

Can Creatures Cause Forms? Aquinas on Cosmology and Evolution

LUCAS PRIETO

*Instituto Santo Tomás de Balmesiana
Barcelona, Spain*

Thus formulated, the question may seem odd. It is enough to look at nature to see that many of the relations that are established between substances are causal relations that results in the production of a form. So, for example, the fire from a match in contact with a piece of paper produces fire, in such a way that the agent causes a new form because it communicates its own actuality. In this sense, at the natural level, we can even say that all production involves the causation of a form. The question becomes meaningful, however, when we distinguish between being the cause of this form inasmuch as it actualizes a matter and being the cause of the form as such—that is, between causing a particular order in a matter and being the cause of the reason for this order.¹ Continuing with the example: the fire of the match is specifically the same as the fire found in the paper, so that the former cannot be the cause *per se* of the fire of the latter—that is, the fire of the match is not that which gives reason for the formality of the fire—because in that case it would be the cause of its own formality. The argument leads us to postulate another agent that is the cause of fire as such.

So, we can now ask: can creatures be ultimately responsible (at the created level) for this particular ontological configuration? That is, can creatures cause a natural form as such? Aquinas answers yes, and his answer is of particular importance in explaining the causal order among creatures

¹ Aquinas formulates this distinction in several places: *Summa theologiae* [ST] I, q. 104, a. 2; *In I sent.*, d. 42, q. 1, a. 1, ad 3; *De veritate*, q. 5, a. 8, ad 8.

and the possibility of true specific novelty in the universe. In this article I will advance how Aquinas justifies ontological novelty by resorting to intra-mundane causes and then show how this causal model allows us to understand the transformism of species (evolution) in a Thomistic framework. To do so, we will formulate our argument in three steps: (1) first we will analyze the notion of form that Aquinas handles in order to understand also how it can be caused in an individual, (2) then we will study the various *ways* in which the causation of a form can occur, and (3) finally, we will apply these conclusions to the problem of evolution.

Form and Individual

For Aquinas, form is a fundamental ontological principle of the corporeal entity because it structures matter according to a determined order of perfection. By the form we can distinguish between different entities because a formal perfection supposes a certain term or limit of the act that implies the deprivation of the perfection of another form. A dog indicates a certain degree of perfection, but by the fact of being a dog it lacks the perfection of being a cat. Now, in the physical world, we find an innumerable diversity of entities that differ from each other not only in their form or essence, but also as individuals, which shows that, ultimately, the fundamental distinction is not between being a cat and being a dog, but between being *this* cat and being *this* dog, or more clearly, between *this* dog and *that* dog. Aquinas holds that this diversity and inequality, both specific and numerical, is something positively willed and caused by God as first agent.² But does this mean that the diverse structuring of matter is produced by a special divine action? That is, is the formal difference the effect of a creative act of God?

In the *Summa theologiae*, Thomas directly addresses this problem by asking whether creation is mixed in the works of nature and of the arts, which is equivalent, in the last analysis, to the question of the origin of novelty in the physical world.³ Indeed, when an entity is generated, a substance appears that is not absolutely contained in the preceding causes. The agent certainly communicates his actuality by resembling the effect to himself, but in the effect, there is always something else that escapes the essential principles. Therefore, how can this novelty of the effect be founded? Before answering this question, two errors should be ruled out. On the one hand, there is the error proper to materialistic monism (atomism), attributed to Democritus

² ST I, q. 47, a. 2, resp.

³ ST I, q. 45, a. 8, resp.

and Anaxagoras, which, through ignorance of matter—that is, of the power that underlies the entity as a disposition to form—ends up affirming that specific and numerical diversity is nothing more than an epiphenomenon of matter and can be reduced to it. According to this position, the forms are already contained in the elementary parts, so that the production of an entity does not really imply the constitution of an irreducible novelty, but a simple reconfiguration of a previous substance. Nowadays it is also possible to find defenders of atomism or reductive essentialism, but as Crawford Elder has noted, this is done at the price of denying common experience: “In the absence of familiar objects there will be nothing to constitute these groups as groups, nothing to set their membership conditions, nothing to make the difference between an individual microparticle’s lying within such a group and its lying without it.”⁴

On the other hand, there is the error attributed to Avicenna according to which diversity in no way proceeds from the second causes, but that these are limited only to arrange a matter so that a superior agent (*dator formarum*) would then create the new form. In this case the error lies in the ignorance of the form, for he forgets “that the natural form of the body is not something subsistent, but that by which something is.”⁵ In this second position, there is novelty, but at the price of a special divine action that justifies it. This position also has its defenders today. Thus, for example, Revol postulates a continuous creation where each ontological novelty is a beginning and supposes an increase of information that is not reducible to the previous state, which ultimately implies a causality in time that is creative in the strong sense, that is to say, the reference to a divine action of a creative type is required.⁶

Both errors, basically, have the same origin: not understanding that the causality of the agent is completed in the material subsistent by the *eductio* of the form from the potentiality of matter. To put it briefly, what changes is not the form of the entity, but an entity of form. Although this explanation is rooted in Aristotle’s natural philosophy, it is with Aquinas’s doctrine of

⁴ Crawford Elder, *Real Natures and Familiar Objects* (Cambridge, MA: MIT Press, 2004), 110. See also David S. Oderberg, *Real Essentialism* (New York: Routledge, 2007), 92–105. For the virtual presence of the elements in substance, see Joseph Bobik, *Aquinas on Matter and Form and the Elements* (Notre Dame, IN: University of Notre Dame Press, 1998), 129–239; Christopher Decaen, “Elemental Virtual Presence in St. Thomas,” *The Thomist* 64 (2000): 271–300; Edward Feser, *Aristotle’s Revenge: The Metaphysical Foundations of Physical and Biological Science* (Neunkirchen: Editiones Scholasticae, 2019), 310–40.

⁵ *ST I*, q. 45, a. 8.

⁶ See Fabien Revol, *Le temps de la création* (Paris: Cerf, 2015), 29–59; Revol, “Théologie de la création continuée,” *Revue des sciences religieuses* 91, no. 2 (2017): 251–67.

participation that it is consistently grounded. Indeed, the irreducible novelty of the individual does not derive from its formal principle, nor even from its singularization by the matter signified, but by its *esse* which constitutes it as something *one*. This does not mean that the *actus essendi* is the principle of individuation of the corporeal entity (something that could not be accepted within Thomism), but that it is by this participated act that we can overcome an essentialist vision of movement by thinking of its term as something substantial that becomes an individual by the introduction of the created cause in divine causality: a cause or a set of causes can deduce a form from matter because the term of its action is not the form, but being (*ens*), even if its proportionate effect is the formal actuality.⁷

Causal Models

Now, the modes of *eductio* are more complex than might be supposed at first glance, for within the Thomistic system we can find three distinct situations referring to the causation of the subsistent, where each situation is defined by the relation established between the effect and the cause, that is, between the proportion of what is produced and its proximate cause. *First*, we have the case where the educed form of the compound is proportioned to the proximate agent [$C \approx E$, where C is cause and E, effect]. Thus, for example, an orange tree gives oranges. This is probably the most common causal model for thinking about the link between an agent and what is produced (so this model could be referred to as univocal or proportionate causation). This proportion between cause and effect does not mean, however, that this proximate cause is the exclusive cause. Although we cannot develop it, the Thomistic view of causality should be thought of in systemic terms: certainly, it is *this particular* cause that communicates its actuality, but it always does so within a set of causal factors that also condition the production of the effect. The orange tree, for example, causes an orange tree with the concurrence of multiple causal factors that make possible the realization of the effect. Thus, the climate or soil conditions also influence the process of generation. In this sense, Thomas Aquinas repeatedly affirms that the sun and man beget a man.⁸

⁷ See Gianfranco Basti, *Filosofía del hombre* (Toledo: Instituto Teológico San Ildefonso, 2011), 149–88; Edward Feser, *Scholastic Metaphysics: A Contemporary Introduction* (Neunkirchen: Editiones Scholasticae, 2014), 177–210. See also Lucas Prieto, “Causalidad creadora y participación instrumental,” in *Naturaleza y creación en Tomás de Aquino*, ed. Enrique Martínez (Valencia: Tirant Humanidades, 2021), 75–91.

⁸ See Aquinas, *ST I*, q. 4, a. 2, corp.; *De iudiciis astrorum* (Leonine ed., 43:201); *Summa*

Secondly, the educed form of the composite or mixed body is proportionate to the higher corporeal agent but exceeds the actuality of the proximate agent [Cu > E, where Cu is the universal cause].⁹ This would be the case for some phenomena that have their origin in celestial bodies. The medieval cosmological image is obviously erroneous, but it is worth not overlooking the ideas it contains. This type of causality occupies an important place in the Thomistic theory because it serves (in part) to justify the principle of proportionate causality. Indeed, according to this principle “whatever perfection is found in the effect is necessary to be in the efficient cause, either according to the same reason (if it is univocal agent, as a man begets man), or in a more eminent way (if it is equivocal agent, as in the sun is the likeness of what is generated by its virtue).”¹⁰ A clear example of this causality can be found in the obsolete cosmology of Aquinas. In it, the recourse to the causality of the celestial bodies explains in part how the production of effects that do not respond adequately to their proximate causes is possible. Thus, for example, the attraction of the magnet on iron or the tides by the action of the moon. That is why Thomas says that an effect of the sub-lunar world is precontained in its equivocal cause in a virtual or eminent way. There is obviously not a formal precontinenence, since the effect does not depend on this cause according to the same *ratio*, but an equivocal precontinenence, because this cause influences the effect in a certain and radical way, but without being properly the cause of the individual, who keeps for the same reason a resemblance with its proximate agent.

Moreover, in this cosmological framework, the heavenly bodies can be causes of the *species* because they are the ultimate reason for this formal configuration. Aquinas, as we saw at the beginning, distinguishes on several occasions between the cause of the individual and the cause of the species. Cause of the individual is the proximate cause that communicates the form it possesses to another; but this agent is not the cause of the species as such, because if it were, it would be the cause of itself. This would be the case of a fire that communicates its form to paper; that is, it burns it. What a specific agent does is to apply its form to a matter, and this application is the production of a similar effect (univocal causality). But what has caused that mode of being? That is, what agent is responsible for that mode of configuration? Aquinas thinks that the causality of the heavenly bodies can

contra gentiles [SCG] III, ch. 99; IV, ch. 7; ST I, q. 45, a. 8 ad 3; I-II, q. 85, a. 6, resp.; *De potentia*, q. 6, a. 1, ad 1; *In liber de causis*, prop. 9; *De spiritualibus creaturis*, a. 3, ad 20.

⁹ See Christopher A. Decaen, “An Inductive Study of the Notion of Equivocal Causality in St. Thomas,” *The Thomist* 79 (2015): 213–63.

¹⁰ ST I, q. 4, a. 2, resp.

explain this order of matter; specifically, he seems to maintain, for example, that the stability and permanence of things in the sub-lunar world was due to the causality of Saturn.¹¹

Although it may seem strange to us, it is an idea that makes sense: obviously we would have to substitute another type of entity for *heavenly body* to make it understandable in the contemporary physical scheme, but what seems to be deduced is that the current configuration of a given matter does not depend on the agent that has educed it out of matter, but on a whole set of causes that allow this configuration to remain in time. One could postulate, along these lines, that the stability and permanence of a substance depends on gravity, atmospheric pressure, or other natural forces that maintain this matter as organized. To understand this, it is useful to remember that we say that an agent educes a substantial form of a matter when it is capable of inducing a determined and stable order to the elements (i.e., finalizing a matter). But the proximate cause is not the principle of such an ordering, but produces it by communicating an actuality which it possesses, but which it has also received. Whether there is such a mode of ordering of matter depends on a cause more universal than the particular agent or on a conjunction of causal factors that do not have as their determined effect such an individual (without forgetting that causation is always of an individual). That is why Aquinas, when he distinguishes between the cause of the species and the cause of the individual, maintains that the cause of the species is also its conservative cause. From this it also follows that the particular agents are like instruments of the causality of the heavenly bodies. This does not mean that the causality of the individual is eliminated, but that it is as it were subsumed in a higher order.

This causality presupposes two things: on the one hand, the possibility of an irreducible novelty whose formal actuality is superior to the preceding cause because it is an actuality that does not exceed the order of nature;¹² that is, the principle of proportionate causality can be integrated into a broader causal framework where the actuality of the agent does not depend exclusively on the proximate agent, but on the causal whole that is ordered to the production of an effect. On the other hand, it presupposes, at least within Aquinas's explicit system, the existence of causes that are universal and heterogeneous (the heavenly bodies) with respect to the sub-lunar causes. Although this idea, thus formulated, cannot be sustained in the

¹¹ *ST* I, q. 104, a. 2, resp.

¹² See Mariusz Tabaczek, *Divine Action and Emergence: An Alternative to Panentheism* (Notre Dame, IN: University of Notre Dame Press, 2021), 74–78.

present physical framework, nothing prevents it from retaining its value as a principle according to which there are fundamental causes capable of explaining at a deeper level a behavior of a higher order. According to this second causal model, one could explain the various inorganic configurations of the universe, because a conjunction of causes can produce an effect that exceeds the actuality of the proximate agent.

But we can go a step further and consider, *thirdly*, a last case. Although linked to the previous one, it differs in one important point: the educed form of the compound exceeds even the actuality of the universal *corporeal* agent [$Cu < E$]. Thomas Aquinas explicitly considers this possibility when dealing with the generation of a living being in a non-seminal way.¹³ How can a heavenly body cause a living entity? “Since the heavenly body is a mover moved, it is of the nature of an instrument, which acts in virtue of the agent: and therefore since this agent is a living substance the heavenly body can impart life in virtue of that agent.”¹⁴ Although Thomas considers that all sub-lunar causality operates instrumentally with respect to the heavenly bodies (at least in a certain sense), the second case differs from the third, because in the previously mentioned equivocal causality ($Cu > E$), there is a proportion between the effect and the corporeal universal cause, while in the latter case ($Cu < E$) the irreducible novelty presupposes recourse to a non-physical (immaterial) causality. That is, the effect is justified only by a causal ordering that transcends the material world. This does not mean, however, that the effect is produced directly by such a trans-mundane cause, but that the corporeal cause is integrated into an order of an immaterial kind. It should be noted, moreover, that such a superior cause is not necessarily a divine cause, for it is sufficient that it be a cause capable of introducing a principle of order to justify the emergence of an effect that goes beyond the mere arrangement of parts. In this sense, nothing would prevent, at least as a hypothesis, man from technically ordering a set of causal factors that have as their effect an organic compound.¹⁵

To complete this picture, three things should be noted. First, these causal models according to which the form can be educed of matter correspond roughly to the ontological levels that make up the universe according to medieval cosmology: sub-lunar world, celestial spheres, and motor spirits. It is obvious that in this cosmological system the intermediate level of

¹³ According to the belief of the time, spontaneous generation was produced by the virtue of the superior agent, that is, by the action of the heavenly bodies.

¹⁴ *ST I* q. 70, a. 3, ad 3.

¹⁵ Aquinas explicitly accepts the possibility of an artificial production of a substantial form; see *ST III*, q. 75, a. 6, ad 1.

the celestial bodies depends on a naive astronomical argumentation, but we cannot disregard the ideas that are linked to it, especially the idea of a more universal causality that gives reason for processes. Secondly, in all this causal order there is also room for chance. Aquinas's universe is in no way governed by necessity, even though he thought it was subject to a greater regularity than might be held today. Within his cosmological vision there were *necessarily* contingent events because of the very constitution of the physical world (weakness of the agent, causal interference, and indisposition of the subject).¹⁶ Thirdly, not every form can be explained by created causes, because the appearance of man always presupposes an ontological discontinuity. Indeed, although the soul is really the form of a body, he possesses being independently of matter, so that it can come into being only by a creative act in the strict sense: the way in which the human soul receives being always presupposes a special divine causal intervention.¹⁷

Cosmology and Evolution

This understanding of causality as referring to the subsistent according to these diverse causal models has two relevant applications for thinking about the causal ordering of the world today. On the one hand, the diverse conjunction of causes makes it possible to justify degrees of dependence within the same created order. In this sense, one can read the Neoplatonic principle: "Every first cause has a greater influence on what is caused than the universal second cause."¹⁸ In the cosmological system of Thomas Aquinas, the set of causes constituted a closed and hierarchical system in such a way that *one* could *traverse*, from a physical perspective, the whole causal chain, establishing the relations that a link could keep with its superior and inferior

¹⁶ See SCG III, ch. 99; ST I, q. 14, a. 13, ad 1; Ignatius Silva, *Providence and Science in a World of Contingency: Thomas Aquinas' Metaphysics of Divine Action* (New York: Routledge, 2022), 72–76; Michael Dodds, *Unlocking Divine Action: Contemporary Science and Thomas Aquinas* (Washington, DC: Catholic University of America, 2012), 33–41; Oscar Beltran, "The Doctrine of Contingency in Nature According to the Commentaries of Card. Cajetan and S. Ferrara," *Studium* 11 (2003): 41–75.

¹⁷ See ST I, q. 90, a. 2; SCG II, ch. 87; *De potentia*, q. 3, a. 9. The *Catechism of the Catholic Church* has also clearly reminded us that "the Church teaches that every spiritual soul is created immediately by God—it is not 'produced' by the parents—and also that it is immortal: it does not perish when it separates from the body at death, and it will be reunited with the body at the final Resurrection" (§366).

¹⁸ *Liber de Causis*, ch. 1, prop. 1, in P. Magnard, O. Boulnois, B. Pinchard, and J.-L. Solère, *La Demeure de l'être: Autour d'un anonyme, étude et traduction du Liber de Causis* (Paris: Vrin, 1990), 38 (trans. mine).

cause. In this sense, the causality of the first heaven reached the totality of that which was found in the lower spheres, and the sub-lunar world (the last degree), in some way, bore the imprint of the causality of all the higher spheres, according to the diverse universality of each one.

Although this image does not correspond to the current scientific representation of the universe, a fundamental idea underlies it. It is true that there is no such thing as a first heaven or a higher sphere, but we can see in the causal relations of the physical universe the existence of levels of influence that also give rise to degrees of dependence. At least as a hypothesis, it is enough to *open* the old cosmological representation to maintain the principle of influence; that is, it is enough to eliminate the image of a closed hierarchy and replace it with an ordered set of substances that have different causal relationships among themselves. In other words, to eliminate the distinction between sub-lunar and supra-lunar worlds and to submit every physical body to the regime of the mixed. In this sense, one could not affirm the existence of a universal physical cause, but one could accept the existence in a particular order of *one or more* causes that exercise a universal causality with respect to certain effects. Thus, it can be affirmed that the sun, for example, exerts a fundamental influence on the generative processes occurring on earth (think, for example, of the gravitational, luminous, caloric influence), without this universality being extensible to the whole universe.

On the other hand, this causal approach allows us to face the problem of species transformism in an adequate metaphysical framework because, ultimately, the specific novelty in a generative process is nothing more than a particular case within the causation of an individual. Although Aquinas affirms the possibility of an intra-mundane cause producing a new species from a given matter,¹⁹ his cosmological system is clearly fixist because he believed that universal causes were subject to a regularity (something, moreover, quite understandable, since his parameters of observation were limited to a *human scale*) that left no room for a process or history of forms in the sub-lunar world.

Now, if we accept a diverse causal influence of substances that does not strictly depend on a hierarchical gradation, it is also possible to accept a multiple causal confluence (even random) that gives rise to a new configuration of matter.²⁰ Since the production of an effect *is not* the exclusive competence of a single finite cause, it may happen that a different

¹⁹ See *ST I*, q. 73, a. 1, ad 3; q. 91, a. 2, ad 2; *In II sent.*, d. 18, q. 2, a. 3, ad 5; *De potentia*, q. 3, a. 11, ad 12.

²⁰ See *De potentia*, q. 5, a. 9, ad 14; *In VII metaphys.*, lec. 6, no. 1403.

arrangement of the set of causes produces an effect formally different from its proximate cause. This perspective also makes it possible to respond to the classical objection according to which a greater perfection cannot come from a lesser one (which is nothing but an application of the principle of proportionate causality).²¹ This causal conjunction shows that an effect can possess a greater perfection than its proximate agent insofar as this proximate agent acts as the instrument of a superior cause or of a set of causes that surpasses the particular actuality. In this sense, nothing prevents a superior species from proceeding from an inferior one, because causes of another order intervene in the causation of this new form. Therefore, although we cannot develop it extensively, this framework allows us to approach the problem of emergence or novelty without affirming a primacy of potency over act: it is true that there can be a temporal precedence of potency, but ontologically speaking, act always has priority over potency according to notion, time, and substance.²²

Moreover, this conception of the causality of form avoids thinking of novelty in the universe in creative terms. There is no need to resort to a special divine action to explain the appearance of a substance or the emergence of complex physical systems, because both cases constitute a novelty that is reducible to intra-mundane causes. In this sense, the Thomistic approach allows us to overcome what could be called the “Platonic myth,” according to which the intervention of a transcendent causality is necessary to explain the becoming of the world. In principle, an ordered set of causes or a universal superior cause is sufficient to explain any possible organization of matter, and in this sense the production of an intra-mundane effect can be explained by intra-mundane causes.

²¹ See Brian T. Carl, “Thomas Aquinas on the Proportionate Causes of Living Species,” *Scientia et Fides* 8, no. 2 (2020): 223–48; Feser, *Scholastic Metaphysics*, 105–46.

²² Aristotle, *Metaphysics* 9.8.1049b10–12. See also Emmanuel Perrier, *L'attrait divin: La doctrine de l'opération et le gouvernement des créatures chez saint Thomas d'Aquin* (Paris: Parole et Silence, 2019), 76–90; Jonathan B. Beere, *Doing and Being: An Interpretation of Aristotle's Metaphysics Theta* (Oxford: Oxford University Press, 2009), ch. 13.