But as I argued above, one takes the standard from the obvious, not the gray borderlands. Insects and fish clearly do have memory. On a related point, insects also have brains (a question students occasionally ask). Indeed, they often have complex brains and nervous systems.

is something of the other possessed by the knower. Sense knowledge has sensible aspects of the other: the color of the other in the case of sight, or the sound of the other in the case of hearing. With sense knowledge, the animal contains aspects of the other and in an abstract sense is somehow more than just itself.[41] The experience of a rose with its deep red color and sweet scent leads to a fuller sense of the rose. Life is greater where there is greater knowledge, where the other abides in the knower. Such an experience leads to a type of reveling and resting in the known. And in animals there is a remote, albeit imperfect, reflection of communion or abiding in the other, a reflection of friendship that is the epitome of personal relations.

With human beings, life takes a gigantic leap. Sensation, memory, and intellect are now interrelated in a new way. Human beings share much with plants and animals. Centuries ago, Aquinas and others like him posited a substantial claim about the Hierarchy of Being: that which is above contains the powers of that which is below.[42] The Hierarchy of Being is not like stair steps that are all the same, each step simply above the next. The hierarchy means that most realities that are on the lower scale of the hierarchy are subsumed into those higher up. The sunflower tracking light is similar to sense experience in animals; it is approaching the power of that above it, the animal. Plants grow and reproduce; animals grow, reproduce, and sense; humans grow, reproduce, sense, and reason.

Reason is perhaps the most controversial difference between the Thomistic view of human beings and that of materialistic science. The intellect, and therefore humans, in modern science is seen as no different from animals.[43] From the Thomistic view, there is a fundamental difference. Scientism is highly reductionistic; it looks at life from the standpoint of its most primitive functions – growth and reproduction. Anything beyond that is extra stuff to aid survival. Thomistic thought views life from its most fundamental action (self-movement) and the deepening of this action as it moves

41. Aquinas, *Commentary on Aristotle's De Anima* II, lec. 5–12; III, lec. 2–3.

42. *ST* I, q. 57, a. 2c.

43. This is so widespread and accepted that it need not be supported by citation. Most standard texts in science make this claim. As discussed in chapter 3, the premise of modern scientistic thought, regarding the intellect, is that there is only material reality. The intellect of man is simply different in degree from that of animals.

toward perfection (completion).[44] So what type of self-movement is particular to humans?

We spoke of the intellect as immaterial. The natural objects of our thoughts are beings composed of matter. Because material things occupy space and time, they are external to us. Humans have a type of intelligence that needs external reality to gather information for the exercise of reason.[45] Once we have this knowledge, the act of thought itself is immaterial.[46] So like animals, humans depend on that which is outside them to know. Unlike them, they do not stop at individual knowledge but move on to the knowledge of the principles of material beings, especially the formal cause.[47] As the sensible aspect of things resides in the sense knower as memory, the intellectual knowledge of things resides in the intellect in its formal aspect, immaterially. This knowledge exists as immaterial in the intellect and not as material as it exists in external reality in the known thing.

Second, once an external object is known, humans further reflect on *themselves* by comparing themselves to what and how they know.[48] *They then know themselves precisely as knowing beings*. They are self-reflecting, able to muse upon and conclude new things from what they know. When humans think about things and their own action of thinking, they form an idea of self. We all have an idea of ourselves that is to a certain degree accurate, but not perfect or "complete," a kind of image of ourselves in our minds. Here we begin to see another type of reproduction. In addition to our biological children occurring from our vegetative powers, the life of the mind produces another self, our image of ourselves as knowers – the remote evidence of an internal intellectual fruition.[49] If, as we have claimed, the intellect becomes that which it knows, the higher the intelligent being, the more accurately that being knows itself. All things love themselves; they do things to augment their life and resist death. Therefore, once known, the more accurate the idea of self, the more it is loved. Thus in the intelligent act we begin

44. Aquinas, *De Potentia*, q. X, 1c.

45. *SCG* IV.11.5.

46. Aquinas, *Commentary on Aristotle's De Anima* III, lec. 4–8.

47. Once again, the formal cause is that which makes a thing to be what it is, as opposed to its material cause, which determines of what it is made.

48. *SCG* IV.11.5.

49. *SCG* IV.9–11.

to see three things reminiscent of a type of reproduction: the possessor of intelligence, the intellectual image of oneself, and the movement of the will (love) to that image.[50]

Perhaps the most important difference of all between the view proposed here and the materialist (reductionistic) view of human beings is that human beings are a bridge between material and intellectual reality, owing to their powers of sense and intelligence.[51] They possess the material powers of growth, reproduction, and sensing, and the nonmaterial or intellectual powers of knowing. They possess the powers of plants and animals in addition to their rational intellect. They are akin to beings lower through their material powers (or body in a generalizable sense) and akin to that which is higher through their intellects. In this sense, they are a microcosm of creation.[52] Our very constitution is the same as the universe around us. This similarity between us and the universe makes us able to know it. Our internal structure is a platform for knowing reality because it is like the rest of the cosmos. This is the real sense in which Christians and the Greeks before them thought of humans as the center of reality, not in the misguided popular sense as portrayed in misunderstandings of the Galileo controversy, of being the physical center of creation. In humans, we have a being able to know *ourselves* and enter into communities of knowledge and love.

### *Law of Assimilation*

When we step back and view the actions of all four types of being in general—minerals, plants, animals, and man—the law of assimilation emerges.[53] This law helps us to understand the idea in chapter 3 that the intellect contains the other. Succinctly put, without the possession of the other in some

50. It is in this sense that certain Fathers of the Church, such as Augustine, used the internal operations of the human soul as a reflection of the Trinity (but not proving it by reason). See *ST* I, q. 32, a. 1, arg. 2 and ad. 2.

51. Scheeben, *Mysteries of Christianity*, 238–39, 357, 401, 401n54.

52. Golitzin, *Et Introibo*, 371–92. This idea of man as a platform of reality or, more specifically, a "little Church" Golitzin claims was prevalent in the Christian Syriac East and found its way into the Christian Greek East from there.

53. The term "law of assimilation" and its synthesis are taken from Sheen, *Philosophy of Science*, 108–11. Sheen in part bases this idea on *ST* I, q. 76, a. 2, ad. 4, and Aquinas, *Truth*, vol. I, q. 2, a. 1.

way, life in the universe as we know it would be impossible: vegetative life needs food, sensory life needs sensible things, and intellectual life needs intelligible being. But this ability to assimilate varies according to the nature of the assimilator. Each step up the hierarchy of being reveals a new and more perfect assimilation. Vegetative life draws in chemicals from outside and breaks them up for nutriment. In modern parlance, this is termed digestion, or catabolism, where a thing is broken down, and then anabolism, where new molecules are built up from these to unite to the organism assimilating. Vegetative life is so weak in its interiority that it must destroy what it assimilates before it unites.

Above vegetative life is animal life, the life of sense. Animals are not as destructive of their object of sense. They take in qualities (sensory aspects) of an object, such as color or sound. The animal then unites them for a composite sensory picture. In the end, its knowledge is only of juxtaposed parts (sensory qualities), just as that of vegetative life is parts of the chemical it has digested. At least in animal sensing, however, the quality as such is not destroyed, as is the chemical in vegetation.

In human intellection, we should expect to find a yet more perfect assimilation than in either plants or animals. And we do. The intellect of man still removes that which it needs for "nourishment," but in a much more perfect way. It unites with the formal principle, or cause, of the very nature of a thing. It does not take up qualities in parts as does the sense but becomes the other in a nonmaterial manner. In all three types of life, the end result is union, but only in the intellect is the cause of the thing assimilated preserved. And it is precisely because of its immateriality that it can do this.

### *Modern Science in a Medieval Framework?*

Our tour of life is both refreshing and challenging. It shows us that philosophers who were keen observers of natural life were able to see many factual truths adumbrated in modern science. Those truths were based on common human experience, the same kind we all possess. Modern science gives us greater detail and precision but does not change the broad outlines of natural truth. Science itself is based on common experience. Common observations of nature cannot tell us about cellular structure or evolutionary

linkages with the past history of the universe, but these details don't in any way lessen our certitude based on the things we know best: human experience of nature.

Yet modern scientism does stand in contrast to the notion of a hierarchy of being based on the greater internalization of self-movement. Modern biology resorts to a minimalistic understanding of life when it focuses on survival and reproduction. One might say that many modern thinkers have missed the obvious, namely, that there is a directionality to this natural hierarchy. It tends to move in a certain direction and not in another. The hierarchy of being points to the culmination of the material world in the immaterial intellect. The overarching, organizing principle of the cosmos is not survival but intelligence.

The neglect or denial of intelligence as an organizing principle or goal of the natural world may be rooted in a false understanding of how the material and immaterial relate to one another. The misconceptions about the body-soul relation, mentioned in chapter 3, are evidence of a mistaken understanding of material-immaterial relations. The Thomistic understanding of the hierarchy of nature shows that the material and immaterial are not opposites or irrelevant to each another. In that framework of thought, what is higher on the hierarchy contains or includes what is lower on the hierarchy. Thus animals with their memory in a small way approximate human beings, although they lack true intelligence. Humans are the material pinnacle of the hierarchy because they share in the material world with other organisms, while they are also able to transcend that world with their immaterial intellects. Life is more than survival or reproduction. Life tends toward intelligence. Still, are human beings the most perfect examples of intelligence and life?