

THE PHILOSOPHICAL AND BIOLOGICAL IMPLICATIONS OF EVOLUTION

ONE of the main difficulties in discussing evolution is to present the problem in its proper light. There are two principal causes of misunderstanding in this matter: first, the indiscriminate use of the term *evolution*; and second, the complexity of the problem in its relationship to philosophy, theology and science.

The term *evolution* implies an idea of becoming, development, change and even transformation; it is used by Thomists and materialists alike, and even official Church documents, such as the encyclical *Humani Generis*, refer to evolution.¹ In fact it is found in so many different and apparently contradictory statements that the word has become a source of great confusion. *Evolution* in its modern context is not in the works of St. Thomas, so in speaking of a *Thomistic concept of evolution*, or of a *Thomistic doctrine of evolution*, the obvious meaning at this point should be that what we commonly mean by *evolution*, in modern language, can be related to the teachings of Thomistic philosophy in one way or another. Moreover, *evolution* has dangerous connotations; we know that some forms of evolution are alien to sound philosophy and to the accepted teachings of the Church, viz. polygenism.² For the purposes of our discussion let us assume that *Thomistic evolution* simply means the teaching of St. Thomas on the formation of the cosmos. Later on, we shall determine more accurately the relations between Thomistic philosophy and evolution.

The second cause of misunderstanding is the complexity resulting from the fact that the problem of evolution contains so many different issues. Everyone knows that evolution is a very timely topic; it is discussed in college classrooms, in scientific journals as well as in popular magazines; and even the youngsters in high school have heard about the missing-link, the Cro-Magnon man, Charles Darwin and natural selection. Practically everyone, at least in the teaching profession, is called upon at one time or another, to state his views on the matter, but the problem is usually

¹ *Acta Apostolicae Sedis*, 1950, p. 575.

² *Acta Apostolicae Sedis*, 1950, p. 576.

brought up in such a way that a precise answer is out of the question.

The first point in our problem bears upon the possibility of evolution as a natural process of formation of the cosmos; the second tries to determine whether evolution is a scientific fact. Obviously, these are two different aspects and if the answer to the first is negative, then the second question is meaningless. Furthermore, we must determine who shall be in a position to demonstrate either the possibility or the fact of evolution. Will it be the philosopher, or the scientist, or the theologian? If the scientist maintains that evolution is a fact, while the philosopher pretends that it is impossible, then one is certainly at fault; on the contrary, if the philosopher holds that evolution is possible and the scientist claims that it is a certainty, then both may be right; or again, a similar opposition may occur between the philosopher and the theologian, or the theologian and the scientist. In order to avoid all misunderstanding, the philosopher's function must be clearly distinguished from that of the scientist and of the theologian.

1—*The Philosopher's Function.*

The philosopher's function is to explain all material beings, to discover the principles, causes and properties of mobile being which is the subject matter of natural philosophy.³ His starting point is not the precise information gathered through technical research, but rather the more universal concepts of motion, principles of motion, causality, time, matter, finality, etc.⁴ On the basis of these fundamental notions he may try to account for individual phenomena and concrete beings, yet the philosopher must realize that the means at his disposal are inadequate since the contingency implied in all natural beings is an impediment to philosophical demonstration.⁵ If the cosmos were mathematically ordered, experimental sciences would be useless, since all reality in nature could be known a priori through deductions based on the general principles of philosophy.⁶ As a result, the

³ St. Thomas, *Com. in Phys.* lib. 1, lect. 1, no. 1-4.

⁴ St. Thomas, *Com. in Phys.* lib. 1, lect. 1, no. 4.

⁵ St. Thomas, *Contra Gentes*, lib. 3, c. 40.

⁶ St. Thomas, *Com. in Anal. Post.* lib. 1, lect. 42, no. 3.

philosopher must realize the limitations brought about by the material principle which is an intrinsic principle of all mobile being.⁷ This is why natural philosophy, whose proper mode of demonstration is hypothetical necessity,⁸ cannot demonstrate contingent events nor contingent beings in nature.⁹ The philosopher needs the help of experimental science in order to complete his knowledge of the cosmos.¹⁰

In relation to our problem we must say that the philosopher will be helpless if he attempts to demonstrate the contingent events which have taken place in the course of centuries,¹¹ and moreover, he will be incapable of drawing necessary conclusions if he uses the contingent beings in the universe as a basis for his demonstration.¹² The philosopher's viewpoint is necessarily incomplete and he must limit himself to problems of possibility and necessity, while the factual issues which imply an element of contingency, will be settled by the scientist or the theologian, as the case may be.¹³

2—The Scientist's Function.

The scientist is not concerned with problems of necessity or possibility implied in the mode of formation of the cosmos; this belongs to the philosopher. If a scientist holds that the universe has not been created his conclusion may be a consequence of his atheistic principles; it is not a conclusion of the scientist *qua* scientist. Similarly, if a scientist accepts the doctrine of *creatio ex nihilo sui et subiecti* his position is the result of sound philosophical antecedents, not of scientific research.

Since the process of diversification and determination of living beings cannot be observed at the moment, having taken place in past ages, the scientist tries to reconstruct an unbroken series of

⁷ St. Thomas, *Com. in Anal. Post.* lib. 1, lect. 42, no. 3.

⁸ St. Thomas, *Com. in Phys.* lib. 2, lect. 15.

⁹ St. Thomas, *Com. in Anal. Post.* lib. 1, lect. 42, no. 3.

¹⁰ St. Thomas, *Com. in De Sensu et Sensato*, lect. 1, no. 2.

¹¹ St. Thomas, *Com. in Anal. Post.* lib. 1, lect. 42, no. 2.

¹² St. Thomas, *Com. in Anal. Post.* lib. 1, lect. 42, no. 2.

¹³ In the natural order it will be solved by the scientist; in the supernatural order, by the theologian.

plant and animal life to see how all this came about. He tries to show that one type of living beings has appeared after another, and that the second is but a modification of the preceding one. This is done through the discovery and analysis of fossils pertaining to the different geological periods, as well as by comparative studies of the living beings actually existing. Such researches belong to palaeontology, geographical distribution, comparative anatomy, embryology, anthropology and other related sciences. The scientific method is that of research, and its conclusions are mainly the results of the inductive process, so in stating his conclusions, the scientist must avoid all undue generalizations and all unwarranted certainty, even if his discoveries are authentic and fully substantiated.¹⁴ The scope of scientific investigation is restricted to the contingent elements of the cosmos, and consequently, the function of the scientist is to bring about new data which will complete the work of the philosopher. Each has his own method; the scientist proceeds through induction, while the philosopher draws his conclusions by deduction from the general principles of mobile being. Consequently, in relation to the problem of evolution the scientist will be interested primarily in factual problems, in so far as they cannot be settled by the philosopher, not in problems of necessity and possibility which pertain to the philosopher.

3—*The Theologian's Function.*¹⁵

Through an act of infinite wisdom and kindness towards men, God chose to reveal some of the truths pertaining to the origin of the universe.¹⁶ This revelation, contained in the first chapters of Genesis, has been the subject of many different interpretations in the course of centuries. Naturally, the exegete, whose proper function is to interpret Scripture and to discover the precise meaning of the Sacred Text, must abide by the decisions of the Church and follow the methods of exegesis accepted by the Church. In relation to evolution the exegete is not primarily interested in the philosophical aspects of the problem although

¹⁴ St. Thomas, *Com. in Anal. Post.* lib. 2, lect. 4, no. 4.

¹⁵ The term *theologian* is taken in its broad meaning, including the exegete.

¹⁶ Denzinger, *Enchiridion Symbolorum*, no. 1785.

he is in a position to judge whether the conclusions of the scientist and the philosopher are acceptable for a Catholic. In this respect, St. Thomas remarks that in discussing questions of Scripture two rules must be observed, according to the teaching of St. Augustine: the first is to hold the teachings of Scripture without fault; the second is that one should adhere to the truth of Scripture, and yet be ready to admit some other explanation, since Scripture can be interpreted in many senses,¹⁷ unless the Church should intervene in the matter. Accordingly St. Thomas, who was well aware of the different interpretations of Genesis, was very prudent in his own conclusions. He did not see in the first chapters of Genesis a scientific statement of fact; the creation of animals and plants according to their own species actually or potentially is dismissed as irrelevant;¹⁸ he admits that the substance of the sun existed before the fourth day;¹⁹ he accepts two interpretations of the word *firmament*.²⁰ The same trend is also noticeable in his exegesis of the phrase *slime of the earth* as applied to the creation of man.²¹

With the help of these distinctions one can see that the problem of evolution really comprises six different issues; the problem of necessity and possibility as judged either by the philosopher, or the scientist or the theologian; and the problem of fact, subdivided in the same way. A complete solution would naturally require that an answer be given to all these points. The second part of this paper is a philosophical approach in relation to possibility and necessity.

In order to understand the Thomistic solution to the problem of evolution we must keep in mind that for St. Thomas every natural being acts for its proper end.²² His conception of the universe is essentially dynamic and teleological; in other words, the material universe taken as a whole, and in all its individual parts, is in a state of becoming, not in a haphazard way, but according to a preconceived plan. Naturally, St. Thomas did not

¹⁷ St. Thomas, *Sum. Theol.* 1 pars, qu. 68, art. 1 c.

¹⁸ St. Thomas, *Sum. Theol.* 1 pars, qu. 70, art. 2 c.

¹⁹ St. Thomas, *Sum. Theol.* 1 pars, qu. 67, art. 4 ad 2 um.

²⁰ St. Thomas, *Sum. Theol.* 1 pars, qu. 68, art. 1 c.

²¹ St. Thomas, *Sum. Theol.* 1 pars, qu. 91, art. 1 c. and also ad 4 um.

²² St. Thomas, *Sum. Theol.* 1a 2ae, qu. 1, art. 2 c.

have at his disposal all the means necessary for scientific investigation, yet he understood that a full development is never an initial stage in existence, but rather the result of a long process of formation.²³ His theory of development is constant throughout his works; it is applied to the formation of habits,²⁴ to the order of learning,²⁵ to the development of the more perfect forms of society²⁶ and even to the moment of creation of the human soul. On this last point, St. Thomas would find no basis whatsoever for the modern theory which claims that the human soul is created at the moment of conception, or shortly thereafter, since such an assumption rejects the necessity of material dispositions of the foetus as conditions for the substantial form.

When Aquinas turns his attention to the formation of the cosmos, one must not be surprised to find an application of the same principles. In the *Summa*, he quotes St. Augustine from his commentary *De Genesi ad Litteram* and accepts his teachings, not as definite solutions, but simply as reasonable explanations concerning the formation of the universe.²⁷ St. Thomas could not subscribe to the Augustinian theory of evolution as a necessary and definite conclusion, since, in the *Summa*, he was writing as a theologian and consequently had to admit the possibility of different interpretations; nevertheless, one can see that he was in no way opposed to an evolutionistic concept of the cosmos.

Thomistic teaching in matters of evolution is based upon three fundamental principles of natural philosophy: the nature of prime matter, the role of finality in nature, and the function of efficient causality. The following paragraphs are a brief explanation of each.

a—*The notion of prime matter.* Prime matter is one of the intrinsic principles of all mobile substances. It is pure passive potency, and yet it is a form of nature as defined in the second book of *Physics*.²⁸ Strange as it may seem, some philosophers

²³ St. Thomas, *Com. in Phys.* lib. 2, lect. 11, no. 2.

²⁴ St. Thomas, *Sum. Theol.* 1a 2ae, qu. 51, art. 2 c.

²⁵ St. Thomas, *Com. in Ethic.* lib. 6, lect. 7, no. 1211 (ed. Pirotta).

²⁶ St. Thomas, *Com. in Politicorum libros*, Prologus, (Ed. Laval).

²⁷ St. Thomas, *Sum. Theol.* 1 pars, qu. 68, art. 1, c.

²⁸ Aristotle, *Physics* 192/b/22.

do not appear to understand that prime matter has a tendency towards form; they see prime matter as an intrinsic principle, but somehow fail to realize its dynamic implications.²⁹ Although they grant the existence of an appetite related to matter, the explanations tend to become metaphorical. St. Thomas remarks that *appetite*, as attributed to prime matter, is not a metaphor, but a reality.³⁰ He insists that the constant tendency of prime matter to other forms accounts for the passing-away and coming-to-be of all natural beings.³¹ The tendency of prime matter to other forms explains the state of tension in all material reality; furthermore, the union of matter with an individual form is but a passing victory, never a final conquest.³² Moreover, the appetite of matter proceeds according to an order of perfection, in such a way that matter is primarily ordered to the imperfect forms of the cosmos, and ultimately to the human soul.³³ As a result, since they are essential component parts of human nature, some imperfect forms of being precede the coming of man, unless a special divine intervention produced them at the very last moment. In this last instance the production of the inferior forms of life would be a miraculous event, and consequently beyond the scope of philosophical demonstration.

b—*The role of finality in nature.* Some of the pre-Socratic philosophers had developed a system whereby the last explanation of all physical reality was attributed to the intrinsic principles of mobile being, without any reference to extrinsic causes. Aristotle could not admit this materialistic view; he realized that constancy in nature and its inborn tendency towards *id quod est ultimum et optimum* cannot be sufficiently accounted for by prime matter.³⁴ Aristotle's idea of finality in nature is the key

²⁹ Concerning this statement it must be said that the authors in question do not make any false statements, but simply omit the key problem of true hylemorphism, namely a true understanding of matter in its relationship to form. Such is the case of Gredt, Maquart, Glenn, Remer among the textbook authors.

³⁰ St. Thomas, *Com. in Phys.* lib. 1, lect. 15, no. 10.

³¹ St. Thomas, *Com. in Phys.* lib. 1, lect. 15, no. 10.

³² Otis, Jean Louis, *Doctrine de l'Evolution*, t. 2 p. 148.

³³ St. Thomas, *Contra Gentes*, lib. 3 c. 22.

³⁴ St. Thomas, *Com. in Phys.* lib. 2, lect. 4, no. 8.

to his entire system of natural philosophy. In the second book of *Physics*, Aristotle presents four arguments taken from the comparison of nature with art and with chance, and also from the activities of brute animals.³⁵ The first argument is directed against the explanation proposed by Empedocles, namely that all natural phenomena are produced by chance. His reasoning obviously presupposes that there are only two alternatives in nature, and in order to have all its cogency this proof must be understood in relation with the mechanistic conception of Empedocles.³⁶ The second one is taken from a consideration of human art, since where there is an end to be achieved the preparatory steps are performed with a view to the end; now, when a thing is produced in nature, the early stages lead up to a final development in the same way as in the operations of art. Consequently, we can infer that since human art acts for a purpose in disposing the means in relation to an end, so also nature is directed by finality.³⁷ By means of this second argument Aristotle paves the way for his third demonstration based upon the principle that art imitates nature. The premise of this third demonstration is that all forms of art either cooperate with nature in bringing it to a higher degree of perfection, or imitate nature producing an opus. Now art imitates nature because all the knowledge required in art has been acquired from nature, since the object of the human intellect is nature; moreover art proceeds according to a purpose, therefore we must conclude that nature acts for an end.³⁸ The last argument is taken from the activities of animals whose operations are not the result of art nor of deliberations. On this basis Aristotle shows that plants and animals produce what is best suited for their own species and consequently act for a purpose because purpose is always a good.³⁹

In some passages of his works Aristotle even compares nature to an able administrator who distributes riches according to the necessities of a plan;⁴⁰ he even personifies nature,⁴¹ calls it di-

³⁵ Aristotle, *Physics*, 199/a/1.

³⁶ Aristotle, *Physics*, 199/a/5.

³⁷ Aristotle, *Physics*, 199/a/9.

³⁸ Aristotle, *Physics*, 199/a/20.

³⁹ Aristotle, *Physics*, 199/a/23.

⁴⁰ Aristotle, *The Generation of Animals*, 744/b/16.

⁴¹ Aristotle, *Parts of Animals*, 687/a/15.

vine⁴² and intelligent.⁴³ In his commentary on the second book of Physics, St. Thomas applies the above arguments to the universe taken in its entirety, and asserts that nature is nothing else than divine art in the cosmos, *natura est ars divina indita rebus*.⁴⁴ The only difference between art and nature is that the former is extrinsic while the latter is intrinsic.⁴⁵ Finally, in the closing paragraphs of the fourteenth lesson, St. Thomas even says that if the wood of which a ship is made could receive from the shipbuilder the capacity to move and place itself in the proper order, then a ship could be built by nature and the plan followed would be the same as that of the shipbuilder.⁴⁶

From the concept of prime matter in relation to its appetite and from the notion of finality, we may now conclude that prime matter achieves its purpose in nature when united to the human soul, the highest form of which it is capable. Consequently, the union of matter to inferior forms, namely those of brute animals and plants, is but a preparatory stage for a higher goal, for prime matter is a principle whose very nature is to desire and to yearn. If there are any substantial forms endowed with a higher degree of immateriality than that of the human soul, we must conclude that such forms are self-subsisting; they are not co-principles with matter in the constitution of material beings; they are not parts of the cosmos and do not represent a final step in its formation. If human nature were not existing, then we would be forced to conclude that the cosmos is an unfinished structure, somewhat like a house without a roof.

c—*The function of efficient causality.* One of the most common objections is that evolution contradicts the principle of efficient causality.⁴⁷ On the one hand, some modern Thomists think that if the philosopher appeals to divine intervention in order to explain the formation of the cosmos, then he is proceeding as a theologian not as a philosopher;⁴⁸ on the other hand,

⁴² Aristotle, *On the Heavens*, 271/a/33.

⁴³ Aristotle, *Parts of Animals*, 658/a/23.

⁴⁴ St. Thomas, *Com. in Phys.* lib. 2, lect. 14, no. 8.

⁴⁵ St. Thomas, *Com. in Phys.* lib. 2, lect. 14, no. 8.

⁴⁶ St. Thomas, *Com. in Phys.* lib. 2, lect. 14, no. 8.

⁴⁷ Glenn, *Psychology* (1948), St. Louis, Herder, p. 153.

⁴⁸ Maquart, *Elementa philosophiae*, Paris, Blot (1937), vol. 2, p. 522, 529.

they firmly hold that an inferior cause cannot produce a superior being.⁴⁹ They conclude that the philosopher is unable to solve the problem of evolution, since he would by the very fact reject the principle of efficient causality, or propose a miraculous solution which would not pertain to philosophy. Consequently, each species has been created as it is and continues in existence through successive generations. Such is the fundamental objection as presented in many textbooks of philosophy.⁵⁰ Others offer a solution calling for a mitigated form of evolution, restricted to the so-called scientific species of living beings, but reject evolution as applied to the philosophical species. This is a *via media*, a compromise solution, advanced because the arguments presented by science offer a challenge to philosophers.⁵¹

The statement that a cause must be proportionate to its effect is certainly true; no disciple of St. Thomas could ever deny it.⁵² Although the objection is valid against materialistic evolution, it has no bearing whatsoever on our problem, because the Thomistic solution admits the necessity of divine intervention and holds that such a mode of causality is natural and in no way miraculous. The question is to determine what kind of cause will be required in nature so that prime matter may be able to attain its goal. Since prime matter is pure passive potency, it cannot actively produce any determination. Now matter is a principle of mobile being, and it has a purpose in the cosmos, namely that of making possible the realization of substantial forms which cannot even exist without matter, as in the case of brute animals, plants and non-living substances; or which cannot fully operate as in the case of the human soul.⁵³ Moreover, prime matter is not equally ordered to all forms at a given time as we have already stated.⁵⁴ Therefore, we must conclude that

⁴⁹ Glenn, *Psychology* (1948), St. Louis, Herder, p. 153; Gredt, *Elementa philosophiae*, Friburgi, Herder (1937), t. 1, p. 490.

⁵⁰ Maquart, *Elementa philosophiae*, Paris, Blot (1937), vol. 2, p. 513 sqq.

⁵¹ Gredt, *Elementa philosophiae*, Friburgi, Herder (1937), t. 1, p. 489; Hugon, *Phil. Nat.*, Paris, Lethielleux (1920), t. 2, pars prima, p. 304 sqq.

⁵² St. Thomas, *Com. in Phys.* lib. 2, lect. 6, no. 11.

⁵³ St. Thomas, *Com. in Phys.* lib. 1, lect. 15, no. 10.

⁵⁴ St. Thomas, *Contra Gentes*, lib. 3, c. 22.

there is some sort of active cause whose function is to prepare matter, and ultimately educe the form from the potentiality of matter. St. Thomas says very clearly that all passive potency must have a corresponding active principle, otherwise prime matter would be absolutely useless, because it could never serve its purpose in nature. This active cause must be proportionate to the highest form of which prime matter is capable.⁵⁵

At this juncture we may conclude that the activity of an efficient cause is natural in the cosmos, because it corresponds to a natural need of the passive principle, and since the human soul can come into existence only by creation,⁵⁶ then we must admit that divine intervention is natural, at least in the creation of the human soul. Furthermore, it also follows that divine causality is a natural intervention in the production of the inferior beings of the cosmos, since they are essential and preparatory steps for the production of man. Finally, even though we must conclude that the cosmos has evolved under divine causal activity, we do not exclude the role played by secondary efficient causes and instrumental causes. On this point St. Thomas holds that, although divine causality is self-sufficient and does not require the help of inferior cooperators, still God chooses instruments in all the works of Divine Providence so that all creatures may take part in divine activity.⁵⁷ In relation to our problem it is quite difficult to determine the function of these inferior causes, but we must maintain the principle at all costs; such further determination would belong to experimental science rather than to philosophy.

If we admit the three principles previously explained then it is possible to see why evolution is necessary. When God created prime matter, He had a purpose, namely to produce mankind.⁵⁸ Man is a composite being; in a physical sense, he is a body and a spiritual soul; metaphysically speaking, he is a rational animal including also plant life and animal life, as well as non-living matter. In order to produce man animal life was required; animal life presupposes plant-life; and this last one calls for an or-

⁵⁵ St. Thomas, *Contra Gentes*, lib. 3, c. 22.

⁵⁶ St. Thomas, *Summa Theol.* 1 pars, qu. 90, art. 2, c.

⁵⁷ St. Thomas, *Contra Gentes*, lib. 3, c. 77.

⁵⁸ St. Thomas, *Contra Gentes*, lib. 3, c. 22.

ganization of non-living matter. Each order of being presupposes the previous one according to a temporal sequence, since prime matter does not immediately tend to the highest form; information is correlative to the dispositions of matter at a given moment.⁵⁹

This last statement may come somewhat as a surprise because the relation between matter and time is oftentimes overlooked. Some are inclined to see but an accidental relation between both, as in the theory that the human soul is created at the moment of conception, thereby rejecting the necessity of complete dispositions as conditions for the coming of the human soul. The reason of the Thomistic doctrine on the relation between matter and time is that matter is incapable of having all its perfections at once, since they are very often mutually exclusive. The only beings not submitted to the necessity of successive informations, and consequently of time, are those which do not include a principle of further determination because they are immaterial.⁶⁰

The dispositions of prime matter with a view to the human soul are effected by means of a natural divine intervention acting as an equivocal cause. There is nothing miraculous in this action of God upon the cosmos, because God simply operates as an active principle corresponding to the passive appetite of prime matter. According to the principles of Thomistic philosophy, we must maintain that evolution, understood as a natural process taking place in time, whereby the inferior forms of inorganic substances and of plant and animal life have come into existence before the more highly specialized categories of living beings and especially before the production of man, and by a natural intervention of God in the cosmos, is a necessary conclusion based upon the notions of prime matter, finality in nature, and efficient causality as contained in the works of Aquinas.

We may now rightly conclude that Thomism is not alien to all forms of evolution. Naturally, all Thomists reject materialistic evolution which tries to explain the formation of the cosmos simply through the forces of nature and the exigencies of matter. Nevertheless, fixism is not the only alternative and rightly so because fixism is but a consequence of materialism. Fixists can

⁵⁹ St. Thomas, *In Sent.* lib. 2, dist. 5, qu. 2 art. 1.

⁶⁰ St. Thomas, *In Sent.* lib. 1, dist. 19, qu. 2, art. 1.

maintain their position only because they lose sight of the part played by finality in nature, and as a result are obliged to omit all reference to equivocal causes. The result is that divine intervention becomes miraculous; Divine Providence is an attribute whose existence is known only through revelation; and the world is like a huge machine going around in circles and merely reproducing itself through successive generations. Such are the logical conclusions of fixism, but they are not Thomistic.

On the contrary, teleological evolution conceives the cosmos as a work of divine art;⁶¹ God has been preparing the world from the beginning of time for the coming of man. In the course of centuries different manifestations of plant and animal have appeared; some have come and gone even before the advent of man. None of the different species of living beings is a necessary part of the cosmos; each species is contingent, indefinable, transitory, and the cosmos can be conceived without the help of any one of them in particular.⁶² Just as human nature can be defined without any reference to any individual, so also the cosmos can be conceived without the accidental concretions of inferior life; but, on the other hand, just as human nature cannot be understood nor defined without a necessary relation to the concept of vegetative and animal life, so also the cosmos cannot be conceived without man and his essential component parts.

Evolution in its Thomistic sense bears no similarity whatsoever to its materialistic counterpart, other than being an explanation of the formation of the cosmos by successive steps; the former is intrinsically dependent upon divine activity at every moment; the latter is frankly atheistic. Thomistic evolution is not transformism, since a brute animal is not transformed into a man, nor non-living matter into living matter; rather it could be called progressive evolution, since the matter which serves as an intrinsic principle of an inferior being is still capable—with the help of more specific determinations brought about through the activity of an adequate efficient cause—of being one of the intrinsic principles of a higher being.⁶³

⁶¹ St. Thomas, *Com. in Phys.* lib. 2, lect. 14, no. 8.

⁶² Otis, Louis Eugene, *Doctrine de l'évolution*, t. 2, p. 28 sqq.

⁶³ St. Thomas, *Com. in Phys.* lib. 1, lect. 15, no. 10.

This explanation of evolution is an integral part of Thomistic philosophy and constitutes a true demonstration; even so it does not solve the problem of fact. It does not give a definite answer to the question whether the cosmos was formed through different periods as explained above, or whether it was produced independently of the exigencies of time. The philosopher is not in a position to solve this issue. Just as the philosopher is unable to prove that the world has been created *in tempore* or *ab aeterno*, although he can demonstrate that the cosmos could have been created *ab aeterno*,⁶⁴ so also the philosopher is unable to determine how the world has attained its present state of perfection. The reason is that both creation and the further development of the cosmos are acts of a divine free-will, and consequently undemonstrable. We may know what took place, either by revelation, if God chose to tell us, or by scientific research if the scientist can show conclusively that there is a definite chronological order between the different forms of life and also a causal relation by which one proceeds from the other. Then the conclusions of experimental science would simply confirm the affirmations of Thomistic philosophy. The philosopher simply proves that if the cosmos has been formed according to the natural exigencies of its intrinsic principles and to the proper mode of causality implied by finality and efficiency, then it has evolved from a primitive state to its actual perfection.⁶⁵ The philosopher's conclusion is always hypothetical, because the knowledge of the realization of the condition is beyond the realm of philosophy; it belongs to revelation and to experimental science.

Historically, the problem of evolution has been a *cause célèbre*, somewhat like the controversy that centered around Galileo. In both instances there is a basic confusion. St. Thomas had warned against hasty conclusions in matters relating to astronomy; he had written very clearly that the Ptolomean hypothesis is nothing more than a working hypothesis,⁶⁶ but the theologians and philosophers as a rule accepted the Ptolomean system as absolute truth. In regard to evolution something similar has taken place during the last century. Philosophers thought that they could present a definite answer to the problem of fact. They

⁶⁴ St. Thomas, *Summa Theol.* 1 pars, qu. 46, art. 2.

⁶⁵ St. Thomas, *Com. in Phys.* lib. 2, lect. 15.

⁶⁶ St. Thomas, *Com. In de Coelo*, lib. 2, lect. 17, no. 3.

failed to see that the philosopher cannot prove contingent events in nature; such issues do not belong to philosophy. On the other hand, some scientists held materialistic views of the universe unacceptable to sound philosophy simply because they believed that science is all-embracing. This confusion was brought about because the scientists believed themselves to be philosophers, just as philosophers assumed that they could judge any and all affirmations of science.

Unfortunately Thomistic philosophy has been associated with these confusions for too long a time. Some philosophers have even suggested that Thomism is outdated and consequently inadequate to solve our modern problems.⁶⁷ On the contrary if Thomism is understood in all its implications I am sure that it can always be the guiding principle of human thought.

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COMMENT ON FR. DUFALT'S PAPER

I am deeply honored to be asked to comment on this fine paper by Fr. Dufault. The honor is greater because this is one of the genuinely Thomistic papers given. We have learned to expect this kind of fidelity from Fr. Dufault. It is certainly refreshing to hear a problem, and one which is as important in contemporary thought as is the problem of evolution, discussed from a strictly Thomistic point of view. Too often we hear papers on this subject which go on *ad nauseam* about accidental questions and trivial distinctions to the extent that either there is no time left to speak about the problem itself or the audience has become so bored that the solution offered is lost to them.

Fr. Dufault has come directly to grips with the problem in his paper. With the principles of matter finality and efficient causality he has placed the problem in its philosophical perspective. The brevity of his analysis can be excused by the exigence of a paper of this nature. The principles are there and can be elaborated in the discussion to follow.

⁶⁷ *Acta Apostolicae Sedis*, 1950, p. 573.