

By the Same Author

AN INTRODUCTION TO
THE SCIENCE OF METAPHYSICS

*An Introduction
to the
Philosophy of Animate Nature*

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The Origin of Life

The Problem

*** 178. The question to be considered here is not how living bodies originate now. With respect to the present everyone admits biogenesis as a law, i.e., not a single instance is known of a living body which did not come into existence through a process of generation from another living body. The experiments of Pasteur and others have conclusively shown that in all instances where life seemed to originate from inanimate matter, microscopically small organisms gave rise to the new living bodies.

Our problem is concerned with the *possibility* of living bodies originating from inanimate matter. To a certain extent this problem refers to the future, but its main interest lies still in the past. It refers to the future insofar as the question can be raised whether or not laboratory experiments will ever succeed in producing a living organism, no matter how primitive, from inanimate matter. It refers to the past insofar as all available evidence points to the fact that once life on earth was physically impossible, so that at some time in the distant past living bodies must have made their first appearance on earth. Because

observation of this first appearance is evidently impossible, the question how this life originated may be studied philosophically by an investigation of the various possibilities and the elimination of any position that is not in accordance with reason. In this way it will perhaps be possible to arrive at the conclusion that only one position is in agreement with the demands of reason, or that one position offers a greater degree of probability than others.

Possible Positions Concerning the Origin of Life.

Omitting pantheistic and occasionalistic hypotheses with respect to the origin of life, the following may be formulated:

- 1) Living bodies did not originate in time, but have always existed.
- 2) The first living bodies came to the earth from other planets.
- 3) The first living bodies were created directly by God. By direct creation is meant that God produced from nothing both body and soul of the first living bodies.
- 4) The first living bodies were produced by God's positive intervention in the existing order of nature. Suspending the laws of nature, He directly produced in inanimate matter the conditions which made matter proximately disposed for actuation by a soul. This soul was educed from the potency of matter, except in the case of man, whose soul was created directly by God.
- 5) Living bodies can be produced from inanimate matter by the sole forces of matter, without any influence of extraneous causes. In this hypothesis, physical and chemical reactions are considered to be the adequate explanation for the origin of life.
- 6) Living bodies can originate from inanimate mat-

ter under the influence of the Primary Cause (God), acting through causes that are intrinsic to matter.

7) Living bodies can originate from inanimate matter under the influence of a secondary cause, extraneous to matter, acting upon inanimate matter.

Examination of the Various Positions with Respect to the Origin of Life

179. The first two of these positions need not be considered to any great extent. Even if living bodies had always existed they would need a cause to explain their existence, for their essence is not their "to be," and therefore they do not have in themselves a sufficient reason for their existence. Moreover, the earth has not always been suitable for life, because at one time in the past it was so hot that no living bodies could have existed upon it. To explain the origin of living bodies by claiming that they came from other planets, as is done by the second position, merely shifts the problem to another planet. Moreover, in passing from another planet to the earth, any form of physical life would have been exposed to certain death because of ultraviolet rays and the heat resulting from its passage through the atmosphere.

Direct Creation. There cannot be any doubt concerning the possibility that living bodies were directly created by God, for anything which is not a contradiction in terms can be done by God. The point, however, is that it would be unreasonable to suppose that God created new bodies when plenty of matter was available for the formation of these bodies. It does not seem in accordance with wisdom to make new material where an abundance of suitable material is available. But inanimate matter contains

all the necessary material for the physical organization required by a living body.

Divine Intervention as the Sole Organizing Cause of Matter. Again, there cannot be any doubt that God has the power directly to organize matter in such a way that it is immediately disposed for actuation by a soul. However, it would seem unreasonable to attribute directly to God what can be brought about through the activity of the natural forces of inanimate matter acting in accordance with the laws of nature. If the Author of nature has endowed matter with forces that can naturally lead to the emergence of living bodies, it would seem unreasonable to suppose that He positively intervened in the process of natural development by suspending the activity of these forces and directly organizing inanimate matter. We say *if*, for it remains to be seen whether or not living bodies can have originated from inanimate matter acting in accordance with the laws of nature. Should the answer to this question be negative, then it would seem to be more consonant with divine wisdom to give rise to living bodies by organizing existing matter than by the creation of new matter.

Emergence of Life from Matter Alone. Can the physical forces of inanimate matter alone serve as an *adequate* explanation for the emergence of life? At first sight it would seem that the forces of inanimate matter can never give rise to a living body, because any material cause acts in accordance with its nature and therefore its effect cannot be greater than itself. But a living body is essentially more perfect than a nonliving body; hence it would seem that no forces of inanimate matter can give rise to a living body.

However, this answer fails to take into consideration the possibility of many material causes combining to produce an effect. Admittedly, if it is possible to introduce into a body the material dispositions making it proximately disposed for actuation by a soul, the cause or causes introducing these dispositions are the cause of a living body. The question, therefore, is whether or not it would be impossible for a combination of material forces to cause these dispositions in nonliving matter. The enormous complexity of the necessary dispositions excludes the possibility that a single line of material causality would ever produce these dispositions. But it is a well-known fact that physical causality, as it occurs in nature, is a very complex process in which many different lines of causality constantly interfere with one another. Now the interference of different lines of causality may result in an effect which is proportioned to none of the interfering causes taken separately. Conceivably such an effect could be even more perfect than any of the producing causes, precisely because the combination of these causes could happen to be equal to the material causality normally exercised by one cause of a higher nature. If the material forces operating in a living body, which the soul combines into a single unit, are able to cause the necessary dispositions for life and thus produce a new living body, why would it be impossible for these forces to be united "by chance" into an operational unit and thus give rise to a living body? If such a thing did happen a living body would have been produced from inanimate matter. Thus it would not be impossible for a combination of inanimate forces to give rise to a living body.

Granted that such a combination is a possibility, does

it provide an adequate explanation for the origin of life? An adequate explanation is one which takes into consideration all the causes that are at work in the production of an effect. No one admits that in the present state of science it is possible to indicate even all the physical forces that are necessary for the production of the dispositions of matter required for actuation by a soul. But supposing that a time will come when man will know all the material causes whose combination results in the production of a living body, will he have an adequate explanation for the origin of living bodies? The answer is in the negative, because he has failed to indicate the cause which led to the combination of these causes by unifying their activity. But could not this unification be brought about by chance, as was suggested above? We must answer that an appeal to chance is not an explanation, but a confession of ignorance of the adequate explanation. Chance refers to the unpredictability of an effect produced by causes whose combined action cannot be foreseen, because the cause of their combination is not known.¹ To deny that their combination has a cause is tantamount to a denial of the principle of causality. Therefore, an appeal to chance is an admission that the known physical forces of inanimate matter cannot explain the origin of life.

But, perhaps, at a future date science will discover the cause or causes which combine the forces of inanimate matter and make them produce in a nonliving body the necessary dispositions for actuation by a soul. Then, at least, science will have given an adequate explanation for the emergence of life by the sole forces of inanimate

¹ Concerning chance, cf. the author's *Introduction to the Science of Metaphysics*, chap. 14.

matter. Again, however, our answer has to be in the negative. Granted that perhaps a material agent causing the unification of these forces will be discovered, there still remains the *principle of finality*, i.e., the metaphysical law that every agent acts for a definite purpose.² An agent can act for a purpose either because it is made to act for this purpose by an intelligent being, or because the agent himself is an intelligent being and directs his activity to a definite end. If the cause of the unification is purely material, it cannot be an intelligent agent; therefore it acts towards a purpose merely because it is made to act in this way by an intelligent being. This intelligent being, *qua* intelligent, is extraneous to matter, for any intellect is immaterial. If, on the other hand, the agent is immaterial, it is of course extraneous to matter. Our final conclusion, therefore, is that the physical forces of inanimate matter *alone* cannot give an adequate explanation for the origin of living bodies.

180. *Emergence of Life from Matter Under the Directing Influence of God.* This position combines certain aspects of the two preceding hypotheses and discards others. It agrees with the theory of divine intervention insofar as it demands God's influence upon matter in the production of living bodies; it differs from it in that it does not require a suspension of the deterministic laws of nature (a miraculous intervention), but merely that God act through causes which are *intrinsic* to matter. It agrees with the theory that life originates from matter alone insofar as it admits that the physical forces of inanimate matter can produce life, but differs from it because it requires that these causes be directed by the Primary Cause.

² Cf. *Ibid.*

Does this new position offer a satisfactory explanation for the origin of living bodies?

There is no reason to suppose that God cannot exercise influence upon the forces of inanimate matter without suspending the deterministic laws of nature. All that is necessary is that God make use of the intrinsic forces of matter, which act in accordance with these laws, by directing their activity to the purpose He intends, viz., the production of the necessary conditions for the actuation of matter by a soul. The question, however, is whether God can give such a direction to the forces of matter without producing in existing matter a tendency previously nonexistent in it, for such a production would be a positive intervention in the existing order of nature. To this question, we answer that the existence of such a tendency in matter allows a double explanation—either God created it in matter which previously did not have it, or He concreated it in matter when matter itself was created. In the first case there would have been a positive intervention, and the whole explanation would be identical with the position that the divine Cause organizes matter by suspending the existing laws of nature. In the second alternative, however, this tendency would belong to the very essence of the material world, as planned and created by God. Therefore, the directing influence of this tendency would not be an intervention in the established order of nature, but merely the execution of the order of nature established by divine providence. In this theory inanimate matter from its very beginning would have possessed all the forces necessary for the emergence of life, because God Himself planned the whole course of nature in such a way that life followed of necessity when the planned combination of inanimate forces occurred.

If this position were true the human observer of nature would be faced with effects emerging "by chance" from a concurrence of causes, because he does not see that this concurrence takes place according to plan. Consequently, upon his level of explanation, he would be justified in speaking about life as emerging from a chance meeting of inanimate causes. He would be mistaken, however, if from his observations he would conclude that his explanation gives an adequate account for the origin of life.

It would seem that this theory does not violate any physical or metaphysical principles. Although it does not postulate a special intervention of God in the origin of life, it does not deny that life would originate only as a result of God's planning and providence. It certainly would be a more splendid manifestation of God's power if life were produced in this way rather than by a miraculous intervention in the established order of nature.

181. *Emergence of Life from Matter Under the Directing Influence of a Secondary Cause.* If the preceding theory offers an explanation for the emergence of life, there seems to be no reason why it should be impossible for an intelligent secondary cause to direct the forces of matter in the production of the material conditions required for actuation by a soul. Of course, such a cause would need to have a far greater knowledge of matter than is possessed by man at this time. It would not seem impossible, however, that ultimately man will succeed in acquiring this knowledge and be able to utilize it to obtain the desired effect. In that case man would be able to produce living bodies artificially. Nevertheless, it would not be a case of life being produced by the sole forces of matter, because these forces would be under the

direction of man, who is an intelligent being. Moreover, even in this case God's action would not be excluded, because man's activity does not escape the directing influence of God.³

A similar theory for the emergence of life from inanimate matter was offered by ancient and medieval philosophers, including St. Thomas, as an explanation of the supposedly spontaneous generation of maggots in decaying flesh. They thought that in this case the forces of inanimate matter, as acted upon by the sun or other celestial bodies under the direction of spiritual substances, made matter proximately disposed for actuation by a soul.

182. *Conclusion.* Of the seven positions formulated above with respect to the first origin of life only the third, fourth, sixth, and seventh offer reasonable possibilities. However, the third (direct creation of the whole living body) is less probable, although it cannot be called impossible. The seventh (directing influence of a secondary cause) does not apply to the first origin of living bodies, if man is supposed to be this cause. Hence the choice seems to be mainly between the fourth position (God as the sole organizing cause of matter) and the sixth (emergence of life under the influence of God acting through causes that are intrinsic to matter). Of course, it is impossible to say what actually did happen, unless there is a reliable report of a witness. But if there is such a report, its contents escape from the domain of philosophy and physical science.⁴

³ We assume here that God's providence has been established in theodicy.

⁴ God Himself "witnessed" the origin of the first living bodies and may have told us about it through revelation. Whether or not He has done so does not concern us in philosophy, but belongs to theology.

Historical Notes

183. The eternal existence of living bodies was defended by *Arrhenius* (1859-1927), *Preyer* (1831-1897), and a few others. *Keyserling* (born 1880), *Lord Kelvin* (1827-1907), and *Helmholtz* (1821-1894) held that the first germs of life on earth had come from outer space. Most authors who defend the eternal existence of living bodies combine the second position with the first.

The origin of "imperfect animals" from inanimate matter under the influence of celestial bodies, as directed by spiritual substances, was commonly admitted before the experiments of *Pasteur* (1822-1895). *Avicenna* admitted the possibility of such an origin even with respect to "perfect animals."

Direct creation of the first living bodies with respect to both body and soul was favored by *Remer*, while others (*Credt*) were more inclined to admit divine intervention as the sole organizing cause of matter.

The possibility of life emerging from causes intrinsic to matter under God's directive influence is regarded with favor by many contemporary Thomists, such as *Sertillanges*, *Messenger*, *Brennan*, and *Klubertanz*.

The emergence of life from matter alone is the view taken by many materialistic evolutionists, such as *Haeckel* and *Huxley*.

SUMMARY

184. Regarding the origin of living bodies which were not generated from other living bodies, several theories are possible. Direct creation, however, of such bodies with respect to both body and soul does not seem consonant with divine wisdom, for it means the creation of

new matter when plenty of suitable matter is available. The organization of matter for actuation by a soul can be attributed to the sole forces of matter, to God alone, or to both. But matter alone cannot provide an adequate explanation of this organization. Rather, a complex combination of causes is required, and this combination implies either a totally extraneous cause, or at least an extraneous cause acting through forces that are intrinsic to matter. If God alone is indicated as the cause of the organization of matter, the origin of life is claimed to be the result of a direct intervention of God in the existing order of nature. If, on the other hand, the organization of matter is attributed to God as acting through forces which are intrinsic to matter, the origin of life came about as a result of God's planning and providence in the creation of inanimate matter.

It would not seem impossible that a living body can originate from inanimate matter if man's intelligence acts as the cause which unifies the forces of matter.

SUGGESTED READINGS

See at the end of Chapter 23.

ones. By "special intervention" is meant that the production of new species took place in such a way that it cannot be explained in accordance with the existing laws of nature.

Transformism can be applied not only to the origin of different species of living bodies, but even to *the first origin of life* itself. As applied to the first origin of life it is called "spontaneous generation" or "abiogenesis," and has been studied in the preceding chapter.

186. *Confusion Concerning the Term "Species."* Much confusion has been caused by the careless use of the term "species." Both biology and philosophy use the term, but its meaning in these two sciences is not the same. Moreover, even in philosophy itself, the term does not always have the same implications. In the strict sense of the term, a *philosophical species* is a class of individuals belonging to the same metaphysical level of being. These levels are at least four in number, viz., inanimate, vegetative, sensitive, and rational. Therefore, at least man, animal, plant, and inanimate matter may be considered to be philosophical species.

In philosophy the term "species" may be used also in a wider sense to indicate any class of bodies which are essentially different, without being metaphysically more or less perfect. For instance, many philosophers consider hydrogen, oxygen, and water to be essentially different; yet no one will claim that, say, water is metaphysically more or less perfect than oxygen. Even if one would make this claim, he would not be able to substantiate it with a proof. Perhaps he would appeal to chemical or physical science, but such an appeal is useless because these sciences are not interested in metaphysical levels of being

and grades of essential perfection. In a similar way as inanimate matter may be subdivided into "species" which are supposed to be essentially different without being on metaphysically different levels, living organisms may be subdivided into species differing essentially without being metaphysically more or less perfect. For instance, one may claim that a rose and a geranium, a cat and a dog are essentially different, without attributing to these differences any consequences for their level of being. We shall give the name "*philosophical subspecies*" to those classes of beings which differ essentially without being metaphysically on a different level.¹

In biological sciences there is question of so-called

¹ The question could be asked: Why not call such differences purely accidental? We may answer, in the first place, that as a matter of fact many philosophers assert that cats, dogs, water, hydrogen, etc., are essentially different, and we are merely indicating here the usage of the term "species." Secondly, the difference between a cat and a dog or between an elephant and a mosquito certainly is much more important than that between two varieties of butterflies. Such a difference deserves to be called "essential" if we keep in mind that the term "essential" does not always have the same value. Accustomed as we are in philosophy to see essential differences illustrated by the example of man and irrational animal, we are inclined to forget that this term is analogous, and consequently that an essential difference does not always have to be a difference as important as that between man and animal. According as we descend lower on the scale of beings, their essence is ontologically less perfect and less important, so that on the subhuman level there may be essential differences which do not amount to very much if we take our standards from the difference between man and animal. Personally, I would be quite willing to admit an essential difference even between the various states of aggregation of the same chemical substance, and in the animate world between any different biological species, precisely because on such a level the difference between essential and accidental diversity is no longer important.

systematic species. A systematic species is one of the many classifications of organisms used in these sciences (kingdom, phylum, class, order, family, genus, species, and variety). It means a collection of individuals which have distinct common characteristics and are indefinitely fertile among themselves. Some of these biological classifications may coincide with philosophical divisions; e.g., the vegetative kingdom coincides with the philosophical species of plant. Other biological classifications are, philosophically speaking, purely accidental; e.g., the thousands of varieties of cockroaches.

Possibility of Transformism

187. *Philosophical Subspecies and Lesser Differences*. When there is not even an essential difference between two classes of living bodies, transformation of one kind into another offers no philosophical difficulty, for it means merely an accidental change.

Even when there is question of philosophical subspecies transformation will be possible. The reason is that such a transformation remains on the same level of being; hence it is just another example of substantial change, against which there can be no philosophical objection. Accordingly, there would seem to be no philosophical objection against any theory which holds that even widely different kinds of animals (or plants) have originated from primitive organisms through the forces of matter inherent to these organisms and other material agents.

*The question may be asked whether inanimate, vegetative, sensitive, and rational are the only philosophical species in the strict sense of the term. Although it is not easy to give an apodictic answer to this question, we may attempt to arrive at a conclusion by taking our guid-

ance from the principle that action follows being. If a class of animals² is capable of activities that are irreducible to another type of activity, and which render them more perfect as sentient organisms, they may be considered to be on a higher level of being than other animals which are not capable of this activity. Because the level of animal being is characterized by sensitivity, an additional mode of sensing may be taken to indicate a more perfect mode of being an animal, and thus give rise to a distinct philosophical species in the strict sense. If this rule is accepted, e.g., an animal which is naturally capable of sight is metaphysically on a more perfect level than another animal which naturally lacks this capacity.

Philosophical Species. Is it possible for a lower philosophical species to give rise to a higher species? In the preceding chapter we have considered this question with respect to the origin of living bodies from inanimate matter. The conclusion reached was that it is not impossible that living bodies should have originated from inanimate matter through the action of the internal forces of matter as directed by God. If life itself may have originated in this way, there seems to be no reason why the various species of living bodies cannot have taken their origin in a similar way from one or a few primitive species of organisms.

Even in the case of *man* there appears no reason why the evolution of his body from primitive organisms (and even from inanimate matter) must be considered to be philosophically impossible. Of course, as we have seen in Chapter 20, man's soul can have obtained its existence

² The question does not arise with respect to plants, at least if all plants have the powers of nutrition, growth, and reproduction.

only through a direct act of creation; therefore, it is impossible for the human soul to have evolved from matter. In a certain sense, even the human body must be said to be the result of an act of creation. For the human body is made specifically human by the human soul, and this soul is created; hence as a *human* body, man's body results from creation. But the question is whether the matter of his body had to be made suitable for actuation by a rational soul through God's special intervention, or if the same result could have been achieved by the forces of nature acting as directed by God. As we have seen in the preceding chapter, there seems to be no reason why the second alternative would have to be an impossibility. Of course, this does not allow us to conclude that the human body actually did evolve from matter or lower forms of life, for in the presence of several possible philosophical positions philosophy cannot give an apodictic answer.

Historical Notes

188. Historically speaking transformism is not a modern theory. It was first mentioned in the fifth century B.C. In a famous passage, worthy of a nineteenth century evolutionist, *Aristotle* cites an ancient philosopher: "Why should not nature work, not for the sake of something . . . but of necessity? . . . Why then should it not be, e.g., that our teeth come up of necessity—the front teeth sharp, fitted for tearing, the molars broad and useful for grinding down the food—since they did not arise for this end, but it was merely a coincident result; and so with all other parts in which we suppose that there is a purpose? Wherever, then, all the parts came about just as they would have been if they had come to be for an end,

such things survived, being organized spontaneously in a fitting way; whereas those which grew otherwise perished and continue to perish."³ It sounds like a brief summary of materialistic evolution through survival of the fittest! *St. Augustine* and his theory of "seminal causes," as well as *St. Gregory of Nyssa's* "spermatoc potencies," are often quoted in favor of evolution. *Cajetan* also expressed evolutionary views. However, the clear and systematic formulation of evolutionistic theories began only in the nineteenth century with *Lamarck* (1744-1829) and *Darwin*. The latter especially amassed such an imposing array of data that evolutionism became extremely popular not only among specialists but also among others.

In the nineteenth century evolution was often proposed in an atheistic way as the final triumph of materialism. God was no longer needed, and man had been reduced to a bit of slime. Small wonder that Christian writers did not look with favor upon it. Nowadays the psychological climate has somewhat changed. Many defenders of evolutionism are far more moderate in their claims and do not exclude God; theologians and apologists, on the other hand, have realized that the acceptance of an evolutionary theory does not necessarily imply the rejection of God or the lowering of man's dignity. As we have seen above, rather than being atheistic in nature evolution may mean a far greater manifestation of God's power than God's special intervention; rather than lowering man's dignity, evolution may mean that the whole world has reached its apex of perfection in man.

³ *Physica*, bk. II, chap. 8 (198b 16 ff.). Quoted from the Ross edition of *The Works of Aristotle*, with kind permission of the publishers, Oxford University Press.

SUMMARY

189. Transformism in general may be described as the view that the various species of living bodies have or can have originated through a progressive development from one or a few primitive types of organisms. If transformism is proposed merely as a scientific theory which classifies the available data for the purpose of research, philosophy cannot have any objection, because scientific theories as such do not concern it. If transformism is proposed unreservedly as what actually did happen, the tacit assumption is that no other explanation is possible. However, the investigation of this assumption belongs to philosophy, as well as the possibility of transformism.

A philosophical species in the strict sense is a class of individuals belonging to the same level of being, or having the same grade of metaphysical perfection. These species are at least, inanimate, vegetative, sensitive, and rational. Philosophical subspecies are classes of beings which are essentially different without belonging to metaphysically higher or lower levels of beings; e.g., various chemical substances; animals as different as a mouse and an elephant. Biological or systematic species are classes of individuals which have distinct common characteristics, and are indefinitely fertile among themselves.

Transformation with respect to any biological classification that is below the philosophical subspecies is merely an accidental change, against the possibility of which no one can object. Transformation of one philosophical subspecies into another is merely an instance of substantial change on the same level of being; therefore, there is no reason to call it impossible. Transformation of a lower philosophical species into a higher one raises the

same questions as the origin of life from inanimate matter, and therefore may be answered in the same way—namely, it does not seem impossible that the various species have developed from one or a few primitive types of organisms through the internal forces of nature as directed by God.

Regarding man, it is impossible that his soul evolved from any lower form of life, for the human soul can come into existence only through creation. His body results from creation, at least in the sense that it is made specifically human by his created soul. But the matter of his body may have been made suitable for actuation by a human soul through the forces of nature as directed by God. Whether this actually did happen or not is not for philosophy to decide.

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 Raymond W. Murray, *Man's Unknown Ancestors* (Milwaukee: 1948).

THE ORIGIN OF SPECIES

Edward E. Dodson, *A Textbook of Evolution* (Philadelphia: 1952).

Although it cannot be said that St. Thomas taught transformism, the following passages throw some light upon the question whether transformism, in the sense in which it has been defended above, can be reconciled with Thomistic principles.

Summa theol., Ia, q. 71, a. 1, ad 1 and 4; q. 73, a. 1, ad 3; q. 74, a. 2, ad 4; q. 91, a. 1, ad 1; q. 118, a. 2, ad 3; IIIa, q. 75, a. 6, ad 1.

Contra gentes, bk. II, chap. 89.

De potentia, q. 4, a. 2, ad 22, 23, 33, 34; ad 5 in contr.

De veritate, q. 5, a. 3 (perfectibile).

In XII Metaphysic., lect. 2, no. 2438.

SOME TRANSLATIONS OF ARISTOTLE AND THOMAS AQUINAS

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