soul. When the soul is effecting a strong connection between spirit and body, then anything in one's spirit directly flows into and gets expressed in bodily activity. Consequently, the body, clothing, location, etc., becomes intensely sacred by direct association with the soul's activities. When the soul is effecting only a weak connection between soul and body, the body and surrounding are still sacred, but not as much so.

Comment [A1]: This will be a key principle in morality in Unit IV: Even though circumstances cannot make a good action bad or a bad action good, they do make actions slightly more or slightly less good, or slightly more or slightly less bad.

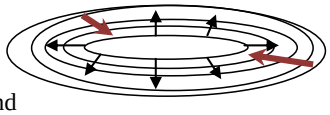
Chapter IV. Matter and Form

Diagram 1.27

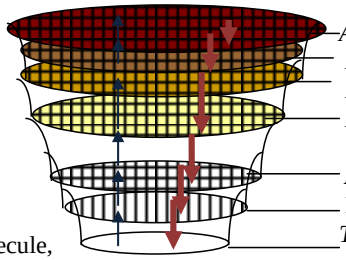
1. The Unfolding of the Material Realm

In the material realm, the relationships of having and being essential are also inverted from what they were in the formal realm (cf. Diagram 1.10).

Comment [A2]: Using diagrams 1.32 and 1.34 and/or diagrams 1.17 and 1.21, demonstrate to the students how the material realm unfolds downward (see white arrow) from the formal realm, using the dividing line as a fulcrum. If this is effectively demonstrated, the students will understand for themselves why it is that the lowest things contain the highest principles: Because before the unfolding it was one of those principles, and the unfolding merely 'separated' it out. Cf. Job 9:8, Ps. 104:2, Is. 40:22, 42:5, 44:24, 45:12, 51:13, Jer. 10:12. 51:15, that God "stretched out the heavens" and Is. 34:4, Rev. 6.14, that at the end of time he will roll them up again.



→ *Has* (possesses) . . .
→ Is essential to . . .

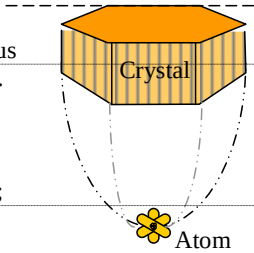


A human (body)
Hominid part (brain)
Primate part (hand)
Mammal part (breast)
Animal part (heart)
Living part (cell)
Thing-ly part (atom)

Comment [A3]: In Diagram 1.27 below, demonstrate to the students how the heart takes care of the full role of animal-ness for the entire organism, that is, by its special operation of pumping blood, it communicates life or breath or *animus* to the rest of the body. Every other organ, except for the heart, can be removed, and animal life (animus) still continue in the organism. However if you remove the heart, the organism's life-principle immediately vanishes. The same argument can be made for the other principles in an organism. Vertebrate-ness is specially represented in the backbone; primate-ness is specially represented in the hands; etc. Thus the heart is as-it-were the *incarnation* (from Lat. in "into" + caro "flesh") of the principle of animalness into the material realm.

If we examine the classes of objects of the material realm, and the patterns of how they relate to their parts, we will soon become aware that the material realm is arranged in a manner as-it-were 'upside-down.'[38] We find that what is smallest and would seem to be the lowest in creation, is really the most fundamental, and thus by consequence, the most sublime (i.e. highest). By itself, an exceedingly small object can explain many larger macroscopic effects. For instance, the atomic arrangements in a single salt molecule, can explains the macroscopic cubic or hexagonal shape of the entire crystal, which can be larger than a human being. Conversely, what is largest to us, is usually a complex hodgepodge of accidental connections, and thus really is comparatively ordinary and mundane. Moreover, this pattern of inversion of matter doesn't just confine itself to natural bodies. Even in artificial bodies—such as a car—it is the parts that are most important and essential; the outer frame or shell of the car—by which we recognize it as the make and model that it is—is comparatively useless. Thus, there is a fundamental correlation of what is deepest in the material realm to what is most sublime in the spiritual realm. The material realm

Diagram 1.28



A tiny particle often has a macroscopic effect much greater than itself.

Comment [A4]: For instance, I value my house because of what goes on there, and what I associate it with; but as a being in itself, my house is relatively base and ordinary. It is based solely on the principle of what is lower holding up what is higher, and everything being 'well-bolted' together. It is really an accidental unity (almost an accretion) of certain timbers and metals in a certain way in a certain place. However, there is nothing inherently special about these timbers and that copper pipe, and why this goes here, but that there. Compare my house to a single cell, and the contrast is enormous. The cell is much more sublime, much more profound than my house.

Comment [A5]: Materials science is the study of how certain materials are able to be used in certain situations.

[38] Aristotle, *Physica*, I:1 (184a17-184b) on the material realm; cf. with *Metaphysics*, 7:3 (1029a33-b14); II:1 (993b19-30) on how things *ought* to be.

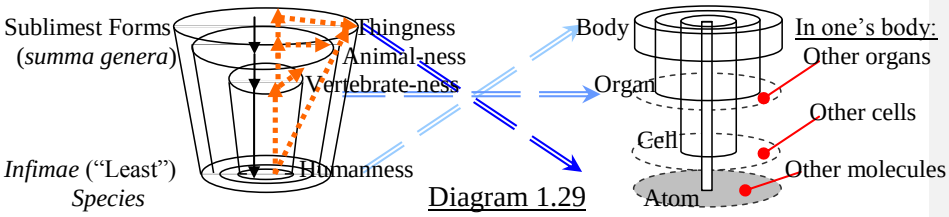
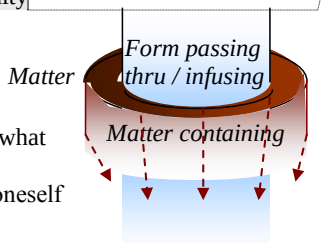


Diagram 1.29

then is as-it-were a formal principle that has gone awry (or been 'flipped'), and now exists in a mode all its own:

However there is something else besides simple inversion. Just as the transcendental of Being dominates in the formal realm (a realm saturated by Being), the material realm is a place in which the transcendental of Unity especially dominates (a realm saturated by Unity). This saturation of the Material realm by the principle of Unity (rather than Being) expresses itself in the phenomenon of containment. Containment, which occurs in the physical realm, is a kind of having, in which what is had is *smaller* than the haver.[39] Normally, in the formal realm, what one 'has' is greater than oneself (cf. Diagram 1.10). However, in the material realm, what is had is smaller than oneself: The body contains the parts that make it up; the parts contain smaller parts, and so on. Each of these progressively smaller unities are complete within themselves, but they are 'had' by the greater unities. Greatest of all, the entire universe is itself a kind of unity (or closed sphere) inside of which the entire material realm exists. Because matter contains in this way (rather than being contained), it is then able to rearrange things into whatever manner it might prefer, and thus is able to 'knit together' the entire universe, regardless of what is next to what. Matter then becomes a 3D box that we are constantly entering into, rather than a 3D box that we are constantly emerging out of. In the material realm, what is had is had as a part; by contrast, in the formal realm what is had is had as a principle. This is because in the material realm matter has form, whereas in the formal realm form 'has' matter.



In the material realm, matter *receives* form, but then contains the form it receives.

Diagram 1.30

Diagram 1.31

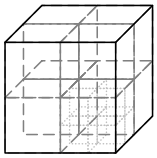
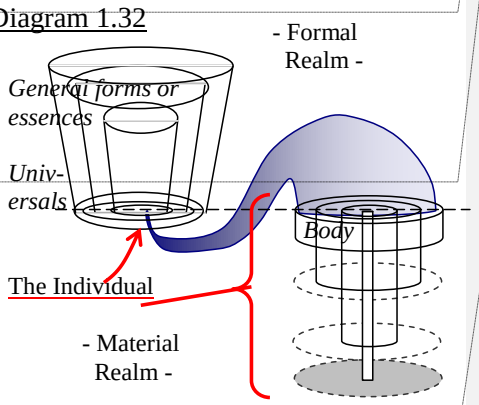


Diagram 1.32



[39] Aristotle, *Metaphysica*, V:23 (1023a8-25).

Comment [A6]: Here, "the formal realm" is a synonym for "the spiritual realm."

Comment [A7]: If matter is horizontal, it is natural that it should come from the transcendental of Unity, and thus also cause Unity. Also it is natural the matter should exist in the context of unity because the material realm 'opens up' and arises (cf. diagrams 1.32, 1.15) from the bottom level of the formal realm, and this bottom level of the formal realm is where Unity is located in the formal realm. Thus the part of the formal realm that generates the material realm is where Unity is, and so it is natural that the *entire* material realm should be a realm dominated by the principle of Unity. Indeed in the Material realm, Unity is as important or more important than Being, because a given area of space can be nothing, but it is still united to all the other adjoining areas of space that are connected to it.

Comment [A8]: Physicists tell us that the universe is a determinate size, and that it is expanding (or perhaps, its contents—we included—are just shrinking).

Comment [A9]: One of the great mysteries of current theoretical physics is how precisely does matter knit together the various parts of the universe. We tend to see formal objects (suns and black holes, etc.) pulling and warping space (cf. Diagram 1.35), and one would like to identify the Hubble expansion (or shrinkage) of the universe as a whole as being a super-macroscopic effect of this warping, but to do so requires positing an unreasonably huge amount of "dark matter" in between all the stars. This would seem to suggest that prime-matter itself is doing the warping, and the material objects in the universe are not responsible for the massive expansion (or contraction). Einstein himself had several theories, which gradually changed throughout his life. Currently, there is no accepted theory of quantum gravity to explain the expansion (or shrinkage) of the universe as a whole.

Comment [A10]: Cf. Comment on Question 3f. in Section 1.2.1. In the formal realm, the material element of a matter-form composite is more *inside of* the form. This causes forms to relate to one another in a *formal* way, i.e. not accidentally, but essentially. Thus in the formal realm each idea (or spirit) occurs in relation to those ideas that it comes from and those ideas that it leads to. Matter can exist inside of each of these forms (and thus according to Anne Catherine Emmerich, before the fall, when man was still spiritual, the body was once a tool, rather than an enclosing, encapsulating suit), but it is not determining what interacts with what, as it does in the material realm. Because matter is inside of its form, a form has the potential to infinitely grow and expand, and the spiritual matter—e.g. the person's hypostasis or identity—as it were gets 'dragged along,' as their spiritual form matures and grows. Thus in the formal realm, people grow profoundly in depth, without changing who they really are.
On the fact that in the spiritual realm, matter would be inside of forms see Bl. Anne Catherine Emmerich, *Life of Christ*, vol. 1, 15-17.

How then do the two realms relate or 'tie in' to one another? The two realms relate through the transcendental of Unity. Recall from Chapter 3 that the hypostasis is where the transcendental of Unity comes to apply to some essence. The hypostasis is the area at the bottom of an essence that completes the idea and ties all its parts together, integrating them and making the idea subsist as a substance. If the transcendental of Unity is also dominating the entire material realm as well, then it is evident that the transcendental of Unity—the hypostasis—is the connection between the formal and material realms. Thus when a formal idea becomes a complete individual—an hypostasis—it can then be joined to a discrete body, which—inside of its own bodily Unity—contains and manifests that idea. Thus Unity itself (as an hypostasis or as a body) ties the two realms together, and when we enter into the material realm, we enter into a realm where Unity is now more important than (prior to) Being.

Comment [A11]: In Diagram 1.32, tell the students to—following the blue connection—position the formal realm atop the material realm. In so doing they will have the *full essence* of a material object. Diagram 1.10 then, though complete for a formal object, is incomplete for a material object, and needs Diagram 1.27.

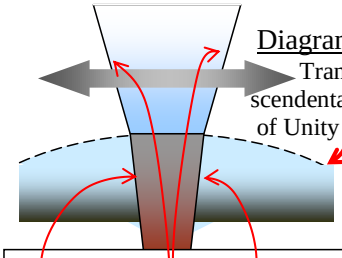


Diagram 1.33

The material realm is a realm in which the transcendental of Unity dominates. Consequently, the material realm is limited in size. The formal realm is not.

Note that the material realm is slightly contracting, whereas the formal realm is expanding.

The Creation of the Universe

Since discrete objects unfold from discrete forms by the transcendental of Unity, we can also make the case that once-upon-a-time the entire material universe unfolded in the same way (cf. Diagram 1.34).[40] Consequently, we can view the entire material realm as a kind of 'opening up' from the formal realm.[41] Thus whatever hierarchy there is in forms is reflected in an upside-down reverse manner in matter (cf. Diagram 1.29): We can connect lower objects to higher truths and higher objects to lower truths. As Aristotle famously stated, "That which is most knowable to us (higher objects) is least knowable in itself (lower truths), and that which is least knowable to us (lower objects), is most knowable in itself (higher truths)."[42] The formal realm then makes itself known in and through the material realm, but is itself distinct from that realm.

Comment [A12]: If desired, give the students the handout entitled "The Material Realm as Mirror Image of the Formal Realm" (in Appendix).

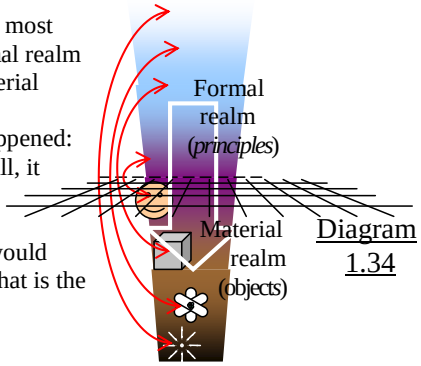


Diagram 1.34

We might ask ourselves why this has happened: Why is the material realm the way it is? After all, it seems rather unnecessary, almost like a second act of creation. Having created the angels in a nice, neat formal progression, why would God start over and do something in reverse? What is the

[40] Is. 40:22.
[41] Historically, this would have occurred in the Big Bang, but it is also happening in an ongoing manner right now inasmuch as the material realm expresses the many principles of the formal realm.
[42] Aristotle, *Metaphysica*, I:2 (982a23-25). Cf. also *Physica*, I:1 (184a17-184b) and *Metaphysica*, 7:3 (1029a33-b14).

good of the material realm? The answer is that God creates matter so that there can be a multiplicity of individuals, all of the same kind.[43] It is an act of love on God's part to make a world in which we can have common horizontal communion with others like ourselves, rather than having each experience be part of a vertical relationship of power of one thing over another. By inverting the material world, there is necessarily more than one respect in which one thing is greater than another. Thus out of two different individuals, God creates a certain measure of equality, by making their relative superiorities to be *just that*: merely relative. Thenceforth, the two are united in some relationship, and can exist side-by-side, even if they have no connection of Being with one another.

Questions:

1. What transcendental dominates each realm? Ans: Being dominates the formal realm; Unity dominates the material realm.
2. Circle the correct answer: In the material realm, all things are had (as principles / inside of others). Ans: Inside of others.
3. From which of the halves of Diagram 1.10 does the material realm immediately emerge? Ans: From the material format / Venn diagram side.
4. How do parts relate to principles? Ans: Principles work through parts for the sake of the whole body (cf. Diagram 1.17). Thus a part is as-it-were the expression of a high-up spiritual principle now down *in* the material realm.
5. Describe how the formal and material realms relate to one another. Ans: They are mirror images of one another. That which is lowest in the material realm comes from the sublimest and highest formal principles. That which is highest and largest in the material realm connects to the lowest and most ordinary formal principles.
6. Which are you more likely to be without: A principle that is essential to you, or a part that is essential to you? Ans: A part that is essential to you. You would never ever be without a principle that is essential to you, because then *it wouldn't be you*! However, you might briefly be without a kidney (e.g. if you were on dialysis).
7. Give several examples of part-principle pairs, in which the principle works expressly through this part.
   Ans: Car's wheel – mobility A house's rooms – inhabitability. A large brain – hominid-ness.
8. Explain: Give one possible explanation for what it might mean to say that God "unrolled" the Heavens (cf. Job 9:8, Ps. 104:2, Is. 40:22, 42:5, 44:24, 45:12, 51:13, Jer. 10:12. 51:15). Ans: Perhaps it was the unfolding of the material realm from the formal realm, that is, the 'pulling down' of the material realm out of the formal realm (as indicated by the white arrow in Diagram 1.34.)

Comment [A13]: For instance, one person may be smarter, but another person may be stronger, and so each may find himself in a situation in which he needs the other.

Comment [A14]: Point out to the students (in Diagram 1.27) how the curving side-lines suggest that each lower level is inside of the next-higher level.

Comment [A15]: This question demonstrates the two slightly different meanings of essentialness. In the spiritual realm, 'essential to' means 'formally necessary for,' as a genus is formally (i.e. by definition) part of its species. In the material realm, 'essential to' means 'materially necessary for ' as a prerequisite is *materially necessary* before a given principle can be applied here and now. For example, you need a body as a prerequisite before a soul can be present, and you need a heart as a prerequisite before a hand can be present (since the hand has blood vessels in it that need to be filled with fresh blood). Cf. black arrows in diagrams 1.10 and 1.27.

[43] Aquinas, *De Ente et Essentia*, V.93.

2. Characteristics of the Material Realm

The fact that the material realm is created in a context of Unity rather than Being entails several important implications for the material realm that we are able to infer.

First, what does it mean to say that the material realm is 'unified' but not 'being?' Here, we're not saying that the universe and everything in it is totally *non-Being*, but that the special condition that creates the universe isn't any *thing*. The material universe, i.e. the fabric of prime matter (to be covered in the section below) in which there is light, time and dimension, is fundamentally *nothing*. In philosophical language, we would say that it is merely accidents, not substance. Nothing prevents God from removing or changing it as He wishes, without affecting any of the beings inside of it. Indeed, experimental evidence would seem to indicate that the universe is contracting and passing away entirely (i.e. toward total non-Being).[44] Thus the physical universe is merely the criteria or condition for material interaction with other material beings.

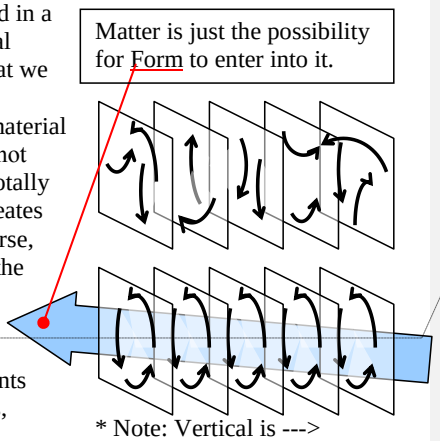
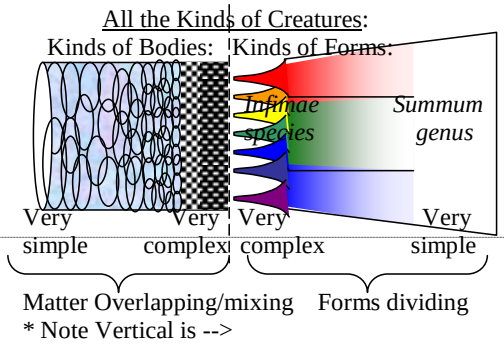


Diagram 1.35

Second, for God to make a multiplicity of individuals, that is, to make each formal principle have its expressed effect—not just once as itself, but—in zillions of material objects, each with a different set of circumstances (time, place, position, etc.), the circumstances themselves must then be in a certain manner overriding and limiting. Consequently there will be comparative difficulty in expressing just any form in the material realm: Only those creatures that are given to some 3-dimensional expression will appear in the material realm. Consequently, there will be fewer kinds of forms (e.g. angels will not be seen), though each will be expressible more times. In the formal realm, there will be a greater (indeed potentially infinite) number of forms, each expressed once, *as* what it is, and next to only those 'cousins' or neighbors to which it is essentially related. Conversely, in

Diagram 1.36



[44] That matter can be lost down a black hole and get discarded out into another universe, see K.C. Cole, *The Hole in the Universe* (Harcourt, New York: 2001), 119f, as well as Stephen Hawking, *Black Holes and Baby Universes*, Bantam Books, New York: 1993, 120-122. See also Wikipedia article on "Black hole information paradox." On the cooling and expansion of the universe, which is widely known, see for example Bradley Dowden, ed., "What Science Requires of Time," *Internet Encyclopedia of Philosophy*, available from http://www.iep.utm.edu/requires/.

Comment [A16]: Really, matter isn't totally nothing, but is next-to-nothing: It is pure potency to receive forms. This means that matter is as-it-were a 'jumble' of indeterminate circulation (cf. Diagram 1.35). When a form enters into it, the form organizes it in some way. For example, when a light-beam (form) enters into an area of empty space (matter), form organizes the magnetic field in that space to go around the light-beam in a particular way. This brightens up that area of space and puts it into act. Consequently wherever there is form, there must be pre-existing matter, which is the *capacity* for form to be present.

Comment [A17]: cf. Diagram 1.33. The material realm is contracting because it is being slowly overcome by non-being. On a cosmic scale, the universe is dying and passing away. We see this in Hubble Expansion (which can be viewed conversely as local contraction, see fuller discussion below), as well as the constant loss of matter down black holes. On a microscopic scale, the smaller and smaller you go, the more you are overcome or crowded out by non-being (i.e. static and noise of particles that don't have quite enough energy to continue to exist; in other words, the waters of possibility out of which the world was created —cf. Comment in Question 1.a. of Section 1.2.2; also Question 6 in section 1.2.1; and Gen. 1:2).

Most scientists would say that the universe is not contracting, but expanding. However, one possible explanation for the universe's expansion is that the universe itself is located within a black hole. One way to model a black hole is that it isn't an infinitely small point (a "singularity," to Einstein), but rather a wormhole in which things fall through the black hole, and pop out the other side, with their units of space, time, energy and mass now redefined due to the warping effect of the black hole on space-time itself (cf. Diagram 1.38), as well as the approach of the objects to the infinitely mass-ifying speed of light. Thus a tiny amount of matter falling into a black hole could be perceived as a colossal amount of matter and energy popping out the other side: Indeed it would be the Big Bang and birth of a whole new universe (a "white hole"). Thus the entire Hubble expansion of our present universe, could be viewed instead, from the perspective of the original universe, as just the progressive shrinking of the objects within that universe, as they progressively fall further and further down that black hole. Thus the universe itself stays about the same size, only the objects within it shrink.

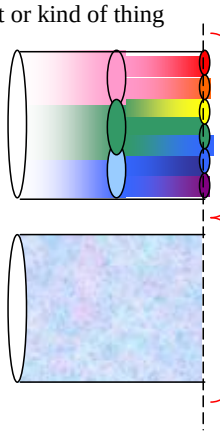
Comment [A18]: This is why St. Thomas Aquinas says that there is an exceedingly great number of angels.

the material realm things occur—not as their essences dictate, but—as accidents dictate. Consequently there is nothing that says that each thing must occur once and only once; rather, things can occur many times, or not at all. Consequently, there will be more repetition and multiplicity in the material realm, and less variety.[45]

Third, since the material realm is stifled in its possibilities, it is saturated with darkness. The light and brightness of the formal realm results from the fact that God has exhaustively and meticulously divided up all the Being of His act of creation into the natures of the various spiritual beings that have been created. Consequently, every angelic nature as-it-were 'borders' its cousin. However, when the pure spiritual forms of the formal realm are diced, refolded and reprocessed into the material realm, it is natural that there should be numerous disconnects and even outright omissions, not seamless connections. These disconnects appear to us as darkness (non-Being) in which our world is saturated. Consequently, we can conclude that whereas the formal realm is created as light found in light,[46] the material realm is created as light found in darkness. The material realm is created in the context of *non-Being* and (as we shall see in Unit V) is located there as a result of Adam's fall into sin.

Fourth, since the formal realm is founded on the principle of Being (whereas the material realm is not) the formal realm is very pure and definite in its forms, whereas the material realm is filled with a large amount of disorder, namely mixing and overlapping. The formal realm divides neatly apart into all its various species, but then each species infuses or causes a particular part or kind of thing on the material side of the diagram. These parts—or objects—are what can overlap and combine and mix up in disorderly ways. The measure of this disorder, this chaos, is known as entropy. In a chaotic system, things combine not because of what is proper to their nature, but because of something incidental such as unity of time and place, or accidental attraction to one another.

Diagram 1.37



We would draw the material realm as shown at left, except that the world's natural resources are not in practice separated out into nice, neat, discrete piles. Rather, they are mixed together, so that the only thing which is pure throughout them all is prime matter. ~~Consequently,~~ this below is more appropriate.

* Note: Vertical is -->

Of course, the material realm is not all disorderly: There is occasional distillation and segregation of a certain class of things apart from the rest (e.g. the cells of one system will separate themselves from the cells of another system), and there are processes that cause this to happen. However, the processes that purify and separate are generally much slower and rarer than the processes that mix and overlap. For instance, in a cell,

Comment [A19]: Accidents will be covered in the next chapter.

Comment [A20]: E.g., there are only about 115 elements in the periodic table, about 16 known fundamental particles (12 fermions + 4 bosons), etc. Theoretically, there could be many more, but this is how many we've actually seen.

Comment [A21]: If desired, give the students the Handout entitled "Mixing within the Material Realm" (in Appendix).

Comment [A22]: Disconnects and omissions can be viewed as the negative consequences of mixing (to be covered in the next paragraph). We will study the positive consequences of mixing when we consider epiphenomena in Section 5.1.

Comment [A23]: This is as eternal forms (i.e. angels or determinate natures) found in God the Son who is the Eternal Word and thus the divine subject of *all* forms.

Comment [A24]: That is, as forms found in non-being (Time and Place is nothing in itself) or at least in *potential* being—i.e. the 'waters of possibility' (cf. Comment about "contracting," at the start of this section) from which the universe had been created.

Comment [A25]: This is affirmed by Anne Catherine Emmerich, in *Life of Christ*, vol. 1, 14-17.

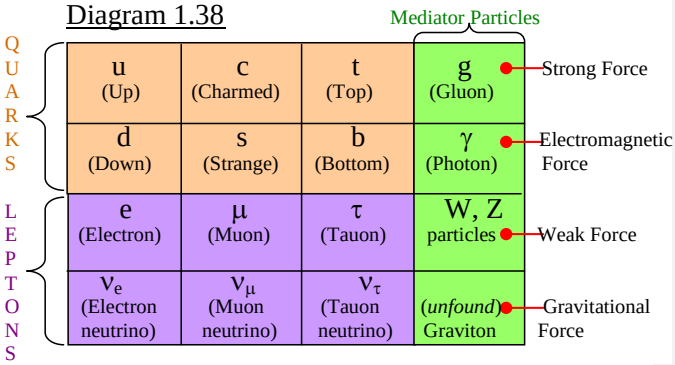
Comment [A26]: The material realm is founded instead on the principle of Unity.

[45] Aquinas, *De Ente et Essentia*, IV:84, V:93.
[46] Augustine, *De Genesi ad Litteram liber imperfectus*, 5.21-22, 24.

there are definite processes that separate particular chemicals into various places. However even in the cell, as it is purifying raw materials and manufacturing proteins, it is doing so in a context of general disorder. Organelles and chemicals travel in impulsive and seemingly random directions, without concern for where they are, what is in the way, or how many other structures might be doing the same job. Thus the functioning of life goes on in and *through* disorder, unaffected by it, and not even trying to fix it.[47] Rather than remove this chaos, life instead transforms it, making it into a chaos of good and liveable *biodiversity*, rather than a chaotic soup of bad and unliveable raw chemicals.

The Current 16 Most Fundamental Particles:

Diagram 1.38



Aristotle (*De Gen. et Corrup.* II:3) held that prime matter was composed of oppositions between the hot and the cold, and the dry and the moist. How is this similar to the above diagram?

Given the material realm's tendency toward confusion, it is natural to want to study what causes it. We will next consider the nature of material space and prime matter from the perspective of empirical science.

Prime Matter

The Principle of matter or 'space' is traditionally called prime matter by philosophers and can be identified with the space-time fabric of the universe.[48] As a principle, matter is the criterion for possibility in the world (cf. Diagram 1.39).[49] For instance, a given piece of space can contain any one of a nearly infinite number of forms, and sometimes several forms simultaneously. Even if it seems to contain nothing, yet physicists tell us that in any piece of space, there are constantly zillions of particles

Comment [A27]: This was an idea proposed by Albert Einstein to explain General Relativity, namely that certain massive objects warp space and time. This idea has since been repeatedly verified by many kinds of experiments.

Comment [A28]: A balloon can be blue or green, or helium-holding or oxygen-holding, or have somebody's face drawn on it, etc.

[47] On this basis, most Thomists and Aristotelians hold that the water inside of a cell isn't 'non-living' (like normal water, in the ocean), but rather has the quality of 'living,' as if the soul is directly in it, so that it is completely and totally within and part of the dynamic process of life.

[48] Aquinas, *Summa*, I.44.2. Plato saw his "receptacle" as a kind of Prime Matter, cf. Plato, *Timaeus*, 50a-53a. Aristotle himself, it seems identified Prime Matter with the most basic of physical substances; but in other places (*Metaphysica*, VII.3, 1029a10-19ff, *De Generatione et Corruptione*, II.1, esp. 329a8-13, 24-26; II.5,332a20-6) he says that Prime Matter doesn't really exist at all, but only a kind of condition which is in balance between opposed contraries

[49] Aquinas, *Summa*, I.44.2.ob.3, cf. also ob.2.

briefly popping into existence, and then popping back out of existence.[50] This suggests to us that at its base level matter is bordering upon the waters of possibility (as stated in Ch.2.). Other experiments indicate to us that even as we wade out into this possibility, yet there are still rules, and though we can know the speed of a particle, yet we cannot know its position; or if we can know its position, then we cannot know its speed. The fact that there are still hard-and-fast rules despite the chaos confirms to us that even possibility itself is rooted in the context of Truth, from which all possibility and reality come. Other experiments indicate to us that not only does Truth exist in the universe, but real, true objects and natures do exist in it, as well, as indicated by the fact that per se series can be exerted across it. For instance, in the Bell Inequality, it was found that two electrons, correlated and in phase with one another, could be gradually separated, and yet continue to be the same thing (staying 'in phase' with one another) across a vast distance, even seeming to exert *phase force* upon one another *instantaneously*, i.e. faster than the speed of light could travel between them.[51] We must recognize then that the material realm bears *idiosyncrasies* that are strange, quasi-spiritual—indeed well outside of classical Newtonian physics[52]—and yet not irrational. Possibility and uncertainty does exist in it, but so do Truth and essential natures. We are then approaching the furthest limits of science where we can still see matter actively functioning as objects, and beginning to venture into areas where matter returns to function again as a form, or spiritual principle (cf. Diagram 1.38). These effects may come to be much more fully understood in the future, but are, for the moment, still partly mysteries.

The Space-time fabric of the universe manifests Unity within its different parts, bending as necessary to accommodate disturbances within it.

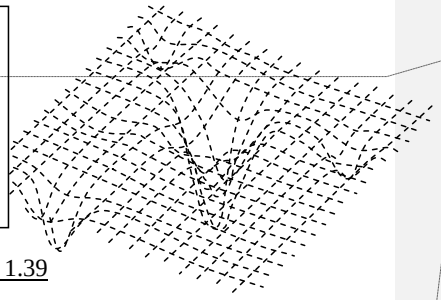


Diagram 1.39

* A *per accidens* (accidental) series is one that occurs with Becoming transpiring in between the steps in the series; thus a *per accidens* series is one that occurs at a rate slower than the speed of light.
* A *per se* (essential) series is one that occurs with no Becoming in between the steps of the series, but only connections of Being, and thus a *per se* series occurs faster than the speed of light (i.e. instantaneously).

Questions:

1. How would you characterize the material universe (up to four answers)? Ans: It is a place of non-being, multiplicity, darkness, and chaos/confusion.
2. In which realm is there . . .

[50] Paul Davies, *Superforce*, 1st ed. (Touchstone, New York: 1985), 37-38, 49, 104-105.
[51] Paul Davies, *Superforce*, 1st ed. (Touchstone, New York: 1985), 45-47.
[52] Paul Davies, *Superforce*, 1st ed. (Touchstone, New York: 1985), 48.

Comment [A29]: This is the famous Heisenberg Uncertainty Principle.

Comment [A30]: i.e. God the Son, the Eternal Word, in whom the world was created (cf. Jn. 1:3, cf. Col. 1:16).

Comment [A31]: It became extremely evident that the universe was not conforming to classic Newtonian physics with the publishing of Einstein's theory of Special Relativity in 1905—to explain microscopic effects—and later by his theory of General Relativity to explain macroscopic effects. These theories and the relativistic effects they describe have been confirmed by numerous experiments.

Comment [A32]: It is almost as if by penetrating to the very basement of matter (i.e. the bottom of Diagram 1.34), we somehow find ourselves again at the top (i.e. the top of Diagram 1.34). Diagram 1.38 demonstrates this: Each of the 16 particles in Diagram 1.38 functions as a unique principle, in a unique way, often displaying one and only one kind of force, or playing one and only one kind of role. Thus—to return to the question posed in Diagram 1.38's caption—the particles in that diagram are sort of like Aristotle's simple bodies ("the moist," "the dry," "the cold," and "the warm"). In each case—Aristotle's and modern Physics'—the element in question has become so fundamental, so basic, that it is no longer appearing as a physical thing that you can grab—i.e. a particle—but rather as a subtle and spirited principle—i.e. one or another kind of sub-atomic wave. Also, note that there are exactly 16 such particles, which is equal to 2 x 2 x 2 x 2, or 2^4, i.e. 4 possible kinds of opposition. Aristotle insisted for the same reason that there could only be 4 simple bodies because there had to be symmetric opposition (cold vs. warm; and moist vs. dry). The only difference, it seems, is that Aristotle didn't go as far as modern physics (He only came up with 2 kinds of opposition, not 4). Of course, the fact that there are 16 fundamental particles while perhaps due indirectly to 4 levels of opposition, nevertheless is also much more complex, as we are finding out. The particles relate, interact, and convert to one another thru pathways much more intricate and complex than just simple opposition. Indeed, the 4 fundamental forces seem to overlap one another in certain respects, not oppose one another; this is why they are believed to have been, at the beginning of the universe, all the same force (A "superforce," cf. the book of the same name by Paul Davies, in the bibliography).

a. as-it-were 'a zillion' principles of each kind. Ans:In the material.
b. one unified principle of each kind. Ans: In the formal realm.

3. Some theorized the existence of an ultimate Higgs particle from which all other kinds of particles in the universe came. If some a particle were found which were the source of everything in the universe, would it be a divine principle of the universe? Ans: No, Matter does not have the source of its existence in itself; the source of its existence comes from Form. Consequently, it would just be a representative or tangible effect/product of the principle that created the universe, not the principle itself. Cf. Aquinas, *De Ente et Essentia*, IV:80; cf. also *Summa*, I.44.2.ad2.

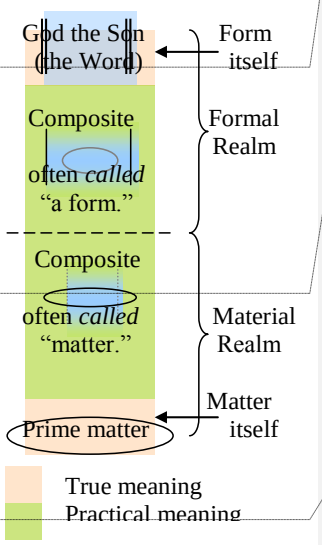
4. Using Diagram 1.36 above, answer the following question: Does a body contain just living matter, or some non-living matter as well? Ans: Both. It contains cells, but things like skin in it are dead. As for the water (the material basis for potency) inside the cells, some would say that it itself is 'alive' because of the presence of the soul working through it; however the safer answer is that it itself is non-living matter, just appearing alive because it is being used in life-processes.

5. Name several experiments or recent developments that have given us a deeper understanding of the nature of the universe. Ans: The Heisenberg Uncertainty principle, Einstein's general and special theories of relativity, as well as various ways to test them (e.g. the use of atomic clocks); the Bell Inequality, astronomical observations indicating the size and age of the universe (e.g. red-shifts, and mirrored images on either side of a black hole, etc.).

3. The terms "Matter" and "Form"

As Applied to Static Things

Diagram 1.40



One of the things you may have noticed in the previous sections is that some form does occur in the material realm, and some material-like things (souls, simple essences, hypostases) do occur in the formal realm. This then raises the question of how precisely do Matter and Form exist and relate to one another, both in their own proper realms, and in the opposing realms? We will now consider Matter and Form, in themselves. To do this we must distinguish several senses of the terms "matter" and "form."

True matter is only prime matter, and prime matter is the most fundamental matter because only prime matter has (nearly) no admixture of form. Since it has no admixture of form, it is in potency to receive *any* form.

Comment [A33]: The Higgs particle is often irreverently called "the God particle."

Comment [A34]: You may wish to have students pick one, research it, and report on it.

Comment [A35]: Proper Vocabulary Usage: The original translation of matter is the Greek word for "wood' (ὑλη pronounced "hoo-lay") and thus it is clear that the idea of form and matter is the idea of a tree, in which the living, wet part is surrounded by a dry, dead part (cf. Diagram 1.30, above) which merely covers it and expands with is as the living part itself grows (cf. Diagram 1.33). The original Gk. for form is morphe (μορφη). Thus form 'morphs' as it gets *qualified* from its general aspects down to its specific aspects. See the "Proper Vocabulary Usage" box on "qua," near the end of this section.

Comment [A36]: This may surprise a person: How can there be matter in the realm of ideas? Many philosophers teach or at least suggest that the realm of ideas contains only forms. However, what we are talking about isn't matter itself in the spiritual realm (i.e. not atoms), but rather something that plays a *material-like* role of receiving form: the Universal. Each universal (e.g. "cows") receives all the forms that enter into its principle (i.e. "cow-ness," "animal-ness," "thing-ness," etc.), and as such can be identified with that principle. Indeed, the only difference between a universal and a principle, is that one is considered as form and the other is considered as matter. We see then that there is indeed a material element in the spiritual realm, any time a universal (in the case of a class) or hypostasis (in the case of an individual) exists.

One way we can know that matter is present in both realms (i.e. even in the spiritual realm), is because divine revelation speaks of the waters above the firmament (i.e. in Heaven) and below the firmament (i.e. in the material world) as originally being one thing (i.e. before they were separated by the firmament), and "In the beginning [when] the Spirit was moving upon the waters." (Gen. 1:2-7)

Comment [A37]: This is in dispute. Some would say that pure matter (prime matter) does not anywhere exist independently of form (Cf. Aquinas, *De Ente et Essentia*, IV:72). Ask the students: "What, again, is prime matter?" Ans: It is the waters, the essences of possible beings, from which God can make *anything*. Cf. *Summa*, I.44.2.sed contra.

Likewise true form is the eternal form that is God the Son, and this form is divine and has no admixture of matter. However, when Matter combines with Form it must do so in one of the two realms, either the material realm or the formal (spiritual) realm. When the two combine, each retains its own character as either Matter or Form, but by convention we tend to call the whole composite of the two as either "matter" or "form," depending upon which principle is dominant. Now obviously, the material principle will be dominant in the material realm, and the formal principle will be dominant in the formal realm. Thus we call a material chair "matter," even though it is actually a composite of Matter (space) and Form (shape, color, etc.). Likewise we call a soul "form" even though it is a composite of Form (spirit/being) and Matter (an hypostasis/identity). Thus there is a distinction between the speculative principle of Matter (found in prime matter), and the practical usage of the term "matter," as we apply it to our common experience; and there is a distinction between the speculative principle of Form (found in God the Son), and the practical usage of the term "form," as we apply it to our common experience.

Since we are dealing with practical things, we should here note some further characteristics of what is called "matter" or "form," as they are each found in nature:

Comment [A38]: i.e., only his divinity (not his humanity) lacks matter and is pure form.

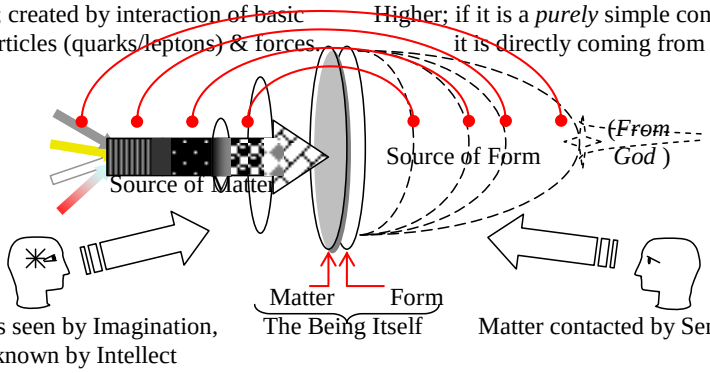
Comment [A39]: In Diagram 1.40, we show whichever principle is dominant—matter or form—as being larger (and thus surrounding) the other principle. Consequently, in the material realm matter contains form and in the formal realm form contains matter.

Comment [A40]: The convention in this book is to capitalize something when we are referring to *the principle* of it. Thus "Form" (capitalized) is the abstract *principle* of Form: i.e. 'Form-ness *itself*,' as if it were a person and we were calling it by its personal (capitalized) name. Conversely "form" (uncapitalized) refers to "*a* form," that is, any particular *instance* in some *thing* that is formal (though not totally formal, but usually a composite of both Form and Matter, only with Form dominating). Cf. Platonic forms in the Glossary.

Diagram 1.41 **A Composite's Components:**

(*Neither component is here shown to be dominating*)

Matter:	Form:
Infinitely divisible.	Contiguous and unified.
Quantitative.	Qualitative.
Repels/bounces off of other matter.	Combines fully with other forms.
A principle of Potency: Can be acted on.	Act: Can only be known and passed through.
Lower; created by interaction of basic particles (quarks/leptons) & forces.	Higher; if it is a *purely* simple concept, it is directly coming from God.



Now obviously since we are dealing with composite substances, such substances will have some characteristics from *both* columns (e.g. it will be both quantitative AND qualitative), but whichever kind of substance it is—"material" or "formal"—will be much

more significant than the other. Thus the left side or the right side of Diagram 1.41 will dominate, depending upon which realm it belongs to.

We see then that matter and form have many special characteristics that help us recognize them. These characteristics will be especially helpful in more-tricky situations:

In Dynamic Situations

The aforesaid method of distinguishing things that should be called "matter" from things that should be called "forms" applies only to static, unchanging things. However, in the dynamic situation of change and Becoming, many times what actually should be called "matter" plays the role of Form in relation to something in the same material realm that is even lower and *more* material-ish; and what actually should be called "form" plays the role of Matter in relation to something in the same formal realm that is that is higher and even *more* formal. Thus when two objects of the same realm interact, all our conventions for using the terms "matter" and "form" should be 'thrown out the window.'

When we have two things interacting, we must have some way to recognize what in the relationship is functioning as Matter, and what is functioning as Form. In general, something is probably going to function as a principle of Matter if it is comparatively low and especially if its components are horizontally related and equal in some respect, and therefore without structural significance (Recall that we represent Matter with a flat, horizontal Venn-diagram circle, as in Diagram 1.10). By contrast, something is probably going to operate as a principle of Form, if its parts are vertically related, or vertically evolving, that is, becoming qualified more and more "as" (qua) some particular species. If you see the actual interaction between the two, you can also distinguish a principle of Matter from a principle of Form by the aforesaid relationship that Matter receives Form and Form informs Matter: Thus whatever is active is probably Form, and whatever is passive is probably Matter. We will study such dynamic situations in the section below, on substantial change.

Proper Vocabulary Usage: We often use the word "qua" to specify in what way something is being qualified. For instance, in court I can testify "qua" a private citizen, or "qua" a public servant, if that is what I am. A good translation for "qua" is "as."

Comment [A41]: When a thing has vertical structure, it is better prepared to infuse its higher form into other low things, just as it is infusing its higher form into the lower components of itself (cf. Diagram 1.42 below).

Other Analogous Usages of the terms "Matter" and "Form"

Besides the normal uses of the terms "matter" and "form" there are also several analogous usages of these terms:

Comment [A42]: Contrary to the practical (physical) usages of the terms, these analogous usages go *back* toward the *principle* of Matter and Form. However, now it isn't the principle (of Matter or Form) in itself, but the principle as applied to and occurring in other things and situations. Thus its usage is not true, but only analogous. Cf. Comment near the start of this section on the convention in this book regarding capitalization when referring to the *principle* of something, be it Matter or Form or something else.

	Practical / Specific Sense	Examples:	Analogous / General Sense	Examples:
Matter	A physical body Gk. ὑλη "wood."	"Matter is studied in chemistry." "Raw material."	Anything essential to a thing. A surrounding situation.	"What's the matter?" "That was immaterial—not pertinent—to the discussion."
Form	An external appearance, visible and distinct (a shape), or knowable & specific (a *kind*). Lat. *species*, "appearance"	"The form or shape of a goat." "The oral form of an antibiotic."	Anything existential: The thing itself. A typified and generic or even vague model, applicable to many situations.	"Formal Logic." "Formal trespass." "He was formally dis-inherited."

Here we are using the term "Matter" in a more general and analogous sense to represent any context at all in which Form exists. For example, angels perform actions; since an action has a form, we might speak of the matter—or context—of the action, meaning the physical situation and circumstances in which the action occurs. This analogous use of the word "matter"—not as referring to a tangible body—but just as a general principle (as when we say "What's the matter?") is the more general understanding of Matter. By contrast, Form is anything that has Being, or anything in Act (to be learned in Section 1.6.3); consequently "form" can be used in a general sense to refer to anything at all. It is important to become familiar with these uses of "formal" and "material" because they bear wide applicability to many situations in human life.

Questions:

1. Do we ever encounter pure form and/or pure matter in this world? Ans: No. In this world, we only encounter composites of form-and-matter together (i.e. only the green area in Diagram 1.40).
2. Determine whether the following composite natures would be considered "matter" or "form:"
   a. A pizza Ans: matter.
   b. A word Ans: form.
   c. An organization Ans: Form.
   d. A person Ans: Form.
   e. A cloud Ans: Matter.
   f. An idea Ans: Form.
3. In the following pairs, determine which is *acting* more as an instance of Form, and which is *acting* more an instance of Matter.
   a. A mob or a phalanx. Ans: The phalanx is organized in a form.
   b. A live chicken or a cooked chicken. Ans: Alive, it is like form. As cooked, its molecular organization has been destroyed, and it is mere matter.
   c. A complex sentence or a compound sentence. Ans: A complex sentence is like form, since its parts are essentially

Comment [A43]: Another word for the "surrounding situation" is the "circumstances."

Comment [A47]: i.e. Logic itself (independent of what it is logicizing about). *Formal logic* is one in which you are only concerned about the *form* of the argument, not what is actually being said (the matter) in it. Thus in formal logic you don't care whether your conclusions are really the case or not, so long as they validly follow from the premises. For instance, you might validly prove in formal logic that "If spotted pancakes rain tomorrow, then unicorns will jump." As long as your argument is 'water-tight' and follows the correct form of reasoning, flowing from stated premises to logical conclusions, you have used formal logic correctly. By contrast, in *material logic*, you try to figure out whether something actually is the case or not. Thus formal logic is like concerning oneself only with the solidness of one's pipe (cf. Diagram 3.51); material logic is concerned more about what actually flows through it.

Comment [A44]: Here we are talking about form as something see-able: a sensible species (usually conveyed by light entering our eyes, though perhaps by sound or some other sensation)—cf. Section 2.2.5.

Comment [A46]: If it has to do with what in categorizing would be called "the species," then it is the specific sense. If it has to do with what in categorizing would be called "the genus," then it is the general/analogous sense.

Comment [A45]: Here we are talking about form as something specific, and specific in an *intellectual* sense (i.e. *known* as this or that kind); it is an *intelligible* species (cf. Section 2.2.5).

Comment [A48]: A complex sentence is a sentence with one independent clause and one dependent clause. The two are usually joined by a preposition such as "that," "which," "because," "unless," "although," "while," "if."

Comment [A49]: A compound sentence is a sentence with two independent clauses. The two are joined by a conjunction such as "and," or "but."

related in some way. A compound sentence is like matter, because its parts are completely incidental and can be flip-flopped at will, without messing up the sentence.

4. In what sense does the principle of Matter unify everything in the universe? Ans: It 'knits' each piece of space to the next adjacent piece of space.
5. What use of form/matter is the following?
   a. "Raw material." Ans: Specific sense; however you could make the case that it is something essential to a job or work to be built (the General sense).
   b. "As a matter of fact . . ." Ans: General sense; it is something essential to the facts.
   c. "Business matters." Ans: General sense; it is something essential to a business' activity.
   d. "Material heresy." Ans: General sense; a surrounding situation.Material heresy is that which is 'equal to' or 'amounting to' heresy, but cannot formally be called heresy because it was done by accident, or unknowingly. It is what smells or 'has the trappings' of heresy, but isn't heresy.
   e. "A mere formality." Ans: General sense; something done for show, or for appearance's sake.
   f. "Formal dress." Ans: General sense of a thing itself.
   g. "Please take a pen and fill out the form." Ans: General sense; a model applicable to many situations.
   h. "What form of language is that?" Ans: Specific sense if you are just trying to recognize it to begin with; (or general sense if you are trying to classify it specifically as this or that kind of language).
6. Distinguish between a material thing and the principle of Matter. Ans: The principle of Matter is anything that receives Form. Material things are material substances composed of matter and form in the material realm. Another way to distinguish them is that the principle of Matter can be identified with prime matter (see Section 1.4.2 above).

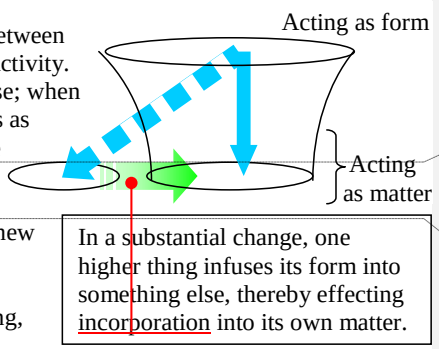
Comment [A50]: If students do not know this term, substitute instead "A material violation"(i.e. *of the law*, as opposed to a formal violation of the law). You might be pulled over for running a red light. If the light just turned red, while you were halfway through the intersection, you would then be caught in a material violation of the law. If you pulled up to the light, looked both ways, and crossed on the red, that would be a formal violation. Material violation is unintentional, but generally overtakes you.

Comment [A51]: Some people might call this the specific sense, since they assume that formal dress is worn especially 'for show.' Here it is suggested that it is better to consider it the general sense, because sometimes formal dress is not worn just for show, but to represent you yourself, and define exactly who you are, in a certain social capacity.

Comment [A52]: Alternatively, some people might call this the specific sense. Here it is stated to be the general sense, because it is assumed that formal dress isn't just for show. Rather, formal dress is often worn to define you or represent exactly who you are in a certain social capacity, and no more and no less.

4. How Matter and Form Operate: Substantial Change

Diagram 1.42



In the area of composite substances in between true Form and true Matter, there can be lots of activity. One thing can infuse its form into something else; when this happens, the one infusing its form functions as Form (even if it is a material thing), and the one receiving new form functions as Matter (even if it is a formal thing). Whenever a new form infuses into something else, thereby giving it a new status or identity this is known as a substantial change. Examples[53] of this kind of substantial change are generation (begetting), eating, naming, conferring, etc.

Now that which is functioning as Matter must of course be *disposed* to receive the new form—it must not have anything which would contradict or 'rule out' having such a form. For instance a tiny little piece of steel cannot receive the form of an enormous blimp; nor can the dense matter of a concrete wall receive the form of a living soul (which is why you can't eat it).[54] However if matter is appropriately disposed, then form can enter into it and remain in it. In order to get matter so disposed, there is a second kind of substantial change that must occur, and which we will study next: *corruption*. We see then that in substantial change, agent and patient relate to each other in a form-to-matter relationship.

There is a second kind of substantial change: In nature there are not only anabolic processes (ana- is Gk for "up"), but there are also katabolic processes (kata- is Gk. for "down"). Substantial change also occurs when something's substantial form is stripped away and the thing is broken down, leaving only the forms of the bare component parts to fend for themselves. For instance, when you eat a piece of food, the food gets 'broken down' into its component parts (proteins and sugars and fats): It is no longer an apple, because the form of an apple has been removed from it and it is now instead just a lot of disorganized molecules. Thus substantial change occurs not only when something receives a new, higher substantial form, but also when it loses what was its substantial form.

In the material world, substantial forms come and go, in the manner already described. In the spiritual world, substantial forms are completely simple, and thus not subject to corruption, and so although one can obtain a new substantial form, it will never be lost. Consequently, what one becomes in a spiritual sense, remains eternally. It may be revised or modified or qualified by some later and additional development, but in itself, as what it is, it will never be removed.

Comment [A53]: For instance when you eat a piece of food, that food—as matter—is incorporated into your body; but then as it is incorporated into your body, your life-principle—your soul, as form—infuses into that matter, organizing it into a particular structure within your body.

Comment [A54]: For instance, a man being ordained or a person being married or baptized thereby obtains a new form (or status) in his/her soul. This new identity is treated as a new form entering into the soul, and what the person brings to it—life, talents, background—is treated as matter. We have a saying for this: "Grace [form] builds upon Nature [matter]."

Comment [A55]: For instance, if there is a cloud or something opaque, then that matter inside of it will be indisposed to receive light; but if it is perfectly clear, then the light will instantaneously enter in. In the same way, if a fetus has a genetic mutation in its body, then at some point during its development it may reach a situation where it is indisposed to further live, and so the form of the soul will be taken out of it, and it will die. This is also essentially what happens in natural death from cancer: Here the body itself grows to the point of being indisposed to retain the form of life.

Comment [A56]: You will notice here that in one example we're speaking of true prime matter (empty space); whereas in the other we're speaking of a material thing (a wall) that is actually a form, since the cement crystals and stones are arranged in a particular, distinct arrangement. Notwithstanding this discrepancy, this is indeed how this saying/maxim is applied. When people say that "Matter must be disposed to receive Form," they are often talking about a material *thing* that has some level of Form—albeit basic—and is attempting to receive an even higher or more complex level of Form. Thus it is usually a question of whether a form is disposed to receive even *more* form, not whether matter itself is so-disposed. However, since this matter-form composite is here playing the characteristic role of Matter by receiving an even higher form, we often speak of the whole as being "the matter" (i.e. the material element), when it is really more than just matter (since it has some Form, too).

Comment [A57]: Tell the students not to think of substantial form as what you see (i.e. the red and toothy-shape of an apple), but rather as something hidden that codes for and causes it to be *what* it really is. In this case, it is the life-principle inside of it, circulating nutrients, repairing bruises, and removing wastes that makes it be an apple, whether or not anybody ever recognizes it as an apple (it could be a strange apple found in the jungle that nobody has yet discovered). This is its substantial form, because this is putting it into the 'form' in which it really is.

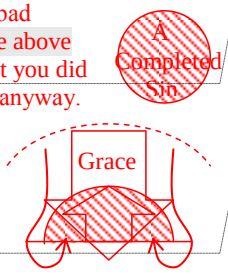
[53] Aristotle, *De Generatione et Corruptione*, I.4 (319b15-21). Aristotle exhaustively lists all 5 kinds of substantial versus accidental change a little later in *De Generatione et Corruptione*, I.4 (319b32-a2).
[54] Aristotle, *De Anima*, II:2 (414a21-28).

Questions:

1. Circle all that apply: In the formal realm there is (generation / corruption), and in the material realm there is (generation / corruption). Ans: generation; both generation and corruption.
2. What has more to do with your substantial form: Your outer appearance, or your genes? Why? Ans: Your genes. Substantial is not what one looks like, but something hidden within oneself.
3. What are the two kinds of substantial change? Ans: Adding a new substantial form (often called "generation" though there are more ways this can happen than just by generation), or removing what was something's substantial form (called "corruption," though it isn't always corruption as *decay*, but any kind of breaking down such as active digestion, wrecking, etc.).
4. Describe the process of corruption: Ans: A thing's substantial form is removed, leaving behind the substantial forms of lots of its components. Thus one comparatively high thing becomes lots of things that are comparatively lower and less structured.
5. Why can't you grow a plant in dry dirt? Ans: Because the matter of the dry dirt is not disposed to receive the form of living tissue: It needs water (as a prerequisite).

6 Can a spiritual substantial form ever be removed or 'undone'? Ans: No.

7. Theorize: What happens if your substantial form becomes something bad (e.g. by the commission of a deliberately-willed sin)?
   a. Could it remain that way for ever? Ans: Yes, it could remain that way forever. A spiritual being (e.g. an angel) that obtains a new, evil, identity, keeps that identity forever. Thus the fallen angels, once they had committed a sin, were unable to repent: Their sin made them *be* what they were, and it was a permanent change.
   b. Is there any way that a bad spiritual identity can be removed? Explain how. Ans: Since any substantial form can be altered by 'adding to' over top of it, a bad spiritual identity can be removed if one above you, puts you in a situation where what you did turns out to have been 'for the better,' anyway. Now of course, if what you did was really bad, and nothing can be done to undo it, then there is no way to redeem or save it; in this situation we say that "sin was *completed*." However, what can seem completed and irredeemable on a natural level can, through the eyes of faith, be recognized to be salvagable, through the work and application of God's higher supernatural grace.



Comment [A58]: If you draw the diagram at right on the board, point out to the students how—at least for humans who 'straddle' partly into the material realm—goodness can always get in the back door (N.b. the arrows that wrap around 'underneathe' of the badness). On the other hand, for angels or departed souls who are fully in the spiritual realm, and not in a state of material becoming, this cannot happen.

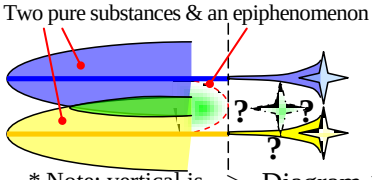
Comment [A59]: For human beings, sin is completed at death, for after death there is nothing that a person can do to become conscious again of goodness, in relation to that evil matter. This is why it is so important, before death to become conscious of the fact that Christ died for each and every one of one's sins, meaning that the evil one did turned out to be 'for the good' for him (and for us too when we realize that we are but part of him—Col. 1:17,20), in offering a sweet-smelling and most perfect sacrifice to God. This is why we call that day "Good Friday." For angels, who are fully spiritual beings, and not subject to the Becoming of this material world, sin is completed from the first moment that they commit it.

Comment [A60]: This is why faith is so necessary; without faith, any one of the atrocities committed throughout history or even in one's own life can appear completely inexcusable and unforgivable. In the eyes of faith, we recognize that this is not the last word, that the evildoers do pay the price—even if it is after this life—and so they can be forgiven if, before dying, they repented before dying. Thus we can truthfully (and not naively) have "charity for all," because justice has not been destroyed.

Chapter V. Substances and Accidents

1. Epiphenomena

Two pure substances & an epiphenomenon



* Note: vertical is --> Diagram 1.43

In common usage, a substance is something fundamental which is amassed in such large quantities, that its peculiar characteristics can easily be seen. The reason that it is especially called a substance is that its principle is infusing into not just the individual molecules, but the macroscopic whole. However, sometimes even more happens at the macroscopic level than what happens at the microscopic level. For instance, water bears different traits when there are exactly five water molecules in a droplet, than it does when there is only a single water molecule. This tells us that water as a substance has characteristics (E.g. surface tension) that arise only when seen on a larger scale. Such a situation in which the large is not just the sum total of small things, but different *in kind*, is known as an epiphenomenon.[55]

Epiphenomena (pl.) are rife throughout the physical and chemical world. If a man meets a woman, and they get married, the family that arises is an epiphenomenon over top of each of their individualities. If a star reaches critical mass, so that its core collapses, blowing it apart, then this sudden and violent change is an epiphenomenon of a slight change in quantity combined with an inability of the star's substance to then support itself. If a ship becomes just slightly too heavy, it becomes no longer a ship, but a hulk on the ocean floor. If a man has just slightly too much knowledge on the stock market, his good bets suddenly attain the ephiphenomenal quality of being considered "insider trading." All of these examples involve something contingent and incidental (an *accident*: either a quality, or quantity, or relation, etc.) causing a substantial change, that is, a change in the nature or essence of *what* it is. The word epiphenomenon is similar to the word "epiphany." Just as an epiphany is an event where you suddenly 'realize' something, so an epiphenomenon is something that you suddenly become aware of: You realize that—for whatever reason—the situation is now different, and that the Being is now different in kind from what it was before. In general, anything that is not essential to something's nature, but which depends instead upon an accidental event like reaching a certain quantity, or quality, or relationship is an epiphenomenon.

Proper Vocabulary Usage: A situation in which something on a macroscopic scale is different in kind from its parts is known as an epiphenomenon, from επι - (Gk. for "over top of") + φαινω "to shine." An epiphenomenon is a phenomenon that "shines above" the sum total of its parts. Life itself is an example of an epiphenomenon.

Epiphenomena are real things. One of the best proofs for epiphenomena is how we experience them in our own lives. For instance, those who focus merely on their material tools are usually initially ineffective at using them. Only when they perform

Comment [A61]: Such a thing is known as an "epiphenomenon" from epi- (Gk. for "over top of") + phaino ("to shine"). An epiphenomenon is a phenomenon that "shines above" the sum total of its parts. Epiphenomena (pl.) are very important in the real world. Life is an epiphenomenon.

Comment [A62]: In chemistry, epiphenomena are known as "compounds." A compound is not just one single kind of atom amassed in large quantities, but a single kind of molecule (composed of several different kinds of atoms in a regular configuration) amassed in large quantities.

Comment [A63]: Epiphenomena are very important in faith. When you have faith it is because you see the epiphenomena that arise as being different in kind (i.e. for a faith-based reason and purpose), from those who experience the same phenomenona without the eyes of faith.

Comment [A64]: We will learn what the various classes of accidents are in Section 5.5 below.

[55] Sir Karl Popper, *The Self and Its Brain*, (Routledge, London and New York: 1984), 72-75. Instead of "epiphenomenon" we could have used the term "emergent property." This goes to the heart of the debate between emergentism/epiphenomenalism and reductionism.

some action regularly and 'get the hang of it,' seeing the activity itself as different in kind from the materials (including themselves) that go into it, do they then become an efficient (even professional) performer of that action. This difference between honed professionalism and awkward, first-time experiment demonstrates that the properly executed activity has a life of its own. In the same way, epiphenomena are real essences that arise, different in kind from their constituents, and as such—when good—are indirectly intended by God (Cf. Diagram 1.43). We will see that epiphenomena are responsible for many kinds of substances that we are aware of in our physical world.

Comment [A65]: Aristotle holds that they are different in kind because, for some strange reason, their elements naturally coallesce to form a substantial unity. Cf. *Metaphysica*, VII: 12 (1037b24-28), 16 (1040b8-9); *Analytica Posteriora*, II:6 (92a6-9, 28-32); II:13 (96b7).

Comment [A66]: Ask baseball player, "Would you describe the event of you hitting a line-drive as being (1) bat, (2) muscle fibers, (3) neural signals, and (4) chemical energy, or rather as one, complete, fluid *swing*?" Although a few professionals have so carefully dissected their game that they do think of it in the former way, most probably thinks of it in the latter, more general way.

Questions:

1. What do epiphenomena have to do with substances? Ans: Epiphenomena cause (are) substances that we wouldn't otherwise have.
2. Explain how each of the following is an epiphenomenon, or what epiphenomenal qualities it manifests:
   a. Table salt (NaCl). Ans: Salt and its peculiar characteristics are not just the result of sodium metal nor the result of chlorine gas, but the unique combination of the two, for one is specially designed to complete the other.
   b. A cooperating team (as opposed to a disorganized group). Ans: A true, cooperating team can usually accomplish much more than the individuals could, by themselves. For instance, in a factory in which individuals specialize and take charge of different steps in the production process, a team can mass-produce much more than the individuals would be able to do if they were each doing the entire process separately.
   c. Ice (as opposed to water). Ans: Ice occurs by the concurrence of water and temperatures less than 32^{o}F.
   d. The unique characteristics of a protein or DNA-molecule. Ans: Protein (or DNA) is what it is because the amino acids (or base-pairs) are arranged in a particular order. Change the order even slightly, and a very different epiphenomenon (e.g. a genetic mutation) may result.
   e. A lichen. Ans: a lichen (and any ecosystem) is the result of two unlike organisms depending upon one another in symbiotic ways. When the organisms evolve in such a way as to be different from what they originally came from (as in the case of the lichen, which is the combination of an algae and a fungus) an epiphenomenon has occurred.
3. Discuss whether the following are epiphenomena:
   a. A house. Ans: Probably not; a house is just the sum total of its structural elements. However, the spirit of the house as concocted by the decor, location, etc. is indeed an epiphenomenon.
   b. Popcorn. Ans: Probably not. The phenomenon of popcorns popping is inherently designed by nature. After all, it is

Comment [A67]: Eskimos have hundreds of words for different kinds of snow, each one of which is an epiphenomenon of water.

natural for the seed organs and starch to be packed into the seed so tightly that when water dissolves a slight weakness in the seed-covering, the insides quickly pop out. Popcorn is just unique in that by suddenly raising the temperature, we can make it pop open all at once.

c. A fad. Ans: Definitely so. A fad often results from the intersection of various societal influences in some particular time and place.

d. Language. Ans: Definitely so. Languages prove that they are epiphenomenona by the mere fact that so many of them have arisen.

e. Weather Ans: Definitely so. So many influences influence weather, that the weather is constantly changing. Certain weather phenomena are also epiphenomena: E.g. a rainbow, or a sun-dog.

4. Discuss: Even though epiphenomena are not one of the things God directly created, are epiphenomena willed by God? Ans: Yes, God at least *indirectly* wills them, if they are good. Thus God wills that we should do the things we do, which are natural to us, and also that things like societies and artwork should be produced by human agents, so that creation may grow progressively more and more replete, and vibrant.

Comment [A68]: Human actions are epiphenomena too, and although God indirectly wills our actions when they are good, He certainly doesn't will our actions when they are evil.

2. Substances[56]

Proper vocabulary Usage: Substance is from Gk. *ousia*, which is very similar to the participle *ouses*, translated "be-ing." Thus substances are beings, or *things*.

In general, substances are things into which a principle immediately infuses. An iron atom is a substance; at the same time an entire bar of iron would also be called a substance. Since the bar bears characteristics (e.g. malleability) that do not apply to the individual iron atom, we can even say that the bar is more of what we mean by "a substance," than the atom. A substance is something that is uniform and materially united, and thus different in kind from other kinds of things. When we speak of substances, we tend to omit the definite article. Thus we don't say "The iron" (as if we had all the iron in the world), but just "iron" or something "*of / from* iron." This tells us that substances are unique in the *kind* of thing that they are (as different from all other kinds), independent of how much is present. Thus each substance is different in kind from all other substances.

Metaphysically, substances differ from accidents in that accidents vary horizontally (one color beside another, or one moment in time next to another), whereas substances differ in a vertical way (i.e. the unique path of essential qualities in its essential definition (cf. diagrams 1.10 and 3.4). So a substance can be thought of as an essence, but it is also more than an essence, in that it is a real, existing being.

Comment [A69]: Here, "immediately" means'non-mediated,' i.e. directly or primarily (in the order of being), with nothing else in between. Thus the principle infuses into this substance more than into anything else.

Comment [A70]: Chemists will tell us, that when many iron atoms are arranged side by side (as in the bar), their orbitals overlap and form as-it-were one super-orbital (called a metal lattice), surrounding all the atoms in the bar. Thus a bar of metal is in some respects like a single atom.

Comment [A71]: Iron is a good example of a substance, because unlike other substances, iron didn't arise all in one lump at the beginning of the universe. Rather, iron is manufactured independently in different places, in stars just before they reach the stage of being a Supernova. Thus iron is truly an epiphenomenon of the course of history of the universe: It wasn't there from the start.

Comment [A72]: We can see then that substances are the material counterpart of what would be an *infima species* in the formal realm.

[56] There are traditionally two different emphases or explanations that can be given for what a substance is: Either (1) it is something that underlies accidents (Aristotle, *Metaphysica*, VII:1, 1028a27, cf. 1028b33-a2), or (2) it is an instance of a real thing, a being. In this book, we take the latter tack (2).

Part of being different in kind from all others is that substances are unified within themselves. If we return to the model of the universe represented in diagrams 1.34, and 1.36-1.37, we will notice that there is multiplicity at the two extrema, but Unity in the center. A substance is one, inasmuch as it approaches to manifesting a unified effect *to us* (since we, being unified beings, are at the center too). Thus epiphenomena are called new substances (because they appear different in kind to us), even though they might be only different accidentally from something else.

A Key Distinction:
- Different in Kind
- Different in Degree
* A substances is where something is different in kind. However in the case of epiphenomena in the physical realm, this difference in kind may be due to a difference in degree.

What kinds of substances are there? Some substances are just *accretions*, meaning that their characteristics are identical to and no different from those of an individual particle.[57] For example a being's DNA is the same, whether you have one strand or many strands. Likewise oxygen functions (and exists) in the same way whether you have a whole roomful of oxygen or just a single O_2 molecule. However, other substances are epiphenomenal. Recall that epiphenomena are things that become different in kind as a quantity, quality, relation or some similar accidental determination is changed. For instance, when light arrives at the quality of having a particularly high frequency, it begins to penetrate flesh and bone and becomes known as an X-ray. Thus we are familiar in our world with certain macroscopic substances that depend for their unique existence upon the chance situations and other accidental occurrences that arise in the material realm.

Because we view substances as complete and unified things (rather than as just the sum total of all their parts), we are able to treat them as conceptual wholes. Human beings are unique from all other animals, in that human beings see epiphenomena as united qualities—a complete *thing*—whereas animals only see them as incidentally or partially united. For instance, an animal may respond to certain images, and may even instinctively *place* one image into another (e.g. if its prey is going to run around a corner, out of sight), but the animal won't perform a true act of combining to get a new concept: For example, they won't combine two words and invent some new third concept out of them, as happens in Grammar (e.g. the compound concepts "dead center" or "spick-and-span" or "stair-way"). Consequently, human beings have an ability to unite any two disparate and unrelated forms and create a third form, fully different in kind and essence, from the two that made it up; animals can only do this laboriously, if at all. This is the source of human creativity, and also the root of why human souls are eternal and spiritual: They do not arise from this partitioned material realm (if they did, they wouldn't be able to invent an idea that was truly 'out of this world,'), but rather they have a simplicity (i.e. Oneness) that is prior to all distinctions in the realms of Spirit or Matter. Consequently human souls are not epiphenomenal products of our material (or even spiritual) realm, and can only have come from above, from the creator Himself.

Questions:

[57] However, even these are substances usually because each of their particles interact in some regular way (usually by inter-particle polar or ionic forces) with the other identical particles surrounding them, so that the whole isn't just a mere heap, but does display some level of unity. Cf. Aristotle, *Metaphysica*, VII:16 (1040b9).

Comment [A73]: Cf. Diagram 1.44 (also Diagrams 1.29). The one body in the center contains many horizontally-distinct cells at the left extreme. Or the one species or hypostasis in the center contains many vertically-distinct forms at the right extreme.

Comment [A74]: Anybody would admit that an X-ray is different in kind from a simple light-beam. The X-ray manifests characteristics (i.e. passing through flesh and causing cancer) that the light-ray does not.

Comment [A75]: cf. second-to-last comment in the Sub-section 1.3.4 titled "Soul."
According to Empedocles (490-430 B.C.) substances were just the four basic things—earth, air, fire, water—out of which everything else was made. To him, these were the only conceptual wholes, in terms of which he saw the whole universe. In modern days, a chemist would see the whole universe in terms of the 117-or-so elements out of which everything is created. Conversely, a physicist would see the universe in terms of the 16-or-so fundamental subatomic particles (quarks, gluons, neutrinos, etc.) out of which the universe is created. How do you see the universe?

Comment [A76]: Animals may respond to components of epiphenomena as generally similar in time, place, quality, or even position, but they won't see them as *the same thing*. Rather, animals respond to individual qualities based on what kind of impression each individual quality makes upon their senses, noting particularly where in the range of sensation the thing's stimulus falls: Loud things will drive them away, as will anything resembling a big staring eye. If you combine loudness with resemblance to an eye, then the animal will still flee, but only because it is responding to first the sound, and then to the color, not because it is fleeing from *both* sound and color at the same time. In other words, the animal doesn't think of it as some *thing* which is doubly or multiplicatively bad, but just as one thing which is bad in one respect, and another thing that is bad in another respect, with the two unrelated, or only incidentally-related. However, two things cannot be combined in the animal min ...

Comment [A78]: For instance, the word "handle" (something to hold on to) plus the idea "bar" (something hard and long) can be combined to make the word "handlebar."

Comment [A77]: Although an animal might be able to respond to just the sound of the words, yet the animal wouldn't be able to 'drum up' the complex connotation which the two parts of this phrase, once combined, produce in our mind, when we hear it.

Comment [A79]: i.e. by putting one form *into* the other (cf. diagrams 3.49-3.50).

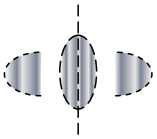
Comment [A80]: Animals recognize different kinds of things based on how their senses differently apprehend them. For an animal to recognize a subtle difference in degree and not kind, it must build up different hormonal responses to the two, which takes days of training. To humans, it takes a few seconds, i.e just one word, to represent the subtly different new idea. This is clearly not due to the subtleties ...

1. Can substances be just the sum total of the individual elements? What do we call these, and give an example. Ans: Yes! Accretions, e.g. as in Helium gas.
2. What kind of substances are more (or less) than just the sum total of their individual elements? Ans: Epiphenomena.
3. Of the four Transcendentals, which one has the most to do with substances? Ans: Unity.
4. Would you call a sand-pile a "substance?" Why or why not? Ans: No. It has no inner unity of Form.
5. If someone asked you to prove that the human soul is created by God, how would you do it? Ans: You would (1) point out that the human being is able to construct a unity, a new substance (either a new invention or a new idea) that didn't prior exist (e.g. a new fad or a new architecture, or a new technology), and that (1b) their idea of it is different in kind—has a different essence or ethos—from the sum total of its parts. Then (2) you would make the argument *a fortiori* that if the human is able to produce this new idea as a product, then the human himself must be equally or more simple than the unity created in the product. Lastly (3) you would extrapolate this to a maximum (*ad infinitum*) by pointing out that a human being can combine not just these two but *any* two ideas. Consequently, you would conclude that the source of the human being's unity can only be God.
6. What can and can't animals do, in regard to comprehending concepts? Ans: An animal may understand and effectively respond to a simple concept, but not to a combined one.

Comment [A81]: The phrase "a fortiori" is Latin for "from the stronger" and can be translated as "how much more," "so much more," or "all the more!"

3. Classes of Substances

Diagram 1.44



Note: Vertical is -->

Aristotle's 3 kinds of substances are material substances, formal substance, and the composite of the two.

In investigating the idea of substance, Aristotle lists three 'candidates' for being called substances: (1) Material substance, (2) Formal substance, and (3) the 'concrete whole' or composite of the two (in which Form is *in* Matter).[58] Now truly, all material substances have Form in them, and all formal substances have a kind of Matter (an essence and/or hypostasis) in them, but the three are still distinct in how they function. Material substances are able to be used as *tools* (or *means*); formal substances are able to be sought as *ends*, and concrete substances (in between) are *agents* that use those means to attain those ends. Thus there are three classes of substances.

A universal

Diagram 1.45

Comment [A82]: Note that the three kinds of substances correspond to the three parts of Diagram 1.26.

Now formal substances are things such as words, angels, disembodied souls, ideas, universals, etc. Material substances are things such as rocks, chemical compounds (and any other epiphenomena of these), solids, liquids, and gasses. Composite substances

[58] Aristotle, *Metaphysica*, VII.3 (1029a2-3, 27-29); VIII:1 (1042a24-32); *De Anima*, II:1 (412a7-10).

are things such as plants, animals, and humans, as well as works of sculpture, and human art and craft in which both form and matter plan an important role. However, since all the material substances have some sort of Form in them, these could just all be called "composite substances." Thus another school of thought holds that there are only two classes of substances: 1st substances (composed of Matter and Form), and 2nd substances (composed of just Form).[59]

Life is a special class of substance, because life has not just an intellectual (downward) element, but also a willful (upward) element. Consequently a life-substance (a soul) has an element of vertical circulation and potency, that the other substances lack (cf. diagrams 2.6ff). Consequently Life exists in a state of *Becoming* whereas the other substances really only exist in a state of Being. Within the three realms (material, formal, or straddling the two), we can then locate the three special life-substances: vegetable souls (mainly in the material realm), animal souls (straddling both realms), and the human soul (able to be fully in the spiritual realm).

Questions:

1. What are the three kinds of substances? Give an example of each.
   Ans: Material substances (a rock), spiritual/formal substances (a word or idea), and combined substances (e.g. a human or a horse).
2. What function do the three kinds of substances play in human life?
   Ans: Material substances are means (or tools), formal substances are ends, and combined substances are agents.
3. What are some examples of material substances? Ans: Crystals, stars and planets, animal (in part) and plant souls, water droplets (which hold together by polar forces), magnets, even such things as clouds and storms.
4. What are some examples of spiritual substances? Ans: Animals (in part), Angels, the human soul (par excellence!), DNA code, sentences and integrated/complex concepts, computer programs, institutions and corporate structures, complex virtues and vices, kingdoms, and even God Himself.
5. What are the two schools of thought as to how many kinds of substance there are? Ans: One school holds to a triple-distinction between the classes of substances, whereas the other school holds to a double-distinction.
6. Draw: Label Diagram 1.44 with the three kinds of life-substances. Ans: Plants souls should go on the left, animals souls in the center, and humans/rational souls on the right.

4. Venn Diagrams and Accidents

In diagrams 1.10 and 1.27 above, the material format for showing essences was what we know as a Venn diagram. We see then that essences can be reduced to concentric circles in a Venn diagram, and we might be prompted to ask whether Venn

[59] Aristotle, *Categoriae*, 2a11-18, 2b4-6ff.

Comment [A83]: For example, machines (e.g. cars) would be products of human craft. A car's design (form) as well as its materials (matter) are both important for it to be what it is.

Comment [A84]: i.e. Aristotle himself, though that since (1) and (3) are really the same thing, there are only two kinds of substance: Material substances (a.k.a. "first substances") and spiritual forms (a.k.a. "2nd substances"). However, he himself is also the source of the 3 classes of substances listed here (cf. footnote at the start of Section 3).

Comment [A85]: For all its size and shape, a star's activities are nearly fully explainable by just the natural activities of the tiny atoms that make it up. For instance, the life-cycle of a dying star (star--> red giant--> white dwarf) is essentially the life cycle of hydrogen atoms fusing into helium atoms fusing ultimately into iron atoms.

Comment [A86]: Animal and plant souls would be classified as really material substances, just with a spiritual principle. They would be considered material substances because their most profound—i.e. sublimest—constituents (their cells) are really what is lowest/smallest in them, whereas their not-so-profound parts—some of which we now fully understand—are really what is largest (and most visible) in them. Thus they correspond with the upside-down substances drawn in Diagram 1.25-1.29, not with the right-side up ones. Animal souls are partially material and partially spiritual, and correspond to the middle of Diagram 1.26.

Comment [A87]: These things have a complex outer structure which depends upon the activities of its simpler parts. A hurricane is a complete system that holds together at many levels. Alternatively, you could argue that clouds and storms are not substances, but merely macroscopic processes.

Comment [A88]: Throughout time as DNA has evolved, it has gone from a few rather simple (high) genes to amassing more and more complexity, indicating a top-down rather than a bottom-up process. For this and other reasons, DNA is quite evidently a logical (i.e. formal) unity rather than a locational or massive (i.e. material) unity.

Comment [A89]: A program could be thought of as just a process, rather than a substance. See comment on "clouds and storms" in preceding question, as well as the discussion of termination in Section 1.3.1.

Comment [A90]: However, note that not all Venn Diagrams represent essences. Venn diagrams which only partially overlap (e.g. The 5-ringed Olympic symbol) represent accidental (non-essential) characteristics.

diagrams might be, in themselves, a completely sufficient way to represent essences. The truth is that they are not. Venn diagrams are used primarily to map accidental, not essential connections. We will learn later in Section 5 what the many kinds of accidents are, but for the present we should only say that an accident is what is not always the case (Whereas, something that is essential *is and must be* always the case!). An accident is not always the case, either not in every instance, or not all the time, or not from all points of view, etc. Venn diagrams can be used to map this, because they are specially given to mapping the concept "some" (of the case / time / individuals / etc.), by means of overlapping circles.

Venn diagrams are often used for quickly pinpointing a select *set* of characteristics from a hodgepodge of over-lapping relationships (e.g. boys who are over 5 feet tall and take French). However, just because a set of characteristics can be pin-pointed on a Venn diagram, doesn't always mean that that set is a really-existing essence. After all, the connection(s) between these characteristics may be merely accidental to one another. For the set to be a really-existing essence, the set's circles would at least have to be concentric(◎).

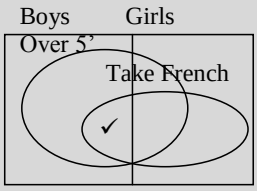


Diagram 1.46

A person might be prompted to ask, "What about the material realm?" The material realm involves overlapping (cf. Diagram 1.36), so does the material realm then involve accidents? The answer is that it most certainly does. Whereas the formal realm is one primarily of essences (and thus all the forms in it are usually concentric and inside of one another or fully separated from one another), yet the material realm is a realm of primarily accidental relationships. The amount of concentric-ness in the material realm is very rare compared to the amount of overlapping. Something essential does occasionally occur in the material realm (as when a heart—most essential for life!—is entirely within the circulatory system, and that is entirely within the body that possess it), but normally the material realm with its three dimensions and varying times is specially given to accidental connections, resulting in entropy and chaos. This will become more and more clear to us as we learn the various types of accidents.

Questions:

1. What is the opposite of essential? Ans: Something accidental.
2. Give some examples of accidents: Ans: Accept any adjective or participle (except the participle "Being"): "Green" "2 tons" "to my left," "running," "a first cousin," etc. are all accidents.
3. Using a Venn diagram, diagram "friends or acquaintances of mine who are taller than me and go to my school." Include a few friends who are shorter than you and/or do not go to your school. Ans: Answers may vary, but should probably overlap in some way.
4. Using a Venn diagram, diagram "Kangaroos that are marsupials, animals, and things." Include a few individuals that are not kangaroos, not marsupials, not animals and/or not things. Ans: The rings should here be concentric, with Kangaroos at the center, and things at the extremity.
5. In questions 3 and 4 above, are the characteristics essential or accidental

Comment [A91]: Being a first cousin—or even a mother or father—is not essential to your nature (though Being a son or daughter would be).

to one another? Ans: In Question 3 the characteristics are accidental to one another; in Question 4 they are essential to one another.

6. How are qualities in the ____ realm generally related to one another?
   a. material Ans: They are usually accidental to one another / overlapping.
   b. formal Ans: They are usually essential to one another / concentric.

5. Accidents

The four Transcendentals are like internal (or *immanent*) qualities, qualities which are inside and part of a thing's nature (recall Diagram 1.2). However there are other qualities which are external qualities, which are *in addition to* a thing's nature and thus not part of a thing's substance, but a thing can nevertheless 'have' them from time to time in addition to its bare existence. These are called accidents, because they 'happen' to occur in beings accidentally (or *incidentally*), and not always. In general there are 9 traditional classes of accidents and, with substance, they make up The 10 Categories:[60]

The word Category (from Gk. *kata* "down" / "according to" + *ago* "to bring") means to bring or file underneath something. Thus the 10 Categories are the ten headings under which all Being is classified.

1. Quantity – how much?
   A. Discrete – 1, 2, 3, or 4 (counting numbers).
   B. Continuous – 3/7^{ths}, a square foot, a gallon, a line, a lot.
2. Quality – in what way? How? Such ___!
   A. Habits or disposition –Virtues, vices, arts, skills, knowledge.
   B. Capacity or incapacity –(Impermeability, in-born talent, memory.
   C. Sense qualities - Sweetness, loudness, coldness, whiteness.
   D. Figure and Shape – straightness, curvedness, triangular-ness, spherical-ness.
3. Relation – to my right, my brother, after you, like, unlike, greater, equal, less than.
   Also, *correlatives* (e.g. father and son, slave and master, double and half).
4. Actions – A flow of Being from you. – heating, throwing, speaking, approving.
5. Passions – A flow of Being into you. – being heated, being punched, shame, desire.
6. Time –
   A. Discrete (a.k.a. "Time-when) - Yesterday, at 3:56 PM, next, in 5 seconds.
   B. Continuous (a.k.a. "Duration") – lasting for 6 minutes, in the Mesozoic era, a week, not yet.
7. Place – Here, there, 45°15'36" W 21°13'34" E, in the lounge, above, within, where?
8. Position – Prone, lying, backward, aimed at 45°, standing upright, in charge of.
9. State – Shod, armed, clothed, tied-in-a-knot.

A property is an accident that a thing has *always*, even though it is not part of its essence: E.g. having a sense of humor is a property of humans, although some humans (e.g. mental patients) lack it.

[60] Aristotle, *Categoriae*, 4 (1b25-26).

Comment [A92]: The opposite of "immanent" (Lat. for "remaining inside of") is "transient" ("going out of"). We will see in vol. II on Theology that just as these four transcendental qualities are immanent within our being, so God performs immanent actions within Himself: First, the actions of the procession of a Son—the Word—by internal generation, and second the action of the procession of the Holy Spirit by internal spiration. Thus all three divine persons stay as-it-were inside of God (immanently) rather than passing out of God (transiently).

Comment [A93]: Instead of saying that Transcendentals are "internal to" and part of a thing's "nature" or "essence" (see definition of nature in the glossary), you might instead say, "part of a thing's substantial form" (a term from Section 1.4.4). After all, those forms that are not substantial forms are accidental forms. Thus the word "accidental" is as-it-were opposed both to "essential," and to "substantial." (This is because substances are—by definition—essential.)

Comment [A94]: It is not so important that there have to be exactly 10 Categories, and no more or no less. In other words, these ten are not necessarily exhaustive and exclusive. For instance, all positions (the 8th category) are certainly also relations (the third category)—as Aristotle himself notes—as well as all states and places (the 9th and 7th categories). What is important is that the students get practice at 'dividing up' their world and learning to see its elements as different kinds of things, operating in entirely different ways. The danger to be avoided is to think of the universe in sweeping generalizations such as "All is matter" [i.e. Materialism], or "All is ideas" [i.e. Idealism]. The world is really much more complex than that, i.e. an inter-working metaphysical system.

Comment [A95]: A quality is a form which is usually not substantial/essential, but accidental. However, sometimes qualities are essential. Each substantial form emits or shines forth a quality—called a property (see gray box below)—that is formally similar to it in everything, except that it lacks matter. E.g. The principle of 'Mammal-ness' casts the quality 'mammalian' upon everything in the class of mammals. An apple emits the quality 'apple-ish' into all that which is in the apple (cells, sugars, seeds, etc.).

Comment [A96]: A correlative is a two-way relation. For example, The father is the father of the son (F-->S) and the son is the son of the Father (F<--S).

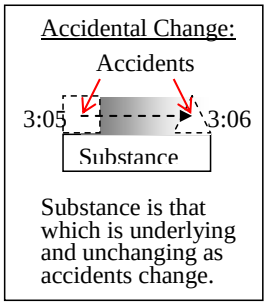
Comment [A97]: Not 1st Acts (of existence), but 2nd Acts of doing something in some way. We will learn the difference between 1st and 2nd Acts in Section 1.6.3.

Comment [A98]: Position is different from State in that . . . Position refers to your substance itself, whereas
state refers to the state of your surrounding external accidents or those things associated with you. Whereas disposition (in the category of Quality) refers to the arrangement of your substance's parts, position refers to your substance itself as arranged in some greater entity.

In this arrangement we have grouped certain of the categories to help you remember them.[61] Quantity, quality, and relation are ungrouped because they are the most important of the categories, having to do with stable, permanent Being. Of these, quantity is a property of one's matter, whereas quality is a property of one's form. The other six categories have to do with kinds of Becoming. Actions and passions are formal phenomena, but complimentary to one another (i.e. in any action, one thing is the agent and acts, and another thing is the patient and 'suffers,' or receives the action). Time and place are generally regarded as properties of one's matter. Position and state are kinds of relations, relating either one's body or on one's spirit, respectively to the surrounding, changing circumstances.

Accidental Change

Diagram 1.47



As the world becomes and changes, accidents come to exist in substances. They may exist there for a certain amount of time and then they 'pass away.' We might ask why this occurs. The answer is that substances tend to be substantial—having to do with the being itself—which means that they tend to endure; whereas, accidents are comparatively peripheral and unimportant, and so they easily come and go. Thus a substance will usually stay what it is for a large amount of time as various accidents come to be in it and then disappear and are replaced by different accidents. Indeed by the changing of the world, one's infinite numbers of relationships are constantly changing: Thus the changing of an accident rarely changes its substance. Such a state of peripheral flux without affecting the underlying substance is known as accidental change.

Indeed even when an accident exists relatively stably in a substance (without changing), it often exists only in a certain respect. For instance from my sideways perspective, a glass may look like a rectangle; but from your top-down perspective it may look like a circle. In general then substances *have* accidents, and accidents *exist in* substances. This is because (as stated in Section 3.1 above) substances exist in themselves, whereas accidents exist in others.

Questions:

1. If there are two kinds of form, substantial and accidental, to which do each of the 10 Categories belong? Ans: Substance tells what one's substantial form is; all the other 9 categories are expressions of accidental form.
2. Determine to which category the following belong:
   a. rough Ans: Quality.
   b. My dog Ans: Substance.
   c. ½ Liter Ans: Quantity.
   d. Curled up Ans: State.
   e. Matter & form Ans: Rel.
   k. In my tummy Ans: Place.
   l. Atop Ans: Position.
   m. Parallel Ans: Relation.
   n. Dodecahedral Ans: Quality.
   o. Incorporation Ans: Action.

[61] Ex me. This grouping and method of classification is purely my own insight.

Comment [A99]: Recall Line 2 of Diagram 1.41, above.

Comment [A100]: The word "passion" is from Lat. "to suffer." If some action goes into you, you 'suffer' it. You can suffer in other analogous ways, as in the statement "Suffer [i.e. permit] the little ones to come unto me." The relationship between Actions is summed up in Newton's 3rd Law of Motion: "For every force there is an equal and opposite reaction force." Of course, Newton's law holds for rigid composite substances (containing both matter and form); however, the relationship between Action and Passion describes activity between non-rigid substances (i.e. just forms). In this latter case, what would be the Newtonian "reaction force(s)" is viewed as *inside of* the patient's substance. Thus the agent does *work* on the patient's substance, putting a *new form* into the patient. For instance, if someone slanders you, they project put the form of evil into you, and you *suffer* from that.

Comment [A101]: One might think that Time and Place would be properties of being; however, they are truly properties of becoming, because any discrete time (i.e. location) or place (i.e. moment) can be viewed relativistically from a difference point of view as something moving through space. In other words, there is nothing truly non-moving, because although from one perspective it appears stationary, yet from another it is rapidly in motion (i.e. in a state of Becoming).

Aristotle classically defined motion as the act of a being which is in potency, insofar as it is in potency (Physics, III:1,201a10). Since any point or moment in time can be viewed as something in motion, then places must fundamentally be points from which potency can be had or exercised.

Comment [A102]: Only in Epiphenomena (see Section 5.1 above) and Substantial Change (see comment below) does the changing of an accident become so great as to change the substance.

Comment [A103]: There are only two kinds of changes: Accidental change and substantial change. Substantial change consists in either generation of a new substance or destruction of a former substance.

Comment [A104]: Emphasize this: Rectangles and circles are opposed to one another (mutually exclusive forms: No rectangles are circles and no circles are rectangles) but they each exist side by side in the same substance.

Comment [A105]: Really, only pure substances (which can then be called hypostases) exist in themselves. Epiphenomena (or mixed substances), though called "substances," do not really exist in themselves, but exist in and through their parts / constituents. For example, salt exists in and though sodium and chlorine and the electrons which make them up. Thus although hypostases-substances are what really exist in themselves, people often say that substances in general exist in themselves.

f. 2nd cousin Ans: Relation.
g. Magnanimous Ans: Qual.
h. Anger Ans: Passion.
i. Julian Christmas Ans: Time.
k. Left-of-center Ans: Rel.
p Truth Ans: Substance.
q. Ready Ans: Quality.
r. square Ans: Quality.
s. Under surveillance Ans: Passion.
t. A.D. Ans: Time.

3. Think: Which two categories have the same two sub-categories? Theorize about what this suggests or why this might be. Ans: Time and Quantity both have "discrete" and "continuous" subcategories. This tells us that Time is a form of Quantity (i.e. distance), which is exactly what Einstein's General theory of relativity tells us, namely, that as you approach the speed of light, both distances and time shorten in a regular relationship.

Comment [A106]: Consequently we often represent Time as being the 4th Dimension.

4. Which of the categories most relate to . . .
   a. Quantity? Ans: Time and Place (all concern Matter).
   b. Quality? Ans: Action and Passion (all concern Form).
   c. Relation? Ans: Position and State (all concern relations).
5. Identify the substance and accident(s) in the following changes:
   a. A chameleon changing color.
      Ans: Substance-The chameleon. Accidents—its colors.
   b. A motorcycle accelerating.
      Ans: Substance-The motorcycle. Accidents—Time passing, and place changing.
   c. A child getting adopted.
      Ans: Substance—The child. Accident—legal custody.
   d. Unfurling a sail.
      Ans: Substance—The sail. Accidents—Its positions.
   e. Pouring Concrete into a mold.
      Ans: Substance—The concrete mix. Accident—Shape.
   f. A bank account rising.
      Ans: Substance—The account Accident—Its quantity.

Comment [A107]: Speed is in units of meters-per-second, so you know that both of these must be changing.

6. Explain: What is the difference between substantial change and accidental change? Ans: Substantial change is either generation or corruption of a new kind of thing. Accidental change doesn't change the kind of thing, but only how much, or when, or where, or how, etc.

Chapter VI. Potency and Act

One class of accidental changes are Actions. Acting requires both pre-existing Potency—in order to have freedom and energy to be able to perform an Act—and Act itself. We will now study these two principles that occur all throughout nature.

Proper Vocabulary Use:
1st Act is the act simply *to be*.
2nd Acts are acts to be *in some way*, that is, to perform some specific action.
1st Act enables 2nd Acts, but 2nd Acts are more commonly what we mean by the word "act."

1. Potency

The potency with which we are familiar so far is a kind of circulation: It is a refusal or failure of something to develop any further or be committed to any one course of action; and so, instead of producing some further form, it is just held in potency, in stasis, and circulates.[62] This kind of circulation—this holding in suspension—is a potency inherent in one's Being. We will first study this existential kind of potency:

When God creates something to be (1st Acts), He creates it "*ex nihilo*"—out of nothing. However it never is totally *nothing*, since it was at least *able* to be, and this mere possibility was already some degree of existence—albeit low. Thus we say that the thing was "in potency" to exist, and God *activated* that potency, calling it forth out of the dark waters of possibility,[63] and creating it to be in a *real* way (rather than just *potentially*).

To create an essence in this way, God must make it last and exist without immediately disappearing again, and He does this by pouring into it an act of Being. The Being that God pours into an essence, making it to be real, is never His own Being, for that would be eternal, perfect, and immense in every way, whereas the creature's limited essence makes it much less than divine. Rather God pours into that creature a level of Being which is commensurate to *it*, is not Divine, and which activates just *its* essence (rather than all essences).[64] When God pours this act of Being into it, it isn't as if He does it once, but rather as if He continually does it, as if He is continually creating or speaking it forth to be. This act of holding and preserving a thing in existence is called—not just Creation, but—Divine Conservation.[65] By continually 'speaking forth' a 1st Act into it, God makes it have Potency, a potency that circles around its 1st Act (cf. bottom of Diagram 1.35). If God were ever to withdraw the creature's 1st Act, its potency would also disintegrate into the larger potency of nothingness (i.e. top of Diagram 1.35), and it would immediately fall out of existence. Thus it is a God-given 1st Act, an Act of Being, entering into the creature that gives it existence, and maintains its potency in good order.

Comment [A108]: Students who have experience with Physics will understand this Chapter much better. Whenever we have circulation in physics, we nearly always get some sort of Act passing through the center of that circulation (cf. Diagram 1.49). For instance, if we have a circular flow of charge (e.g. traveling around and around in a loop of wire), we get a directional magnetic field flowing in one direction only (and not the reverse direction) through the center of that loop. Here the circling charge is equivalent to potency, and the directional magnetic field is equivalent to Act. The same thing happens for moments in quantum mechanics. An electron circling around an atom has angular momentum, and produces a dipole moment, which we represent as a vector proceeding either upwards or downwards, through the north or south poles of the atom, respectively. Thus circulation (Potency) produces direction (Act); this demonstrates the active or act-producing capability of Potency. The reverse can also happen: Act—a magnetic field entering into a loop of wire, can create a circulating potency, as we see in Faraday's Law of Magnetic Induction; this demonstrates the passive ability of potency to be acted on. This is the true meaning of potency: It is the ability to produce or be produced by Action. Cf. definitions 1 and 2 respectively in Aristotle, *Metaphysica* V.12 (1019a15-23). Thus general potent circulation, and direct, definite, unrepeatable Act have characteristic relationships that pop up in many places.

Comment [A109]: It was existing as a real essence in the mind of God, and also potentially in terms of how God could make use of that essence outside of Himself and in combination with other essences/beings (see Diagram 1.7 above).

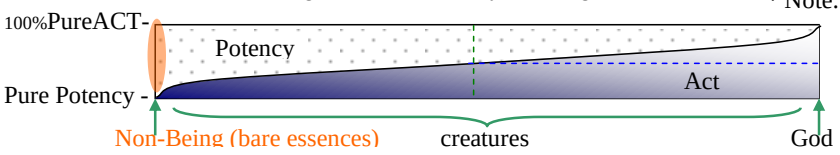
Comment [A110]: If God were to pour His own Being into such an essence, the creature would just be absorbed into God.

[62] Ex me. This understanding of Potency as circulation is purely my own idea, but I am delighted to find that it has echo and support in Aristotle's discussion of circular motion (*Physica*, VIII:8-9, esp. 265a34-b8).
[63] Gen. 1:2. Cf. also Is. 40:26, 48:13, Col. 1:13, I Pe. 2:9, Ps. 147:4, Prov. 8:24.
[64] Aquinas, *De Ente et Essentia*, I:13, V:92.
[65] Cf. CCC 301, 320.

We see then that a creature is a mixture of some Act and some Potency.[66] As created, it is active and real, but since it is not everything, it is in potency to be those things which it isn't. It is in potency to become and take on forms and values of other beings; it is in potency to learn new things in God; and at the very maximum it is in potency to become full Act (very God) again, that is, if it should ever be reunited back into the divine Being.[67] Thus there is a continuum between total potency and total act, and creatures lie somewhere in the center of this continuum:[68]

A Diagram of the Potency in Beings' First Acts: Diagram 1.48

* Note: Vertical is -->



Now of course, there is a certain limitation on this potency, because if a man is already one thing (e.g. a carbon-based being), it is contrary to God's nature to arbitrarily undo that part of him and make him be something else (e.g. a 'silicon-based' being). Thus there is a certain trail (see dashed blue line in diagrams 1.48, and 1.14) of already-determined characteristics that each creature has in relation back to God its creator, and it is unlikely that God would ever alter or undo something that He had already determined (For it would suggest that God's first act of creation had been mistaken, or vain). In fact this trail of determinative characteristics may be a significant part of how God conserves a being in existence: It is like a word that God is constantly speaking into the creature, making and confirming the creature not just to be, but to be *what* it is. Consequently, when a creature has potency, it is not potency to become *absolutely anything* (although this is always a scant possibility), so much as potency to become things consistent with what it already is. This greatly limits the ways in which a creature is likely to evolve.

Potency of being is potency to (1) be reunited into God, (2) become some-thing else, or (3) become more specific.

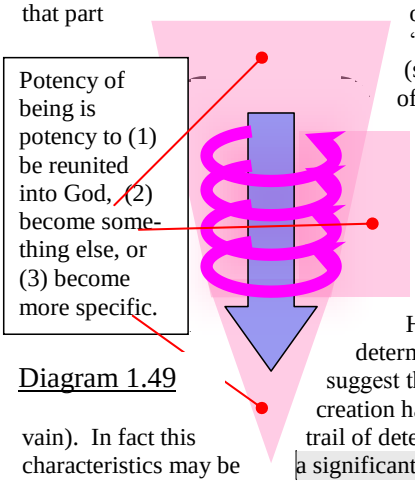
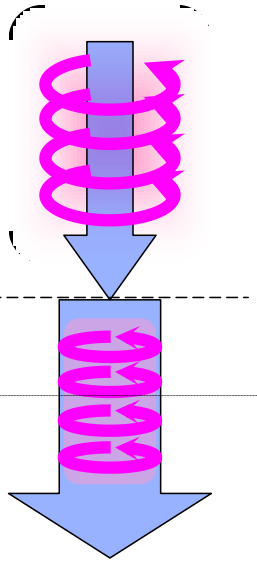


Diagram 1.49



In the spiritual realm, Potency goes on outside of Act. In the physical realm, Potency goes on inside of Act.

Diagram 1.50

[66] Aquinas, *De Ente et Essentia*, I:13, V:96.
[67] Aquinas, *De Ente et Essentia*, IV:76.
[68] Aquinas, *De Ente et Essentia*, IV:84.

Comment [A111]: As opposed to God the Son, who is pure and total Act, and as opposed to mere essences which are pure and total Potency.

Comment [A112]: Cf. Matt. 3:9
You can visualize this in the following manner: If God creates a creature on one side of Himself, that creature is unable to see the forms that are proceeding from God on the opposite side of God; consequently, even the highest creatures must move very quickly around God in order to absorb as much of the divine light (i.e. the divine forms), as possible.

Comment [A113]: One useful way to think about potency is that it is the ability to receive a new form. God is not in potency to receive any new form, because He already contains all forms; at the other extreme, complete non-being is in potency to receive absolutely *any* form. In between are creatures which are in potency to receive some forms (forms which are consistent with what they already are), but not others which they already possess or which would contradict what they already possess.

Comment [A114]: Draw vertical arrows from the area of Act up into the area of potency to indicate that that which is partially in act penetrates into potency so that it may come to be in act in new and different ways in which it is not currently in act. Point out to the students that there is no area of "potency" above God's Act (since his Act is total), and then ask the students: Can God act in any way other than He is? [Ans: No, because He has no potency surrounding (above) his Act.] Then ask the students "Then does God have no freedom and no life? . . . is He forced and necessitated? Let the students ponder a little bit, and then draw an horizontal arrow from the far right part of the graph that is all act (God) *leftward* into the area of potency. Tell the students, "Imagine that this is a 2nd-Act [an act-*ion*] coming from God. Now do you see whether God can act in different ways? Is He necessitated ...

Comment [A115]: This horizontal trail (blue dotted line) in Diagram 1.48 is identical to the one in Diagram 1.14, above. For instance, man is a "rational, sensate, living, bodily, thing." This is the "trail" of characteristics by which God holds man in existence. Incidentally, it is also the stairway by which—lest they appear in an entirely unrecognizable way—angels (who are things, but ...

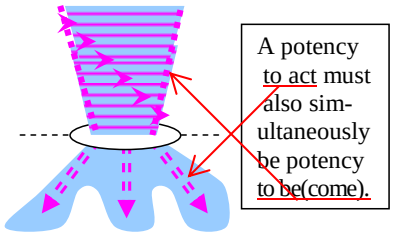
Comment [A116]: It is unlikely that the 'word' by which God speaks a creature to be a determinate kind of thing is the only way that God conserves it in existence. After all, it is normally held that all 3 persons, working together create the creature. Now obviously God the Father, through his word, God the Son, holds the creature in existence, but what about the Holy Spirit? Does he cooperate in making and conserving a creature to be? To suggest a possibl ...

Comment [A117]: That is, lower or higher in Diagram 1.49 above, but not sideways. Just like a screw can easily be screwed in up or down, but not sideways so potency is much more likely to evolve into something more specific (lower), or more general (higher), but not something else, and entirely unrelated to it. Thus most biological evolution occurs by fine-tuning (up or down), but not in rapid mutations and jumps (sideways).

Now this potency within the creature is primarily a potency to become and change in its essential being (as already discussed, cf. Diagram 1.49), but there is also a secondary and accidental component to this potency: It may also be a potency to *act* in some way.[69] Many times creatures have a special faculty (from the word "facility," Lat. for "easiness.") that enables them to easily act over and over and over in a certain, regular way. For instance, if you have an arm, you can easily move your arm; if you have a jaw, you can easily bite. Plants, and especially animals have lots of faculties that enable them not so much to change in a permanent way, as to change temporarily, performing actions. Because most of these actions are not performed in the abstract, eternal realm of spiritual forms and essences, but rather in our material world, we draw such faculties as proceeding into the material realm (below the line, in diagrams 1.50 and 1.51).

Now any such potency proceeding into the material realm and enabling action, obviously comes from the permanent reservoir of potency in one's form, i.e. one's soul. This means that any ability to perform action is also necessarily an ability to transform oneself. Any time you act, you necessarily also affect yourself spiritually. For instance, if you punch someone, you put the memory of that punch into your consciousness. Thus what you *do* becomes part of you. This principle, is extremely universal: It applies to every action, no matter how minor or trifling it may seem: Every action that you perform willfully (i.e. using your own potency) puts something into you. If you kill or steal or curse even once, it puts a certain imprint on your soul. This is the way the Will works, and it is not a physical law, but a metaphysical law of human nature: Any time the Will is involved in something, the whole person is involved, or implicated. If you do an evil thing in the world, your form—your soul—will be tinged with evilness; if you do good things in the world, your form—your soul—cannot help but slowly become virtuous, just, good, and even holy.

Diagram 1.51



Potencies lie in and are substantial parts of the soul (i.e. man's form, not man's material body).[70] Consequently, any potency for action in the material realm, must exist in the forms found in that realm. Now where is this formal part of the material realm? Recall from sections 1.4.1 and 1.4.3, that in the material realm, all form is *contained* in matter. Consequently, any potency occurring in the material realm occurs inside of matter.[71] For instance, any fluid circulation of liquids in a cell goes on inside of the rigid cell walls. Potency and circulation may occur as itself, outside of matter, in the formal/spiritual realm, but when it enters into the material realm, things get inverted.

Comment [A118]: This is because any circulation down at the material level, is caused and exerted by equal or greater rotational force up at the formal/spiritual level. Consequently you won't willfully do anything in the material realm, except what has been planned, and deliberately caused, by a similar rotation up in the spiritual realm. It is like drilling for oil, or drilling a screw: All the rotational force comes from a motor located at the top of the screw (not at the bottom).

Comment [A119]: This is the reflexive function of consciousness, which Pope John Paul II explored extensively in his books The Acting Person and Love and Responsibility. He there described how, reflexively, a person is not only the subject and agent of his actions, but also indirectly the object of his own actions: He 'creates' himself by what he chooses to do. You cannot approve of and consent to some valued action, without having that value 'rub off' on you and affect who you are (i.e. as part of your self-identity).

Comment [A120]: The ways Intellect and Will relate to one another differ depending upon whether it is in the physical or spiritual realm. In the physical realm, willful potency occurs inside of Intellect: in the willfully significative *content* of the words you speak; in the hidden heat-energy inside pieces of matter; in the life inside of a cell. Thus in the physical realm, Intellect causes Will as a side effect of propagating itself. Consequently the amount of Will in the universe is—by entropy—dwindling down to nothing, since as new intellectual events occur, the immediate result is always an excess of Intellect rather than an excess of Will. However, in the spiritual realm, willful acts are actually external to and causative of intellectual acts. Indeed, we control by our Wills, what we spiritually think with our Intellects (to be covered in Section 4.1.3). Also, when we perform spiritual acts, we often end up with more physical, psychological, and social energy than we started with. This excess of willful energy is partly due to nature (from within this universe) and partly due to grace (from outside of this universe). Moreover, since Will is surrounding Intellect in the spiritual realm, Will is slightly more characteristic of that spiritual realm, than Intellect. After all, those who have strong Wills become more spiritual than those who have strong Intellects.

[69] Aquinas, *Summa*, I-II.55.2.c.

[70] Aquinas, *Summa*, I.77.5.c, ad1. Aquinas holds, following Aristotle (*De Anima*, 412a9-10), that the combined substance (Formal soul + Material body) is the subject of most potencies. However he also notes that some potencies (to understand and to will), lie in the soul alone, and not in the body. We ourselves might also add that certain potencies lie in the body and not in the soul, e.g. the potencies for rigor mortis and for blood to clot. Consequently, instead of considering the soul as exclusively form, as Aquinas does, it is better to consider the spirit itself as Form (recall Section 1.3.4), and the Soul as the combined composite of the two, in which case we come into agreement with Aristotle.

[71] Ex me. This idea, most clearly represented in Diagram 1.50, is purely my own, although I believe it to be a self-evident pattern or characteristic of our world.

Here, any circulation must occur within a material object. So when you exert force with your arm, it isn't as if the arm itself is doing any pushing, but that the formal and living parts of the muscles and chemicals inside of the arm are pushing against one another. The external movement and pressure is just the outer, visible effect.

Comment [A121]: Thus when two boxers are boxing, it isn't as if their bodies are boxing, but that the formal life-principles inside of them are boxing.

Summary:

1. Potencies to Be(come)

(From God)

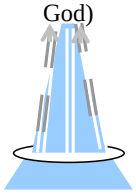
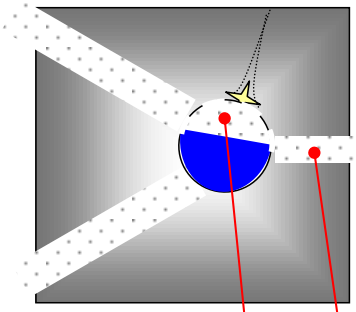


Diagram 1.52

When God activates some of man's potency, God also gives man special potencies or avenues in which he is able to further grow. These are called *potencies ordered to one's form or nature*.[72] Man has potency to grow taller, to mature and develop, to hone his instincts, and to learn. As man perfects these, these potencies are replaced by pure, permanent Act (though never as pure and permanent as God's). Since these potencies are activating certain parts inside of man's act that are still potential, they can be drawn as *entering back into* man's own 1st Act, or even as entering all the way back into God. When one's potency enters back into oneself in this way, it seeks out new things, new ends, that one currently is not, and thereby refines, purifies, and solidifies one's 1st Act (i.e. widening the top half of Diagram 1.52, or increasing the circle's dark-blue level in the circle in Diagram 1.53, at right).

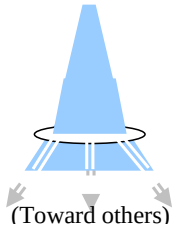
Diagram 1.53



Man has two types of potencies: Simple potency *to be*, as well as potencies *to act* in some respect.

2. Potencies to Act

Diagram 1.54



(Toward others)

Besides Potency *to be*, there are also *potencies to act*, a.k.a. faculties of acting, or "operative potencies."[73] Potencies to act are momentary extensions of Act beyond oneself, out toward outside beings.

Comment [A122]: Faculty comes from Lat. *facilis*, meaning "easy," so faculties are ways in which things are easy for us. Of course things are very easy for us, if we have a part specially designed for that.

Man has many potencies, some physical, some sensate, and some rational. Examples of physical potencies are abilities to grow, abilities to resist temperature-changes and blood-loss; examples of sensate potencies are abilities to see, to taste, to act, to imagine, and to instinctively react to certain things; and lastly examples of rational potencies are abilities to love, to know, to hope, to learn, etc.

[72] "...in ordine ad formam vel naturam." Aquinas, *Summa*, I-II.51.1.c.
[73] "…ad operationem." See citation in previous footnote. See also Aquinas, *Summa*, I.77.5.c.

Potencies enable action in some way. These are not just simple potencies *to be*—an element of potency that is always in one's Being; no, these are potencies *in a certain respect*, that enable or make easy action in some way. We will next consider two classes of Potency to act: capacities and powers.

Comment [A123]: You can think of a respect as a direction; however, it also includes the kind of looking ("-spect") involved: Thus a respect includes both direction and also which manner of looking. This will be integral to understanding a science later in Section 3.7.1, where the manner of looking will become known to be the "Formal Object *quo*" of the science.

Questions:

1. Is there Potency all throughout—and mixed into—the Being of a creature, or not? Ans: Yes, there is potency mixed into a creature (Summa I.77.1.ad6, I.75.5.ad4). Without this admixture, the being would be divine, equivalent to God the Son.
2. What are the two kinds of potencies, and which is more permanent? Ans: Potency to be (more permanent), and potency to act.
3. Fill in the blank: Every potency to act is necessarily also _____. Ans: a potency to be.
4. Circle the correct answer: In the physical realm, Will is (external/internal) to Intellect. In the spiritual realm, Will is (external/internal) to Intellect. Ans: Internal . . . External.
5. Which kind of potency would you call ***ad intra*** (Lat. for "towards the inside") and which would you call ***ad extra*** (Lat. for "towards the outside"). Ans: Even though potencies to act occur inside the being, and potencies to be as-it-were around the outside of the being, yet a potency to act would really be called "ad extra" and the potency to be(come) would be called "ad intra." The reason for this contra-intuitive situation is that a potency to act is ordered toward another object outside of oneself—and so it is "ad extra"—whereas a potency to be(come) is not, and is thus called "ad intra."
6. What in the universe is pure Potency? Is there anything in the universe that is pure Act? Ans: The uncreated essences, or waters of possibility are what is pure potency. There is nothing in the universe that is pure act, because it would then be divine, and God is outside of the universe (Jn. 1:9).
7. What is something most likely to become? In other words, in what way is it most likely to evolve? Ans: It is most likely to become something *related* (either more specific—downward—or more general—upward) to what it already is.
8. Apply what you know: Would God ask you to leave your wife and completely abandon your fatherly role as bread-winner for your family, in order to go spread the Gospel? Ans: No. Other beings' substance depends upon you, and so inasmuch as you have become a husband and a father to these other children, God wouldn't ask you to undo what He has made you (cf. I Cor. 7:17). Thus God might ask you to grow in a vertical sense (cf. Diagram 1.49), preaching the Gospel *within* the state-of-life in which he has put you, but he probably wouldn't ask you to horizontally evolve, thereby abandoning the good that is already present, in order to go do 'good' somewhere else.

Comment [A124]: People who do such things are often really being attracted not by Duty or Call, but by an excessive and thus irresponsible desire for Adventure.

9. Connection to Physics: Look up in a physics textbook: Are electrical potentials always vector quantities, or scalar quantities? Why do you think this is? Ans: Scalar Quantities. The difference between a vector and a scalar is that vectors have direction, whereas scalars do not. Potentials are always scalar quantities because inasmuch as they are circling, they have no definite, permanent direction.

Comment [A125]: Point out to the students that by "potentials" we here mean the physics definition of "potential" (see next comment), which they may have to look up and research a little bit about, in order to understand.

Comment [A126]: Electrical potentials are circling because they are made from circling charges (electrons circling around the nucleus of the atom, or protons vibrating and circling within that nucleus). An electrical potential is basically the amount of work needed to bring a unit of test-charge from an infinite distance away, and *push* it towards another charge, to the point of combining the two charges at a single point in space. If the charges are opposite and attract, then the potential will be negative (i.e. you will 'get energy out,' as they approach and combine); if the charges are like and repel, then the potential will be positive (i.e. you will have to put energy in, to make them approach one another and combine).

2. Kinds of Potencies

Capacity and Power

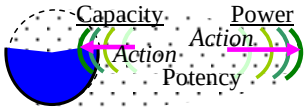


Diagram 1.55

There are two kinds of faculties: capacities—which are passive—and powers—which are active.[74] Both kinds *flow from* (N.b. circle's perforated edge allowing outflow, in Diagram 1.55) the substantial potency of the soul.[75] For instance, a human being has certain capacities inherent in his/her Being: To be able to hear, taste, understand, absorb nourishment, etc. On the other hand a human has certain powers: to lift, carry, bow, and speak. Both powers and capacities are still potencies because they are sometimes in (2nd) act and sometimes not, sometimes doing one thing, and sometimes doing another. We see then, that capacity is identical to power except that one is passive and the other active.

For civil society to exist, it is necessary that individuals have the ability to both give to, and receive from one another. After all, would you ever consider joining yourself (in some permanent social relationship) to a stone or to a forest or to a planet? Why not? Because it would be incredibly boring! These things don't have the capacity to comprehend you, nor to supply you with many services. However, you might very well consider uniting yourself to a club, a church, a spouse, or a new family because these all have the capacity to receive from you and give back to you.

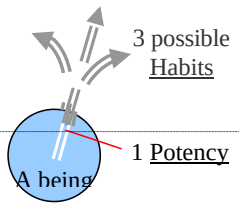
One of the situations in which people give and receive nearly simultaneously is in a conversation. In conversing, it is important to speak with a certain potency in one's voice—slowly, and with a certain openness or vulnerability to the other—so that either person can play a role in directing the course of the conversation. Too little potency, and the ideas and responses will appear all 'one-way,' as if the speaker prepared them all beforehand, without concern for who might be listening. Too much potency, and the speaker will appear weak and unassertive, as if he/she doesn't really care, and his/her ideas have no serious substance. Having just the right amount of potency enables the persons conversing to hold conversation 'in balance' between the two of them, so that each is dynamically reading the other's mind, and both are contributing to the conversation, as they deem appropriate. With just the right amount of potency, the conversation is a product of both of them, rather than just one.

Comment [A127]: Potency in one's voice is often heard as a certain angst and uncertainty, or trepidation, if the person is one's superior; or as a certain 'talking down' and/or deignful patience if the person is one's subordinate.

[74] Aristotle, *Categoriae*, 8 (9a14-28). Aristotle lists 4 species of quality, of which the second is "capacities or incapacities." Aristotle does not actually list "powers" as distinct from capacities, but they would be there included. Cf. also Aquinas, *Summa*, I.77.3 on the difference between active and passive potencies.
[75] Aquinas, *Summa*, I.77.6

Habits

Diagram 1.56



What happens when you get into a rut, into a nearly unavoidable habit? Is there any difference between potency in a mere faculty and potency in an ingrained habit? Indeed, there is.

If you happen to do something once, we might think that it was just caused by the situation, as a quirk of happenstance. For instance if you pass your hand through your hair, it might just be circumstantially-based on the position of your hair. However, if you do something two or more times, then there probably is some special reason for it, proper to your form (your soul), or the form of your species or genus. For instance, if you cough, and then cough again, it is caused by a reflex reaction proper to all humans and maybe even to all warm-blooded animals. If you absent-mindedly sing a song and then later sing it again, it is probably because you like it (in your soul).

A habit is a power or disposition to act in a certain regular and dependable way.[76] Potencies are the subjects of habits; in other words, habits occur within potencies.[77] However because many different kinds of habits can be had within the same potency (e.g. either the virtue or any one of a number of vices, may be had within the same potency), we can say that potencies are only the seeds or entryways for habits to occur in (cf. Diagram 1.56). The habit itself, once it develops, is a specific form, a manner of acting, a "how," that in its minor details is unique to that individual. The habit becomes a part of the person's soul, as new Being (rarely as permanent as the person's original God-given nature, but still quite permanent), either accidentally or substantially connected to their spiritual substance. We see then that a habit stands for itself as what it is.

There are two classes of habits, virtues and vices, which differ depending on whether they give you an ability to do something well, or poorly. Habits (really, virtues) can also be divided between infused and natural. An infused virtue/habit is poured into your soul all at once.[78] Examples of infused habits are graces, innate talents, and sciences that are taught to you, ready-made. A natural (a.k.a. "acquired") virtue/habit is learned gradually over time, by hard work and repetition. Examples of natural virtues are skills at sports, language, art, and craftsmanship. Just as a natural virtue takes a long time to learn, it takes a long time to lose. Paying your bills late just once won't immediately put you into the habit of not paying your bills; however unless you take extra care to correct the matter the next time, you may soon find yourself doing it again and again, making a habit of it. On the other hand, since an infused virtue is located more in the intellectual part of your soul/spirit (than in your Will), an infused virtue can be lost all at once by even one act directly contrary to it. Thus if a person deliberately looks at a bad picture they may all at once lose their innocence; or if a person breaks their leg, they may all at once lose their talent for running. Infused virtues are normally given to you by God, either at birth, or later by grace.

Comment [A128]: Caused by an efficient cause, that is, *effected*.

Comment [A129]: If the habit were to become permanent, it might be visualized as if the gray dashed lines became solid. In this situation, note that the gray is a fainter color than the blue.

The only times that a habit becomes as permanent as one's God-given being is when it occurs by means of supernatural faith; and, incidentally, this is God-given as well.

Comment [A130]: If desired, give students the Handout on "The Preternatural" (in Appendix).

[76] Aristotle, *Categoriae*, 7 (8b25-9a13); *Metaphysica*, V:20 (1022b3-14).
[77] Aquinas, *Summa*, I-II.50.2.c.
[78] Aristotle, *Metaphysica*, IX:5 (1047b31-34); cf. also Aquinas, *Summa*, I-II.51.4.

Questions:

1. Is a power a potency *to be* or a potency *to act*? Ans: *To act.*
2. Is a capacity a potency *to be* or a potency *to act*? Ans: *To act.*
3. Explain: What sorts of potencies should an individual develop in order to function well in his/her society? Ans: An individual should develop both capacities and powers, e.g. power to serve and perform a job, and power to use different tools and institutions in society. Also, one should develop one's capacities so that once one has served, one can then appreciate what is good, and judge wisely about how to spend one's money. Developing capacities to serve and appreciate others directly, are especially useful, and make life much richer. In particular, one should learn how to speak well *with* others, paying extra attention—not just to speak, but also—to *listen* well.
4. What is the subject of a habit (where is it located)? Ans: In one of your potencies/faculties.
5. A habit is the sum total of many identical _____s. Ans:2nd Acts/actions.
6. What are the two ways you can get a habit? Ans: By having it infused into you, or by learning it naturally, through repetition.
7. Give an example of a . . .
   a. natural virtue. Ans: Temperance (learning by training).
   b. infused virtue. Ans: Good genes, supernatural Faith/Hope/Love.
   c. natural vice. Ans: Something you 'slip into' by bad repetition.
   d. infused vice. Ans: Something you unconsciously 'pick up' from your friends or family.
8. Are infused or natural virtues epiphenomenona? Ans: Natural. A natural virtue is an epiphenomenon, a new reality, that develops from many correctly performed acts.
9. Can you have both a virtue and a vice in the same faculty? Ans: Yes, but not in the very same way. For instance, in regard to eating, you might have a good habit of eating healthily, but a bad habit of eating too much.
10. How do you lose . . .
    a. a natural virtue? Ans: By failing to keep practicing it, or by performing many actions that are contrary to it.
    b. an infused habit? Ans: Performing a single act seriously contrary to the virtue/vice.

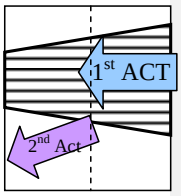
Comment [A131]: We do also have a capacity to Be(come) something new in God, but this usage is comparatively uncommon since such a capacity is one and simple. Rather, the word "capacities," is used more in regard to 2nd Acts, because 2nd Acts are varied and numerous, and thus we need a common word ("capacities") to describe the similar ways of receiving each of them. Thus "capacity" is used more in regard to our Becoming (2nd Acts), than to our Being (1st Act). Indeed, it is really through those 2nd Acts, that we change our 1st Act, anyway.

Comment [A132]: Original Sin is probably an infused vice. Children first 'pick up' evil actions by getting 'caught up' in an evil example set by a parent, or sibling, or visitor (cf. Rom. 3:23, which doesn't state that it is necessary to sin, but just that—in fact—all have sinned.).

Comment [A133]: An infused virtue is not an epiphenomenon (arising from below), but rather a completely new reality, or infusion of Being (descending from above).

3. Acts

Diagram 1.57



In the last section, we saw that there were two kinds of Potency: potency to be(come) in the formal realm, and potency to act in the material realm. These two potencies correspond to two kinds of Acts:

1st Act and 2nd Acts.[79] 1st Act is the Act of Being that every being possesses. 1st Act comes from God and involves a surrounding potency to be(come). 2nd Acts are the actions that each individual performs (assuming God has made them able to perform actions), and 2nd Acts, conversely, are caused by potency, rather than causing it.

Whereas 1st Act corresponds to true potency, 2nd Act corresponds to Passion (from Lat. *pati* "to suffer"). When an action is performed, there is a doer and a 'done-to.' The doer is called the "subject" or the "agent;" and the 'done-to is called the "object" (of the act) or the "patient." The doer causes a form to pass into the patient. From the doer's point-of-view, it is the form of his own action; from the done-to's point-of-view it is the form of his own *passion*.

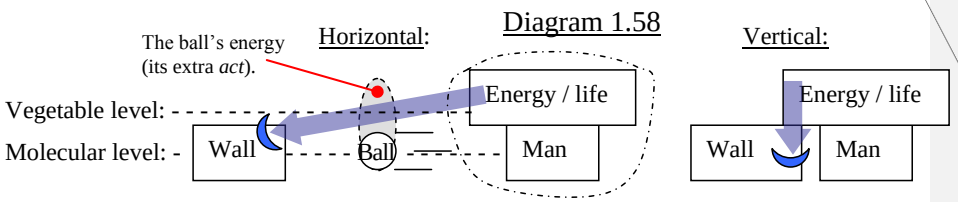
> Passion occurs when two forms collide and at least one of them must receive the other.

Since there are many types of forms that can be impressed upon your body or your soul, there can be many types of passions. A physical form (e.g. that of a baseball) can make a physical (and painful!) imprint on you. A spiritual form (e.g. a word of praise or condemnation) can cause a spiritual passion in your soul (e.g. worry, distress, happiness, or joy). In general, a passion is anything beyond your control that changes your internal being; a passion occurs *when a being's form is altered by an exterior agent*. Even knowledge is loosely called a passion because in knowledge something (true or false facts) enters into your being.

It can be a little difficult to distinguish where actions and passions end. When a man throws a ball into a wall, it might seem that two acts occur: The throwing of the ball and the slamming of the ball into the wall. However, really only one act has occurred because between the agent and the patient (the wall) nothing else has been seriously altered. The ball is not affected (except insofar as it is worn out by being slightly squeezed): It is just a *medium* for the action to occur. Only the wall is a true patient. Until you come to the patient—that is, something whose form is internally changed—the action has not yet finished. Thus an action is that which is bounded by an agent and a patient.[80]

The locational travel from agent all the way to patient, is the horizontal element of an action. However there is a vertical element, as well. The form of an agent cannot change the form of the patient, unless it has a higher form than the patient's. For instance, if the man is just a dead body (like the wall is a dead body), he will not be able to throw the ball. The man can only throw the ball because there is a higher form within him (i.e. life and chemical energy), more in act than the form he is altering.

Diagram 1.58



Actions may appear horizontal, however true actions and passions are when a higher form vertically impinges upon a lower form

[79] Aristotle discusses the difference between 1st acts and 2nd acts in *De Anima*, II:1 (412a22-29).
[80] Aristotle, *Physica*, VII.2 (244a3-b1).

Comment [A134]: Tell the students that these two correspond to the two halves of Diagrams 1.50, 1.51, 1.52 and 1.54 above.

Comment [A135]: Ask the students if any of them know what the two "voices" are in languages. [Ans: Active voice and passive voice.] Tell them that these two voices arise in language so that we can properly describe this aspect of reality (i.e. that there are passions).

Comment [A136]: Ask the students, "What are some other mediums through which actions occur?" Ans: Water, air, a row of billiard balls, or a rope.

Comment [A137]: This means that actions are really macroscopic things and not lots of submicroscopic particle-collisions. The only submicroscopic particle-collision that might be considered an action is when an atom decays (because then its internal substance is altered).

Comment [A138]: Thus if you think of things as nothing more than quarks and tiny particles (the parts of atoms), the whole history of the entire universe—all the way back to the Big Bang—can be thought of as a single action that is still taking place. Of course this is not really the case, since modern physics indicates to us that many particles do pop into and out of existence, and do in fact internally change (e.g. as in proton-decay into a neutron).

Comment [A139]: Many times, if you don't have enough energy in you, instead of causing the macroscopic effect that you intend (e.g. to move a boulder), you merely cause some slight surface damage. In this case, the patient is not the whole macroscopic object that you intended to affect, but just the tiny little piece of it that was in fact affected. Here we see that there is a definite limit to how much work an agent can effect: The agent is limited by how much energy—form—it contains or can draw upon to bring to bear upon the object.

Thus a true action is one in which a higher form affects and impinges upon the normal form of a lower form, and actions are more truly vertical than horizontal. Actions can only *appear* horizontal because the vertical action involves a spending of energy (see yellow enthalpy arrow), that enables the vertical difference in being to be translated into a horizontal motion, as well.

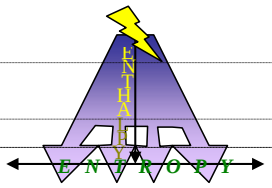


Diagram 1.59

An action involves a spending of energy in which vertical being is often converted to horizontal motion (entropy).

Questions:

1. What is 1st Act, and who gives it?
   Ans: 1st Act is the Act of Being that every being possesses, and it comes from God, who makes it to *be*.
2. What are 2nd Acts, who gives it, and who gets it? Ans: Actions. The agent (or subject) gets it, and the patient (or object) receives it.
3. Do _____ cause potency or are they caused by potency?
   a. 1st Acts Ans: Cause
   b. 2nd Acts Ans: Are caused.
4. Describe what happens when you act: Where does the horizontal circulation (potency/energy) go? Ans: It goes into a downward effect, which is the action.
5. Explain: Which is a better description of what goes on in an action?
   (1) Indirect causality: A man pushes a shovel which pushes and separates the ground.
   (2) Direct causality: A man digs into the ground.
   Ans: (2) Direct causality. Many times the tool merely serves to concentrate the force against a particular spot or (as in the case of a lever) in a particular direction. When the man performs the action, it is no accident that the tool is correctly oriented (Think how useless the shovel would be if you were trying to dig into the ground with the blade 90° from what it should be!), nor that he hits the particular spot he intends. Thus the tool is functioning as an extension of the man, and in particular of the man's chemical and mental activity, and not as a separate, autonomous being. It is just like when you speak a word. When you speak a word, it is no accident that you say what you want to say, using just the right sounds that you intend. With two slightly different words you can effect radically different results. In the same way, with two slightly different tools you can effect radically different results. Thus the tool—in its finesse and detail—is an extension of man, and his personality, and his spirit.
6. What is essential to an action: The horizontal component or the vertical component, or both? Ans: The Vertical component only. You

Comment [A140]: Point out to the students in the right side of Diagram 1.58 how the cause and effect are really present in existence simultaneous with one another: The Man is not present simultaneous with the Wall, but the Energy / Life (in the impacting ball) is present simultaneous with the Wall. This is a principle of Aristotelian causality, that cause and effect are always present together simultaneous with one another. Aristotle, *Analytica Posteriora*, II:12 (esp. 95a22ff).

Comment [A141]: Make sure the students know that when we say "vertical" we do not mean vertical *in location* (Although this can be one element of it, since a ball on a hill possess more potential energy than a ball in a valley), but rather vertical *in being* (i.e. farther to the right in Diagram 1.48).

Comment [A142]: In kinetics there are concentrated forms of energy—e.g. Uranium—and not-so concentrated forms of energy—e.g. water. When a concentrated form is converted into a lower form of energy, entropy (spreading out) occurs. The reason this occurs is because when energy is transferred from one object to another, there are many degrees of freedom that the doer has, and so the doer may transfer its energy to more than one object. Since two objects now each possess half the energy of the original one, a certain spreading out has occurred. This spreading out causes motion. During the whole process of spreading out there is complete continuity of act (i.e. *energy*), and so there is never a moment when something is not in act: First the energized form is in act, and later the not-so-energized forms are in act, but it is the same act that has been transferred from the one to the two. Thus although act may be spread out and dissipated, it does not disappear. All that has happened is that potency has been activated (i.e. the potency of energy in this one thing to be in all those others things). Thus passion does not occur in classical particle mechanics.

Comment [A143]: Enthalpy and entropy are the two parts of the Gibbs free energy equation, $\Delta G=\Delta H-T\Delta S$ (Change in Gibbs Free Energy = Change in Heat/enthalpy –Temperature x Change in Entropy) which determines whether a reaction will occur and go to completion, or not. As such, they are extremely fundamental parts of the universe. Enthalpy is heat; entropy is disorder, or spreading out. If the change in disorder (ΔS) is positive (i.e. more disorder is occurring), and the change in heat (ΔH) is negative (i.e. heat is being gotten out), then the reaction will go to completion. *The Greek letter delta (Δ) means "change in."

Comment [A144]: Alternatively, one could replace the word "cause" in this question by the word "contain." Then the answers would be reversed. 1st Acts are contained by potency, and 2nd acts contain potency (Cf. Diagram 1.50)

Comment [A145]: Humans are unique in that humans can cause a practically infinite variety of effects, whereas animals cannot. Animals can only cause the effects that their natural tools (claws, or teeth, or tail), enable them. However humans can design a tool to accomplish practically any task, because humans can think in a truly spiritual way.

can exert the same action whether or not you're right next to the object, or far away from it.

7. Think: What causes us to have so much difficulty moving horizontal distances here on earth? Ans: Friction. If we were in space it would be incredibly easy. Friction is like a tax that must be paid, so that you affect not just your object, but the ground a little bit, as well, along the whole distance to the object.

Teachers' Comments (continued)

A3: Here, we instead recommend following John Duns Scotus and considering Being as itself a transcendental, making four total transcendentals. Having four transcendentals enables us to correlate the 4 transcendentals to the two end points (top and bottom) and two processes (intellectual descending and willful ascending—Cf. Diagram 1.5) in metaphysics. It also enables us to correlate them to the 3 persons + 1 nature of the Blessed Trinity: God the Father is in the infinite of Being, God the Son the infinite of Truth, God the Holy Spirit the infinite of Goodness, and their common nature is the infinite of Unity (cf. further discussion in the handout on "The Number of the Transcendentals," in the Appendix.

A4: This flash represents the flash of creation, by which God creates you and holds you in existence. If the students want to know more about what this flash of light is, and how God creates you, tell them that it represents *a word* that God is speaking into you, keeping you in existence. This flash repreents where the dashed line in Diagram 1.3 enters into the being, making it be.

A5: of "a true connoisseur," or "true freedom," or "true love." Ontological truth is the correspondence of a thing to the plan of the one who created it, or to the perfect ideal of what that kind of a thing should be.

A17: Also, *how much* are they each *one thing*? Are they greatly or even substantially self-united, or are they loosely and only incidentally united? Is their border/edge hazy or undefined in places (e.g. like the Roman empire just before its fall)?

A18: 'potential' being / in 'mental' being / in 'physical' being / etc.]

A22: We see then that they differ by which one is most primarily and properly that way.

A24: at that moment only 'potentially' or 'virtually' present and hasn't yet come to be real in the here-and-now. For example, as you are willing to lay a foundation for the sake of building a skyscraper, that foundation is already virtually 'in' and *part of*, and *belonging to* the whole skyscraper, even though the skyscraper isn't yet present. At this point, the skyscraper is there only as an idea: It is *virtually* present, but not yet there physically.

*If students have trouble accepting that when you're willing you're already "inside of" and part of a substance only virtually present, tell them that in this whole discussion, we're talking about spiritual substances (ideas), not physical ones.

A38: good in its construction (cf. Gen. 1:3, 1:31, Wis. 1:14, Sir. 39:33-34).

A39: with, it is replaced by new life. Thus even Sin and Death are made use of for good purposes: God permits Sin so that He may bring greater good from it; and God permits Death so that He may bring an end to Sin.

A42: simultaneous in time. Thus the only order that can be attributed to them is an order of causality.

A74: At the moment of creation, all human beings are essentially identical in their souls; it is only their material bodies which enable them to be differentiated one from another. Humans are all identical because they are all made in the same way in God's image (Cf. Gen. 1:26-27, Col. 1:15): They are made in the image of Christ, who is God-become-man.

A77: know me…." Ps. 139:1-3), since He created and is still creating you; but as a being yourself, part of your own being involves instantaneous and immediate self-comprehension. It isn't even knowledge *that* you are, as Descartes clumsily tried to prove when he said "I think, therefore I am." No, it is a knowledge that is even more primal, and more basic: It is nothing more than the silent and yet unbreakable bonds of truth that connect oneself within oneself.

Incidentally, these bonds of truth may be the same thing as neuron connections weaved or formed into a complete circle, so as to enable a nerve stimulus to continue indefinitely, re-circulating within it.

A79: simple, but—by another view—also diverse and multiple.

A83: Question 1 in this section), which we shall here call a "broad-source diagram" vs. a "point-source diagram."

A86: can even visualize the 'recirculation' not as a horizontal 2D spiraling, but as an even vertical 3D spiraling, as well (cf. Diagram 1.16). A good synonym for potency is "stasis." A being that is 'in stasis,' is 'standing' (from Lat. *stare* "to stand"), but not changing.

A119: intended them to be used. The Devil invented the principle of Pride by misapplying God's God-given and good principle of supremacy, to himself, rather than to the One to whom it was owed. Consequently, Sin became something real, when the Devil consented to it and made it a principle for himself, as-it-were 'institutionalizing' it.

A76: mind: When they *are* combined, as occasionally happens in real life, the animal just thinks of it as (surprise!) a new situation.

A80: subtleties of human sensation (i.e. on how the different words sound to us), since dogs' ears are much better than ours, but rather on a subtlety deeper than sensation, either within the brain, or (what is more truly the case:) within the human spirit.

A114: necessitated?" [Ans: No God is not necessitated, and Yes, God can act in various ways: He can perform Act*ions* (a.k.a. "2nd Acts:). God—and sometimes even we ourselves—can activate the potency of creatures which are lower than us. So God is not necessitated and determined; He definitely has Free Will (He just doesn't have free will about what His own 1st Act shall be. Thus, as a Being, He Himself is necessary—necessary to be just the way He is—but the creatures around / beneath Him are not.]

A115: but not bodies) ascend and descend to bear their messages to men (Jn. 1:51).

It is unlikely that God would ever undo and replace one of these characteristics, first because it would suggest that God's creative action to begin with had been in vain, and second because in a certain sense the creature might not even be the same creature as it had been before: After all, how can you remember what it had been like to be sensate if you are no longer sensate at all (i.e. if you lack a brain and nerves)? Indeed, since sensate-ness is a genus of humanness, we can conclude that such a being would be a completely different kind (*genus* means "kind" in Latin) and, *a fortiori*, it couldn't possibly be the same individual, either.

A116: possible answer to this question, let us recall that the Holy Spirit's is often called the "Lifegiver." Just because you make a creature according to a certain formula, doesn't mean that the creature is alive. For a creature to live, it has to exist in a state of not-just act, but as-yet-undetermined potency. The process of living and *becoming* then enables that creature to determine what it shall do (in the case of animals) or what it shall become (in the case of humans).

Thus when God creates us, He creates us not just as determinate Act (as a stone), but with areas of indeterminate potency within us (as a living being). This potency within us is in our power to determine as

we so choose. How does this potency occur? It cannot come from God the Father, the creator, because He is separate from the creature (at the right extremity of diagram 1.48). It cannot come from God the Son, because He is the changeless and eternal Word, the form of all things, who is necessarily in pure Act (like the bottom X-axis in Diagram 1.48). The potency must then necessarily come from God the Holy Spirit. How does the Holy Spirit do this? The Holy Spirit is Love returning back to God the Father, and love unites. Thus the Holy Spirit is the agent of attraction that removes creatures from the downward thrust of the act of creation (and evolutionary development), and turns them around to seek back toward God: In Dionysius the Areopagite's theological terminology, it is no longer "*exitus*" (going out), but "*reditus*" (return). It is the introduction of this upward element into the creature's being as now being *for* a higher calling that enables it to circulate, and deliberately 'weigh' different possibilities in a state of relative Freedom.