On the Principles of Nature

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To Brother Sylvester

Chapter 1

Act and Potency

Note that some things can be, although they are not, and some things now are. Those which can be and are not are said to be in potency, but those which already exist are said to be in act. But existence is twofold: one is the essential or substantial existence of a thing (for example, man exists). And this is existence simply speaking. The other is accidental existence, (for example, man is white): and this is existence in a certain respect.

Moreover, for each existence there is something in potency. Something is in potency to be man, as sperm or the menstrual blood, and something is in potency to be white, as man. Both that which is in potency to substantial existence and that which is in potency to accidental existence can be called matter: for example sperm is the matter of man and man is the matter of whiteness. But these differ, because that which is in potency to substantial existence is called the matter from which, but that which is in potency to accidental existence is called the matter in which.

Again, properly speaking, that which is in potency to substantial existence is called ‘prime matter,’ but that which is in potency to accidental existence is called ‘the subject.’ Thus we say that accidents are in a subject; but we do not say that the substantial form is in a subject. In this way matter differs from subject because the subject is that which does not have existence by reason of something which comes to it; rather, it has complete existence of itself, just as man does not have existence through whiteness. But matter has existence by reason of what comes to it because, of itself, it has incomplete existence. Hence, simply speaking, the form gives existence to matter. The accident, however, does not give existence to the subject; rather, the subject gives existence to the accident, although sometimes the one is used for the other (namely, matter for subject, and conversely).

But, just as everything which is in potency can be called matter, so also everything from which something has existence (whether that existence be substantial or accidental) can be called form; for example, man, since he is white in potency, becomes actually white through whiteness, and sperm, since it is man in potency, becomes actually man through the soul. Also, because form causes existence in act, we say that the form is the act. However, that which causes substantial existence in act is called substantial form, and that which causes accidental

existence in act is called accidental form.

Because generation is a motion to form, there is a twofold generation corresponding to this twofold form. Generation simply speaking corresponds to the substantial form, and generation in a certain respect corresponds to the accidental form. When a substantial form is introduced, we say that something comes into being simply speaking: for example, we say that man comes into being or man is generated. But when an accidental form is introduced, we do not say that something comes into being simply speaking, but that it comes into being as this. For example, when man comes into being as white, we do not say simply that man comes into being or is generated, but that he comes into being or is generated as white. There is a twofold corruption opposed to this twofold generation: simply speaking, and in a certain respect. Generation and corruption simply speaking are only in the genus of substance, but generation and corruption in a certain respect are in all the other genera.

Also, because generation is a change from non-existence to existence, contrarily, corruption should be from existence to nonexistence. However, generation does not take place from just any non-being, but from the non-being which is being in potency. For example, a statue comes to be from bronze, which is a statue in potency and not in act.

In order that there be generation three things are required: being in potency, which is matter; non-existence in act, which is privation; and that through which something comes to be in act, which is form. For example, when a statue is made from bronze, the bronze which is in potency to the form of the statue is the matter; the shapeless or undisposed something is the privation; and the shape because of which it is called a statue is the form. But it is not a substantial form because the bronze, before it receives the shape, has existence in act, and its existence does not depend upon that shape. Rather, it is an accidental form, because all artificial forms are accidental. Art operates only on that which is already constituted in existence by nature.

Chapter 2

The Three Principles of Nature

Therefore, there are three principles of nature: matter, form, and privation. One of these, form, is that by reason of which generation takes place; the other two are found on the part of that from which there is generation. Hence matter and privation are the same in subject but they differ in definition, because bronze and what is shapeless are the same before the advent of the form; but for one reason it is called bronze and for another reason it is called shapeless. Wherefore, privation is not said to be a principle essentially, but rather a principle accidentally, because it is coincident with matter. For example we say that it is accidental that the doctor builds, because he does not do this insofar as he is a doctor but insofar as he is a builder, which

is coincident with being a doctor in the same subject.

But there are two kinds of accidents: the necessary, which is not separated from the thing (for example, risible in man); and the non-necessary, which can be separated (for example, white from man). Thus, although privation is an accidental principle, still it does not follow that it is not necessary for generation, because matter is never entirely without privation. For insofar as it is under one form it has the privation of another, and conversely, just as there is the privation of fire in air and the privation of air in fire.

Also, we should note that, although generation is from non-existence, we do not say that negation is the principle but that privation is the principle, because negation does not determine a subject. Non-seeing can be said even of non-beings: for example, we say that the chimaera does not see, and we say the same of beings which are not apt to have sight, such as stones. But privation is said only of a determined subject: namely, that in which the habit is apt to come to be; for example, blindness is said only of those things which are apt to see.

Also, because generation does not come to be from non-being simply speaking, but from the non-being which is in some subject, and not in just any subject, but in a determined subject—because fire does not come to be from just any non-fire, but from such non-fire as is apt to receive the form of fire—therefore, we say that privation is the principle, and not negation. Privation differs from the other principles because the others are principles both in existence and in becoming. In order for a statue to come to be, there must be bronze; further, there must be the shape of the statue.

Again, when the statue already exists, it is necessary that these two exist. But privation is a principle in becoming, and not in existing, because until the statue comes to be it must not be a statue. For, if it were, it would not come to be, because whatever comes to be is not, except in successive things: for example, in time and motion. But from the fact that the statue already exists, the privation of statue is not there, because affirmation and negation are not found together, and neither are privation and habit. Likewise, privation is an accidental principle, as was explained above, but the other two are essential principles.

Therefore, from what was said, it is plain that matter differs from form and privation by definition. Matter is that in which the form and privation are understood, just as in bronze the shape and the shapeless is understood. Still, matter sometimes designates privation and sometimes does not designate privation. For example, when bronze becomes the matter of the statue, it does not imply a privation, because when I speak of ‘bronze’ in this way I do not mean what is undisposed or shapeless. Flour, on the other hand, since it is the matter with respect to bread, implies in itself the privation of the form of bread, because when I say ‘flour’ the lack of disposition or the inordination opposed to the form of bread is signified. Also, because in generation the matter or the subject remains, but the privation does not (nor does the

composite of matter and privation); therefore, that matter which does not imply privation is permanent, but that which implies privation is transient.

We should notice, too, that some matter has a composition of form: bronze, for example. For, although it is the matter with respect to the statue, the bronze itself is composed of matter and form. Therefore, bronze is not called prime matter, even though it has matter. However, that matter which is understood without any form and privation, but rather is subject to form and privation, is called ‘prime matter’ by reason of the fact that there is no other matter before it. This is also called hyle. Also, because all knowledge and every definition comes by way of the form, prime matter cannot be defined or known in itself but only through the composite. Consequently, it might be said that that is prime matter which is related to all forms and privations as bronze is to the statue and the shapeless; and this is called first simply speaking. A thing can also be called prime matter with respect to some genus, as water with respect to aqueous solutions; this, however, is not first simply speaking because it is composed of matter and form. Hence it has a prior matter.

Note, also, that prime matter, and likewise form, is neither generated nor corrupted, because every generation goes from something to something. But that from which generation takes place is matter, and that in which generation terminates is form. Therefore, if matter and form were generated, there would be a matter of matter and a form of form, and so on forever. Hence, properly speaking, there is only generation of the composite.

Again, notice that prime matter is said to be numerically one in all things. But to be numerically one can be said in two ways, such as that which has a determined numerically one form, like Socrates. Prime matter is not said to be numerically one in this way, since it does not have in itself a form. Also, something is said to be numerically one because it is without the dispositions which would cause it to differ numerically. Prime matter is said to be numerically one in this way because it is understood without all the dispositions which would cause it to differ numerically.

Notice, likewise, that, although prime matter does not have in its definition any form or privation (for example, neither shaped nor shapeless is in the definition of bronze), nevertheless, matter is never completely without form and privation, because it is sometimes under one form and sometimes under another. Moreover, it can never exist by itself: for, since it does not have any form in its definition, it cannot exist in act, since existence in act is only from the form. Rather, it exists only in potency. Therefore, whatever exists in act cannot be called prime matter.

Chapter 3

The Four Causes

From this it is plain, therefore, that there are three principles of nature: matter, form and privation. But these are not sufficient for generation. What is in potency cannot reduce itself to act: for example, the bronze which is in potency to being a statue cannot cause itself to be a statue. Rather, it needs an agent so that the form of the statue can pass from potency to act. Neither can the form draw itself from potency to act. I mean the form of the thing generated which we say is the term of generation, because the form exists only in that which has been made to be. However, what is made is in the state of becoming as long as the thing is coming to be. Therefore, it is necessary that besides the matter and form there be some principle which acts. This is called the efficient, moving, or agent cause, or that from which the principle of motion is.

Also, because, as Aristotle says in the second book of the Metaphysics, everything which acts, acts only by intending something, there must be some fourth thing: namely, that which is intended by the agent; and this is called the end. Again, we should notice that, although every agent, both natural and voluntary, intends an end, still it does not follow that every agent knows the end or deliberates about the end. To know the end is necessary in those whose actions are not determined, but which may act for opposed ends (as, for example, voluntary agents). Therefore, it is necessary that these know the end by which they determine their actions. But in natural agents the actions are determined; hence, it is not necessary to choose those things which are for the end.

Avicenna gives the following example. A harpist does not have to deliberate about the notes in any particular chord, since these are already determined for him; otherwise, there would be a delay between the notes, which would cause discord. However, it seems more reasonable to attribute deliberation to a voluntary agent than to a natural agent: and thus it is clear, by reasoning from the greater thing to the lesser, that a natural agent can intend the end without deliberation. Therefore, it is possible for the natural agent to intend the end without deliberation; and to intend this is nothing else than to have a natural inclination to something.

From the above it is plain that there are four causes: material, efficient, formal and final. But, although principle and cause are used convertibly, as is said in the fifth book of the Metaphysics, still, in the Physics, Aristotle gives four causes and three principles, because he takes as causes both what is extrinsic and what is intrinsic. Matter and form are said to be intrinsic to the thing because they are parts constituting the thing; the efficient and final causes are said to be extrinsic because they are outside the thing. But he takes as principles only the intrinsic causes. Privation, however, is not listed among the causes because it is an accidental principle, as was said. When we say that there are four causes we mean the essential causes, to which all the accidental causes are reduced, because everything which is accidental is reduced to that which is essential.

And, although Aristotle calls intrinsic causes ‘principles’ in the first book of the Physics, still, principle is applied properly to extrinsic causes, as is said in the eleventh book of the Metaphysics. ‘Element’ is used for those causes which are parts of the thing (namely, for the intrinsic causes). ‘Cause’ is applied to both. Nevertheless, one is sometimes used for the other: every cause can be called a principle and every principle a cause. However, cause seems to add something to principle as commonly used, because that which is primary, whether the existence of a posterior follows from it or not, can be called a principle: for example, the smith is called the principle of the knife because the existence of the knife comes from his operation. But when something is moved from whiteness to blackness, whiteness is said to be the principle of that motion; and universally, everything from which motion begins is called a principle. However, whiteness is not that from which the existence of blackness follows. But cause is said primarily only of that from which the existence of the posterior follows. Hence we say that a cause is that from whose existence another follows. Therefore, that primarily from which motion begins cannot really be called a cause, even though it may be called a principle. Because of this, privation is placed among the principles and not among the causes, because privation is that from which generation begins. But it can also be called an accidental cause insofar as it is coincident with matter, as was said above.

Element, on the other hand, is applied properly only to the causes of which the thing is composed, which are properly the materials. Moreover, it is not said of just any material cause, but of that one of which a thing is primarily composed; for example, we do not say that the members of the body are the elements of man, because the members also are composed of other things. Rather, we say that earth and water are the elements, because these are not composed of other bodies, but natural bodies are primarily composed of them. Hence Aristotle says, in the fifth book of the Metaphysics, that an element is that of which a thing is primarily composed, which is in that thing, and which is not divided by a form.

The explanation of the first part of the definition, that of which a thing is primarily composed, is plain from the preceding. The second part, which is in that thing, differentiates it from that matter which is entirely corrupted by generation; for example, bread is the matter of blood, but blood is generated only by the corruption of bread. Thus bread does not remain in blood; and therefore bread cannot be called an element of blood. But the elements must remain in some way, since they are not entirely corrupted, as is said in the book On Generation. The third part, and which is not divided by a form, differentiates an element from those things which have parts diverse in form (that is, in species), as the hand whose parts are flesh and bone, which differ according to species. An element is not divided into parts diverse according to species: rather, it is like water whose every part is water. For an element to exist, it need not be undivided by quantity; rather, it is sufficient that it be undivided by form. Even if it is in no way divided, it is called an element, just as letters are the elements of words. This it is plain from what was said that ‘principle,’ in some way, applies to more than does ‘cause,’ and

‘cause’ to more than does ‘element.’ This is what the Commentator says in the fifth book of the Metaphysics.

Chapter 4

Coincidence of Causes

Now that we have seen that there are four genera of causes, we must understand that it is not impossible that the same thing have many causes. For example, the statue whose causes are both the bronze and the artist: the artist is the efficient cause while the bronze is the material cause. Nor is it impossible that the same thing be the cause of contraries; for example, the captain is the cause of the safety of the ship and of its sinking. He is the cause of the latter by his absence and of the former by his presence.

Also, notice that it is possible that the same thing be a cause and the thing caused with respect to the same thing, but in diverse ways. For example, walking is sometimes the cause of health, as the efficient cause, but health is the cause of the walking, as the end: walking is sometimes on account of health. Also, the body is the matter of the soul, but the soul is the form of the body. The efficient cause is called a cause with respect to the end, since the end is actual only by the operation of the agent. But the end is called the cause of the efficient cause, since the efficient cause does not operate except by the intention of the end. Hence the efficient cause is the cause of that which is the end—for example, walking in order to be healthy. However, the efficient cause does not cause the end to be the end. Therefore, it is not the cause of the causality of the end; that is, it does not cause the end to be the final cause. For example, the doctor causes health to actually exist, but he does not cause health to be the end.

Also, the end is not the cause of that which is the efficient cause, but it is the cause of the efficient cause being an efficient cause. For example, health does not cause the doctor to be a doctor—I am speaking of the health which comes about by the doctor’s activity—but it causes the doctor to be an efficient cause. Therefore, the end is the cause of the causality of the efficient cause, because it causes the efficient cause to be an efficient cause. Likewise, the end causes the matter to be the matter and the form to be the form, since matter receives the form only for the sake of the end and the form perfects the matter only through the end. Therefore, we say that the end is the cause of causes, because it is the cause of the causality in all causes.

Also, we say that matter is the cause of the form, insofar as the form exists only in matter. Likewise, the form is the cause of the matter, insofar as matter has existence in act only through the form, because matter and form are spoken of in relation to each other, as is said in the second book of the Physics. They are also spoken of in relation to the composite, as the part to the whole and as the simple to the composed.

But, because every cause, as cause, is naturally prior to that which it causes, notice that we say a thing is prior in two ways, as Aristotle says in the History of Animals XVI. Because of this diversity, we can call something prior and posterior with respect to the same thing, both the cause and the thing caused. We say that one thing is prior to another from the point of view of generation and time, and likewise from the point of view of substance and completeness. Since the operation of nature proceeds from the imperfect to the perfect and from the incomplete to the complete, the imperfect is prior to the perfect (namely, from the point of view of generation and time), but the perfect prior to the imperfect from the point of view of substance. For example, we can say that the man is before the boy according to substance and completeness, but the boy is before the man according to generation and time.

But, although in generable things the imperfect is prior to the perfect and potency to act, when we consider that in one and the same thing the imperfect is prior to the perfect and potency to act, still, simply speaking, the act and the perfect must be prior, because it is what is in act that reduces potency to act and it is the perfect that perfects the imperfect. Matter is prior to form from the point of view of generation and time because that to which something comes is prior to that which comes to it. But form is prior to matter from the point of view of substance and completeness, because matter has completed existence only through the form. Likewise, the efficient cause is prior to the end from the point of view of generation and time, since the motion to the end comes from the efficient cause. But the end is prior to the efficient cause, insofar as it is the efficient cause from the point of view of substance and completeness, since the action of the efficient cause is completed only through the end. Therefore, these two causes, the material and the efficient, are prior by way of generation, but the form and the end are prior by way of perfection.

It must be noted that there are two kinds of necessity: absolute and conditional. Absolute necessity is that which proceeds from the causes prior by way of generation: the material and the efficient causes. An example of this is the necessity of death which comes from the matter: namely, the disposition of the composing contraries. This is called ‘absolute’ because it does not have an impediment. It is also called the necessity of matter. Conditional necessity, on the other hand, proceeds from causes posterior in generation: namely, the form and the end. For example, we say that conception is necessary if a man is to be generated. This is called ‘conditional’ because it is not necessary simply that this woman conceive, but only conditionally, namely, if a man is to be generated. This is called the necessity of the end.

Notice, also, that three causes can coincide in one thing—namely, the form, the end and the efficient cause—as is plain in the generation of fire. Fire generates fire; therefore, fire is the efficient cause insofar as it generates. Fire is also the formal cause insofar as it causes to exist actually that which before was in potency. Again, it is the end insofar as the operations of the agent are terminated in it and insofar as it is intended by the agent.

But the end is twofold: the end of generation and the end of the thing generated, as is plain in the generation of a knife. The form of the knife is the end of generation; but cutting, which is the operation of the knife, is the end of the thing generated, namely, of the knife. Moreover, the end of generation sometimes is coincident with the two aforementioned causes: namely, when generation takes place from what is similar in species, as when man generates man and the olive, an olive. But this cannot be understood of the end of the thing generated.

Notice that the end coincides with the form in something which is numerically the same, because that which is the form of the thing generated and that which is the end of generation are the same numerically. But it does not coincide with the efficient cause in a thing numerically the same, but in a thing specifically the same, because it is impossible that the maker and the thing made be numerically the same, but they can be specifically the same. Thus, when man generates man, the man generating and the one generated are numerically diverse, but they are specifically the same.

However, matter does not coincide with the others. This is because matter, by the fact that it is being in potency, has the nature of something imperfect; but the other causes, since they are in act, have the nature of something perfect. However, the perfect and the imperfect do not coincide in the same thing.

Chapter 5

Causes and Predication

Therefore, now that we have seen that there are four causes—the efficient, formal, material and final—we must note that any of these causes can be spoken of in many ways. We call one thing a prior cause and another a posterior cause. For example, we say that art and the doctor are the cause of health, but art is a prior cause and the doctor is a posterior cause. And it is similar in the formal cause and in the other causes. Notice, also that we must always bring the question back to the first cause. For example, if it be asked: Why is this man healthy? we would answer: Because the doctor has healed him. Likewise, if it be asked: Why did the doctor heal him? we would say: Because of the art of healing which the doctor has.

Notice, also, that the proximate cause is the same as the posterior cause and that the remote cause is the same as the prior cause. Hence these two divisions of causes into prior and posterior, remote and proximate signify the same thing. Moreover, it must be observed that that which is more universal is always called the remote cause, but that which is more particular is called the proximate cause. For example, we say that the proximate form of man is his definition, namely, rational animal; but animal is more remote and substance is still more remote. All superiors are forms of the inferiors. Again, the proximate matter of the statue is bronze, but the remote matter is metal, and the still more remote is body.

Further, there is one cause which is an essential cause, another which is accidental. An essential cause is said of one which is the cause of something as such: for example, the builder is the cause of the house and the wood is the matter of the bench. An accidental cause is said of one which happens to an essential cause. For example, we say that ‘the grammarian builds’; the grammarian is called the cause of the building accidentally, not insofar as he is a grammarian, but insofar as it happens to the builder that he is a grammarian; and it is similar in other causes.

Likewise, some causes are simple, others are composed. A cause is simple when that alone is said to be the cause which is the essential cause, or that alone which is the accidental cause; as if we were to say that the builder is the cause of the house and likewise if we were to say that the doctor is the cause of the house. A cause is composed when both are said to be the cause, as if we were to say that the medical builder is the cause of the house. According to the explanation of Avicenna, that can be called a simple cause also which is a cause without the addition of another. For example, bronze is the cause of the statue without the addition of another matter, because the statue is made of bronze; and we say that the doctor causes health or that fire heats. But a cause is composed when many things must come together in order that there be a cause. For example, not one man, but many, are the cause of the motion of a ship; and not one stone, but many, are the cause of a house.

Again, some causes are in act, others are in potency. A cause in act is one which causes a thing in act, as the builder while he is building or the bronze when a statue is made of it. A cause in potency is one which, although it does not cause a thing in act, can cause it nevertheless, such as a builder when he is not building. Note that in speaking of causes in act, the cause and the thing caused must exist at the same time, so that if one exists the other does also. If there is a builder in act, he must be building and, if there is building in act, it is necessary that there be a builder in act. But this is not necessary in causes which are only in potency.

Moreover, it should be noted that the universal cause is compared to the universal thing that is caused and the singular cause is compared to the singular thing that is caused. For example, we say that a builder is the cause of a house and that this builder is the cause of this house.

Chapter 6

Analogy

Also, notice that, when we speak of intrinsic principles (namely, matter and form), according to the agreement and difference of things that are from principles and according to the agreement and difference of principles, we find that some are numerically the same, as are Socrates and this man in the Socrates now pointed out. Others are numerically diverse and specifically the

same, as Socrates and Plato who, although they differ numerically, have the same human species. Others differ specifically but are generically the same, as man and ass have the same genus of animal. Others are generically diverse and are only analogically the same, as substance and quantity which have no common genus and are only analogically the same, because they are the same only insofar as they are beings. Being, however, is not a genus because it is not predicated univocally, but only analogically.

In order to understand this last we must notice something is predicated of many things in three ways: univocally, equivocally, and analogically. Something is predicated univocally according to the same name and the same nature (that is, definition), as ‘animal’ is predicated of man and of ass because each is called animal and each is a sensible, animated substance, which is the definition of animal. That is predicated equivocally which is predicated of some things according to the same name but according to a different nature, as ‘dog’ is said of the thing that barks and of the star in the heavens, which two agree in the name but not in the definition or in signification, because that which is signified by the name is the definition, as is said in the fourth book of the Metaphysics. That is said to be predicated analogically which is predicated of many whose natures are diverse but which are attributed to one same thing, as ‘health’ is said of the animal body, or of urine and of food. But it does not signify entirely the same thing in all three. It is said of urine as a sign of health, of body as of a subject and of food as of a cause. But all these natures are attributed to one end: namely, to health.

Sometimes those things which agree according to analogy—that is, in proportion, comparison, or agreement—are attributed to one end, as was plain in the preceding example of health. Sometimes they are attributed to one agent, as ‘medical’ is said of one who acts with art, of one who acts without art (like a midwife), and even of the instruments; but it is said of all by attribution to one agent, which is medicine. Sometimes it is said by attribution to one subject, as ‘being’ is said of substance, quantity, quality, and the other predicaments, because it is not entirely for the same reason that substance is being, and quantity and the others. Rather, all are called being insofar as they are attributed to substance, which is the subject of the others. Hence ‘being’ is said primarily of substance and secondarily of the others. Therefore, being is not a genus of substance and quantity because no genus is predicated of its species according to prior and posterior. Rather, being is predicated analogically. This is what we mean when we say that substance and quantity differ generically but are the same analogically.

Therefore, the form and matter of those things which are numerically the same are themselves likewise numerically the same, as are the form and matter of Tullius and Cicero. The matter and form of those things which are specifically the same and numerically diverse are not the same numerically, but specifically, as the matter and form of Socrates and Plato. Likewise, the matter and form of those things which are generically the same, as the soul and body of an ass and a horse differ specifically but are the same generically. Likewise, the

principles of those things which agree only analogically or proportionally are the same only analogically or proportionally, because matter, form and privation or potency and act are the principles of substance and of the other genera. However, the matter, form and privation of substance and of quantity differ generically, but they agree according to proportion only, insofar as the matter of substance is to substance, in the nature of matter, as the matter of quantity is to quantity. Still, just as substance is the cause of the others, so the principles of substance are the principles of all the others.