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THE PROBLEM OF SPECIES ACCORDING TO ARISTOTELIAN-THOMISTIC PHILOSOPHY AND THE BIOLOGICAL THEORY OF EVOLUTION

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Thesis presented to the School of Philosophy of the University of Ottawa as partial fulfillment of the requirements for the degree of Master of Arts

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PREFACE

This thesis found its origin in the occasional contention that the philosophy of the Aristotelian-Thomistic tradition was opposed to the biological theory of evolution from the very beginning, that is, from the development of the theory of evolution, which, for practical purposes, could be centered around the publication of The Origin of Species by Charles Darwin. The reason for this opposition was said to lie in the belief that the evolutionary concept of reality was incompatible with the principles of traditional philosophy. I have intended to discover, then, the specific argumentations used by those who spoke in the name of traditional philosophy in encountering the theory of evolution, and I have attempted to evaluate the central issue of the philosophical problematic related to that theory.

The research on the first part of this thesis, the historical consideration, was done while I was studying theology in Europe, and most of the resource material comes from either the National Library in Paris or the Gregorian University library in Rome.

Upon returning from Europe, armed with the results of this research, I was guided by Dr. John N. Deely in formulating and developing the problem. Thus arose the second and third chapters.

I would like to thank Fr. Marcel Patry, O.M.I., who started me out on the subject of this paper, Dr. John N. Deely, who guided my research and study while I worked at the Faculty of Philosophy of the University of Ottawa, and Professor Donald Gallagher, who generously aided in the completion of the work.

Roger Schwietz, O.M.I.
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INTRODUCTION

It is a phenomenon of human communication that ordinary words can sometimes be charged with an extraordinary power to provoke highly divergent and emotion-filled reactions. The mere utterance of a few simple syllables is sufficient to evoke a hard, cold stare from one man, light up with approval the face of another man, and cause fire to leap forth from the eyes of a third. The word "evolution" is certainly an example of this phenomenon. Perhaps less so today, but certainly within the span of our own century, evolution has been a subject of intense controversy whether in the sciences, in religion, or on the street corner. It was not always so. Notions of progressive development or evolution and convictions of a gradual realization of a divine plan can be found in the writings of learned men long before Charles Darwin published his Origin of Species in the mid-19th century. At the appearance of Darwin's theory with its elements of natural selection and the survival of the fittest, however, a new period began in the history of evolutionary doctrine -- a period of unbounded enthusiasm and intense controversy. By far the great majority of educated men today accept

evolution as a reputable scientific hypothesis. Similarly, philosophers of the Aristotelian-Thomistic tradition, such as those considered in the latter part of this paper, are seeking a new understanding of their own cosmological principles in the light of evolutionary theory. Their attitudes are the result of a full century of development.

Any effort at elucidating the basic philosophical issue involved in the relationship between evolutionary theory and Aristotelian-Thomistic philosophy must first include a consideration of the tumultuous history of evolutionary doctrine. This type of analysis would involve two main questions. First, what, historically, was the reaction of philosophers to the theory of evolution and to what extent was it philosophic? Within the context of this question, we may ask whether the rejection of evolutionary theory by the sample philosophers investigated was based upon their understanding of the principles of Aristotle and St. Thomas, or rather upon a non-philosophic reaction, combined with a defense of strongly-held religious convictions concerning the nobility of man and the future of the universe. If the rejection of evolution was less philosophic, and more emotional and religious, we may also ask here whether time has made possible a reasoned conclusion that further dispute over the issue lay beyond the philosophical domain.

A second, more polemical, question, which flows from the first, must also be answered: Is a continued discussion of evolutionary theory in its relation to Aristotelian-Thomistic philosophy indicative of the discovery of a real, philosophic problematic? If such a problematic has developed, we should ask what efforts are being made at finding a solution.

These, then, are the two basic questions that must be considered; namely, 1.) Historically, how philosophic in content were the reactions to evolutionary theory? and 2.) In relation to the first question, is there a real problematic here, and if so, what solutions have been attempted? Though the scope of this study may appear vast, it is nevertheless necessary to come to an understanding of the historical background of the conflict and the attempts at resolution if one is to advance further in the philosophic consideration of evolution.

We propose, then, that this paper trace the general conflict arising from Darwin's theory of the origin of species and deal with the vital challenge which evolution, that is, the transforming of one species into another, presents to Scholastic philosophy. This treatise cannot pretend to present a complete exposé either of the theory Darwin proposed in the Origin of Species, or of the body of Aristotelian-Thomistic principles. Yet it will be necessary to devote brief sections of Chapter I

to a sketch of the major issues and principles involved. These sections will prepare the reader for the consideration of the reactions to the theory of evolution which took place mainly in the second half of the 19th century, after the publication of Darwin's first book, The Origin of Species, in 1859.

Then we shall make an effort to sift through the evidence and to present a digested outline of the reactions. Consistent with our efforts at clarifying the issue, the reactions against evolution will be treated in various categories. The first category will include those reactions which appeal more to emotion than to reason. A second category will contain those reactions which presented philosophic or scientifically oriented reasonings. Finally, consideration will be given to those who reacted in favor of evolution. Here we shall view the extreme positions taken by those who opted for evolution as the only explanation for the existence of the diversification-in-unity of living beings, and we shall view the more moderate positions taken by those who recognized the many unanswered questions remaining in the scientific or religio-philosophic spheres and began the quest for a clarification of the issues.

Naturally, not all the vast amount of pertinent data which has accumulated through the decades could be included without making this paper impossibly long. Yet

a comprehensive treatment can be made by examining sample and representative spokesmen of each area. Because of this, the libraries of both Europe and America were consulted for treatments, attitudes, and arguments which would be of use in this area.

With the renaissance of Scholastic philosophy during the first half of the 20th century, we can see a growing awareness of the real issues involved in the challenge evolution presents to Scholasticism. In a final section of Chapter I, then, efforts at clarifying the philosophic issues will be examined in order to define more clearly the basic elements involved.

With the problem of evolution finally placed in its proper philosophical context, the initial efforts made at definition and solution-finding can be considered in Chapter II. Here we shall investigate the attempts made to resolve the philosophic problem by Charles De Koninck and Mortimer Adler. The central philosophical issues in the theory of evolution will be examined in the light of these great minds; and, hopefully, this will prepare the way for an examination of the more recent attempts at solving the evolution problematic found in Chapter III.

The issue with which this paper is concerned, then, is the challenge presented to the philosophy of the Aristotelian-Thomistic tradition by the biological theory of evolution. An effort will be made to understand the

elements of the theory, the reactions to it by philosophers, the forms these reactions have taken, and, finally, the efforts made by contemporary philosophy at solving the evolutionary problematic. If we cannot say that a final solution can be presented at this time, at least we can hope that a clarification of the philosophical issue will better enable us to see what is necessary for the eventual solution to the problem of species.

CHAPTER I

GENESIS AND EMERGENCE OF THE PROBLEM OF EVOLUTION

The General Conflict: A Strife for Mastery

The word "conflict" is defined by Webster's New Collegiate Dictionary as "a strife for mastery," and perhaps this is an apt way of describing the development of the theory of evolution as an effort at explaining the simultaneous unity and diversity of the universe of living beings. As shall be seen in the course of this treatise, the notion of developmental life forms, of advancing in perfection from lower to higher degrees, is almost as old as man's ability to reflect upon the world about him. Yet, whenever the word "evolution" is mentioned, the image of Charles Darwin will almost certainly loom at least within the shadows of one's mind. If by this time the ideological conflict is near resolution and evolutionary theory is commonly accepted, it is definitely due to the final great battle spearheaded by Charles Darwin. He led the attack, and the battle lasted a century, but Darwin himself never doubted the final outcome. In the introduction to his book The Origin of Species, he exudes confidence as he states:

> Although much remains obscure, and will long remain obscure, I can entertain no doubt, after the most deliberate study and dispassionate judgement of which I am capable, that the view which most naturalists until recently entertained, and which I

> formerly entertained - namely, that each species has been independently created - is erroneous. I am fully convinced that species are not immutable ...[1]

It would be good, then, in treating the problem as related to philosophy, to give a short consideration to this central figure in the conflict over the theory of evolution. It is not necessary, nor is there space within the scope of this paper, to give a detailed account of Darwin's theory; yet some points need consideration in order to understand the reactions and efforts at solution outlined herein.

The Theory of Evolution Presented

Charles Darwin was by no means the first person to believe that species evolve. In a historical sketch which Darwin himself added to the later editions of The Origin of Species, the author traces "the progress of opinion on the origin of Species"[2] beginning with Buffon, as "the first author who in modern times has treated it in a scientific spirit"[3] and Lamarck, who first published his views in 1801 and "was the first man whose conclusions on the subject excited much attention."[4] From Lamarck, Darwin lists authors

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[1] Charles Darwin, The Origin of Species (Reprinted from the Sixth London Edition, London: A.L. Burt Company, n.d.), p. 5 (Original Publication date was 1859).

[2] Ibid., p. V.

[3] Ibid.

[4] Ibid., p. VI.

and publications dealing with the subject of the development of species down to the first publication of his own work, The Origin of Species, on November 24, 1859. Even in his own family there had been considerations of the development of species. His grandfather, Dr. Erasmus Darwin, had published "a long and unfortunately remarkably boring poem"[5] entitled "Zoonomia" in 1794 in which he "anticipated the views and erroneous grounds of opinion of Lamarck."[6] Charles Darwin himself, however, seems to have put forth his views at the proper historical moment and with the properly convincing details and explanations. Not only had he presented a strong statement of his own convictions, based on a life of personal study and research,

> but Darwin did what none of his predecessors had done: he adduced in favor of his evolutionary views a store of facts which biologists could interpret in no way other than that in which Darwin interpreted them.[7]

Hence Darwin was able to profit by all the work of naturalists who had prepared the way before him, through the various facts and hypotheses they had discovered and advanced. In this, the development of the theory of evolution seems to have followed the course taken by the discovery of other laws of nature, and Darwin's coming at the final stage helps explain why his book made such an immediate impact.

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[5]C.H. Waddington, "Theories of Evolution," A Century of Darwin ed. S.A. Barnett (Cambridge, Massachusetts: Harvard University Press, 1958), p. 1.

[6]Darwin, The Origin of Species, p. VI.

[7]Theodosius Dobzhansky, "Species After Darwin," A Century of Darwin, p. 19.

> We remember that there are usually three stages in connection with the discovery of a law of Nature: first, that of dim suggestion in pure speculation or rash anticipation, with eyes closed to facts; second, that of clear statement as a tentative or working hypothesis in an explanation of certain facts; and finally, the proof, profiting richly by the hard struggles of his predecessors over the first two stages.[8]

Though Darwin described the facts of nature well and drew proper inferences in a convincing way, he by no means gave a complete answer to the problems involved. It would have been unscientific even in the 19th century to accept his theory as presented without a critical attitude, for:

> Darwin's theory had a major gap from the beginning. Granted that natural selection will cause changes of some kind in living organisms, can we be sure that these changes will be adequate to account for the evolutionary alterations which would be necessary to convert one species into another.[9]

To the critical reader there were obvious difficulties involved in the very basis of his theory, natural selection, the process in which the weaker and less adapted individuals perished and only the fittest survived. Without natural selection Darwin could not explain the facts; yet

> Darwin never formulated the theory of natural selection in a logically valid way, but adopted Herbert Spencer's expression 'the survival of the fittest' without waiting to ask: what is the definition of fitness? Darwinian fitness, however, is measured by the capacity to produce offspring, and Spencer's phrase, in a biological context, is hardly more than a tautology: the survival of those that survive.[10]

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[8] Henry Osborn, From the Greeks to Darwin (2nd. ed. rev., New York: Charles Schribner's Sons, 1929), p. 9 (First published in 1894).

[9] Waddington, A Century of Darwin, pp. 5-6.

[10] S.A. Barnett (ed.), A Century of Darwin (Cambridge, Massachusetts: Harvard University Press, 1958), p. XII. This comment is taken from preface written by the editor.

Natural selection was to become a key concept in Darwin's theory on the origin of species, even if he could not clearly define the elements involved in it. Long before the publication of his book, The Origin of Species, Darwin discovered the notion of the struggle for existence and, in his words, recognized it immediately as the key he needed for his theory:

> In October 1838, that is, fifteen months after I had begun my systematic inquiry, I happened to read for amusement Malthus on Population, and being well prepared to appreciate the struggle for existence which everywhere goes on from long-continued observation of the habits of animals and plants, it at once struck me that under these circumstances favourable variations would tend to be preserved and unfavourable ones to be destroyed. The result of this would be the formation of a new species. Here, then, I had at last got a theory by which to work...[11]

Darwin had his theory, but he had yet to explain how it worked. To say that favorable variations tended to survive, resulting in the formation of a new species, immediately raised two questions: how did these "favourable variations" appear, and what did he mean by the term species? Though Darwin's publication was dedicated more to fact than theory, dealing more with examples than reasonings, there came through the pages an effort at answering these questions. The problem of variations was dealt with in Darwin's theory

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[11] Francis Darwin (ed.), The Autobiography of Charles Darwin (New York: Dover Publications, Inc., 1958), p. 42. This work was first published by Darwin's son in 1892.

of "pan genesis," which is explained:

> During the proliferation of the various tissues of the body, their cells 'throw off' in Darwin's words, 'minute granules or atoms, which circulate freely throughout the system, and when supplied with proper nutriment multiply by self-division.' These granules, or 'gemmules' as he called them, are transmitted from parent to offspring, and 'in their dormant state' says Darwin, they 'have mutual affinity for each other, leading to their aggregation either into buds or into the sexual elements.'[12]

Unfortunately, Darwin was forced to adhere to this unscientific theory of pan genesis, when there existed, at least a short time after the first publication of his book on The Origin of Species in 1859, a theory that was to give the true answer to the problem of inherited characteristics, the heredity theory of Mendel. "He should have been in contact with a true theory - the gene-chromosome theory of Mendel, for it was published in 1865, but that was not 'found' by science until 1900."[13]

The second question concerning the meaning of the term species was answered in the accepted scientific terminology of the day, thereby avoiding the necessity of a philosophic examination of what was later to appear as a crucial challenge given philosophy by the theory of evolution.[14] Darwin remains on the level of the biological

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[12] Donald Michie, "The Third Stage in Genetics" in A Century of Darwin, p. 69.

[13] Waddington, A Century of Darwin, p. 9.

[14] As shall be seen in the course of this paper.

sciences in stating that:

> I look at the term species as one arbitrarily given, for the sake of convenience, to a set of individuals closely resembling each other, and that it does not essentially differ from the term variety, which is given to less distinct and more fluctuating forms. The term variety, again, in comparison with mere individual differences, is also applied arbitrarily, for convenience sake.[15]

Thus in 1859 Darwin first published a scientific and factual account of his observations of nature and his theory on the origins of existing species. The reaction was immediate. Though Darwin did not deal with the origin of man specifically in this book, he had man in mind, and so did his readers. As Darwin comments in his autobiography: "As soon as I had become convinced in the year 1837 or 1838, that species were mutable productions, I could not avoid the belief that man must come under the same law."[16] Impressed by the favorable reception his book received from scientists, Darwin decided to publish his theory on man: "When I found that many naturalists fully accepted the doctrine of the evolution of species, it seemed to me advisable to work up such notes as I possessed, and to publish a special treatise on the origin of man."[17] That book, The Descent of Man, was published in February, 1871. His theory was now public, placed before men of science to be discussed,

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[15] Darwin, The Origin of Species, p. 50.

[16] Francis Darwin, Autobiography of Charles Darwin, p. 49.

[17] Ibid.

criticized and corrected. But it was also taken up by men of philosophy and religion, each interpreting its implications from the prejudices of his own background and convictions. There was an immediate reaction by those who saw evolutionism as an effort at destroying man's dignity and established religion.[18] Yet Darwin himself was certainly not irreligious, and there is no indication that he intended his work to be an attack on religious convictions:

> When thus reflecting, I feel compelled to look to a First Cause having an intelligent mind in some degree analogous to that of man; and I deserve to be called a Theist. This conclusion was strong in my mind about the time, as far as I can remember, when I wrote The Origin of Species, and it is since that time that it has very gradually, with many fluctuations, become weaker. But then arises the doubt - can the mind of man, which has, as I fully believe, been developed from a mind as low as that possessed by the lowest animals, be trusted when it draws such grand conclusions?[19]

Perhaps, as a result of a conflict between his findings as a naturalist and the fundamentalist faith of the 19th century, Darwin, as well as many other of his contemporaries, was driven to wondering and doubting, for Darwin candidly adds: "I cannot pretend to throw the least light on such abstruse problems. The mystery of the beginning of all things is insoluble by us, and I for one must be content to remain an Agnostic."[20]

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[18] Later sections of this chapter will examine not only philosophic, but also religious reactions to evolution, since the two were so closely interrelated at the time.

[19] Darwin, Autobiography of Charles Darwin, p. 66. This passage is taken from the part of Darwin's autobiography written in 1876.

[20] Ibid.

With the publication of The Origin of Species, however, and the public debate on the nature and value of the theory of evolution that followed therefrom, there were bound to be accusations that Darwin and his theory were destroying the dignity of man, lowering him to the level of an animal. To this, Darwin simply replied:

> For my own part, I would as soon be descended from that heroic little monkey who braved his dreaded enemy in order to save the life of his keeper, or from that old baboon, who, descending from the mountains, carried away in triumph his young comrade from a crowd of astonished dogs - as from a savage who delights to torture his enemies, offers up bloody sacrifices, practices infanticide without remorse, treats his wives like slaves, knows no decency, and is haunted by the grossest superstitions.[21]

From the viewpoint of science, Darwin had introduced a new concept, a new way of looking at the world. The realities of the struggle for existence and the disappearance of life forms which were not fit for survival had been recognized before the time of Darwin, but "within the context of a different life view."[22] The 17th and 18th centuries had witnessed the building up of a body of knowledge about the universe through the work of scientists laboring under the presupposition that all could be ordered in the geometric spirit, that the universe was governed by a permanent, well-ordered set of stable laws which could be predicted, discovered, and arranged with mechanical precision. Into this rationalistic atmosphere Darwin introduced a vision that would necessitate

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[21] Charles Darwin, The Descent of Man (2nd ed.; New York: H.M. Caldwell Company, 1874), p. 643.

[22] John N. Deely, "The Philosophical Dimensions of the Origin of Species" (Chicago: Institute for Philosophical Research, 1969), p. 131. (Reprint from The Thomist, Vol. XXXIII, Nos. 1 and 2, 1969.)

the reassessment of the world-view of science, "a vision of the world-order as being in a dynamic, relative equilibrium rather than a permanent and mechanical one."[23] From a philosophical standpoint, this amounted to a returning to "Aristotle's epigenetic view of individual development"[24] without his mathematical view of the world. In order to understand better the impact of this new view on the minds of Darwin's contemporaries, we shall devote space to a consideration of the philosophical background into which The Origin of Species was inserted, a philosophical background that reaches back into the world-view of the Greek philosophers. It was a world-view that had been reinforced by generations of great scientific discovery, creating in man the infatuated view of himself as the one being capable of solving the mysteries of the universe. It was an atmosphere perhaps well understood by the lady who, upon hearing of Darwin's theory for the first time shortly after the publication of The Descent of Man, exclaimed: "Descended from an ape! Let us hope that it is not true. And if it is true let us hope that the general public does not find out."[25]

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[23] Ibid.

[24] Ibid.

[25] H. Haag, A. Haas, and T. Hurzeler, Bible et Evolution, translated from German (Paris: Maison Mame, 1964), p. 93. The English translations in this paper are my own. The original text: "Descendre du singe! Espérons que ce n'est pas vrai. Et si c'est vrai, espérons que le grand public n'en saura rien!"

Evolutionary Thought Before Darwin

Man has a penchant, it seems, for digging up the words of the ancient sages in order to show that the greatest of them was in agreement with his own particular theory or thought pattern, or at least would be in agreement were he still alive. Even Darwin quotes Aristotle's Physical Auscultations at the beginning of his historical sketch in The Origin of Species in order to show how the philosopher agreed with his theory of natural selection: that the development of various useful faculties in man came about as the result of accident.[26] Though it is certainly clear that the ancients in no way thought in the patterns of Darwin's theory, there can still be found within their writings various opinions on the development of life and of life's forms, expressed within the context of observation. In a study of the various stages of the development of evolutionary thought, Henry Osborn distinguishes between Greek evolution, which he called "the anticipation of nature," and modern evolution. The latter, which he termed "The Interpretation of Nature," began with the emancipation of botany and zoology from Greek traditions after the 16th century. From here modern evolution developed through the rapid extension of zoology, botany and paleontology in the 18th and 19th centuries, until its final stage

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[26] Darwin, The Origin of Species, note on p. V.

of the establishment of evolution inductively and deductively as a law of nature by Darwin and Wallace.[27] Having studied the writings of the thinkers through these centuries, Osborn finds that the success of the evolutionary idea was linked to the rise and fall of the acceptance of Greek scientific thinking:

> The history of the central evolution idea before Darwin therefore follows its rise and fall as the broad central explanation of the history of life, which we must throw into contrast with the steady rise of the special knowledge of the lesser ideas which center in it. As a whole, it rose among the Greeks, declined with the decay of Greek science, was kept alive by Greek influence in theology, and fell with ecclesiastic opposition to rationalism and the age of reason. When it was first revived in France and Germany, it was either inspired by Greek freedom of speculation and suggestiveness, or permeated by Greek fallacies.[28]

This development of thought can be contrasted with the generally accepted notion of the eternity of the heavens, the symbol of perfection and stability in which are grounded the mathematically precise and unchanging laws of nature. In another view, this notion of the heavens as eternal and

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[27] Osborn, From the Greeks to Darwin, pp. 14-16. The first period, Greek Evolution: the anticipation of nature, is dated 640 BC-1600 AD and covers "the rise, decline, revival and final decline of the Greek natural history and Greek conception of Evolution." The second period is divided into three parts: I. Philosophical Evolution: 1600-1800 AD - The Emancipation of botany and zoology from Greek traditions; II. Inductive Evolution, 1730-1850, the development of the sciences and scattered observation and speculation; and III. Inductive Evolution, 1858-1893, the establishment of the theories of Darwin and Wallace.

[28] Ibid., p. 13.

divine, dating back to the time of Plato and Aristotle,

> held sway for nearly two thousand years, then began slowly to crumble. First, Copernicus made the earth a planet. Then Tycho Brake saw with astonishment a new star in Cassiopeia's chair, shining brighter than Venus. Soon after this, Galileo used his 'optic reed' to shatter forever the illusion of celestial incorruptibility. Then Descartes, in 1644, published his theory on celestial vortexes. From there it was but a step to Bernard Fortenelli's 'Conversations on the Plurality of Worlds,' to the Rev. Dr. Burnet's 'Sacred Theory of the Earth' and others. 'Mechanick Theism' was loose in the world. Newton would make short work of Descartes' theory of vortexes in his exposition on the laws of motion, but the general idea that worlds might be generated by the operations of the system of matter in motion was not to be banished. In another century and a half it would triumph over Newtonian Creationism.[29]

Within this patrimony of Greek thought (the stability of essence and the "unchanging environmental reference of the celestial, immutable spheres"[30] which reigned over the first millenium after Christ as "the sole guarantee that the relation of generator-generated would be absolute and not just relative across the ages"[31]), we can see an element of the dynamic in Aristotle's rejection of the preformism and

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[29] John C. Greene, The Death of Adam (Ames, Iowa: The Iowa State University Press, 1959), pp. 15-17 passim.

[30] Deely, "Philosophical Dimensions of the Origin of Species," p. 132.

[31] Ibid.

typological thinking of the theory of pangenesis.[32] Though Aristotle had rejected the theory of pangenes, Darwin was to revive a version similar to that of Hippocrates. He wished to avoid that type of "creative" theory espoused by Aristotle in the epigenetic unfolding of that which was only potentially present.[33] Darwin was forced to make this theoretical choice, of course, because of his ignorance of the true answer found in the heredity theory of Mendel.

St. Augustine approached the problem of the development of the new form from the seed deposited by the parents. He proposed that all things were created germinally in the beginning and were present virtually from the time of creation

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[32]There were thus among the ancients two dominant theories concerning the problem of like generating like. Hippocrates thought that the semen came from all parts of the body, each part producing pangenes or particles which preformed that part in the offspring to match the corresponding part in the parent. Hence this theory of pangenesis is known as a preformistic theory. Aristotle, however, could not accept this preformism in reproduction, with its pangenes. He held, instead, that the whole organism is greater than any of its parts, and the phenomenon of replication of parent type combined with the presence of a certain degree of novelty was best explained by admitting of a potential factor in the elements of reproduction which gradually came into actualization as the form reached maturity. This theory of gradual realization through organic development is what is called the epigenetic view. Cf. Ernst Mayr, Animal Species and Evolution (Cambridge, Mass: Harvard, 1963), p. 4 and also Raymond J. Nogar, "Preformism vs. Epigenesis" in The Wisdom of Evolution (New York: Mentor-Omega, 1963), p. 292.

[33]The point being made here is that the central elements of Darwin's theory: variation, selection, and the struggle for existence, were all known before Darwin, but in the context of a different world view. Darwin's contribution was to change the context from the balancing permanent and mechanical outlook of Greek thought to a notion of the world order as being in a dynamic, relative equilibrium. Cf. Loren Eiseley, The Firmament of Time (New York: Athenum, 1962), p. 72.

in what he called "rationes seminales." Only with the passage of time were new forms produced through the influence of some inner active force triggered by the appropriate dispositions of the milieu.[34] Augustine was followed by a number of thinkers who proposed a concept of transitory soul that would have easily fit into the doctrine of evolution: "St. Ephraem ... plainly understands Scripture to teach that plants, animals, etc. were all produced by the active power of the elements."[35] There is also St. Gregory: "... all things were virtually ... in the first Divine impulse for creation, existing as it were in a kind of spermatic potency ..."[36] And there is St. John Chrysostom, who "attributes to the primaeval waters a certain vital activity or power ... (which exercises) an active and not merely passive role in the producing of the first plants and animals."[37]

St. Thomas, however, rejected the virtuality of the presence of all things from the beginning, but did propose a doctrine of potentiality in which forms are seen to be "fluid" - giving way to more perfect forms. His notion of potency was not limited to passive obedience or privation, but contained

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[34] Frederick Copleston, S.F., History of Philosophy, Vol. II (London: Burns, Oates and Washbourne, 1950), pp. 75 et seq.

[35] Ernest C. Messenger, Evolution and Theology (New York: The McMillan Company, 1932), p. 17.

[36] Ibid., p. 25.

[37] Ibid., p. 31.

a positive element tending toward actuality.

> The intention of everything existing in potency must be to tend through motion toward actuality. And so, the more posterior and perfect an act is, the more fundamentally is the inclination of matter directed toward it.[38]

St. Thomas indicates the direction in which he sees matter tending toward forms - not an aimless urge to keep moving from one form to another, but toward a higher degree of perfection. "Hence," he adds, "in regard to the most perfect act that matter can attain, the inclination of matter whereby it desires form must be inclined as toward the ultimate end of generation."[39] St. Thomas then explains the gradations to be found among beings in the universe and concludes: "The ultimate end of the whole process of generation is the human soul, and matter tends toward it as toward an ultimate form."[40] But, of course, not all matter is at any given moment capable of acquiring just any form. There is a process, or series, that must be traversed, for:

> Prime matter tends towards its perfection by actually acquiring a form to which it was previously in potency, even though it then ceases to have the other form which it actually possessed before, for this is the way that matter may receive in succession all the forms to which it is potential, so that its entire potentiality may be successively reduced to act, which could not be done all at once.[41]

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[38] St. Thomas Aquinas, Summa Contra Gentiles, Bk. 3 trans. Vernon J. Bourke (Garden City, New York: Image Books, Doubleday & Co., Inc., 1960), III, 22, 7.

[39] Ibid., III,22,7.

[40] Ibid., III,22,7.

[41] Ibid., II,22,7.

In order to clarify what he means by the relative terms, "higher and lower form," St. Thomas also gives the ascending order through which he sees matter passing:

> Thus, prime matter is in potency, first of all, to the form of an element. When it is existing under the form of an element it is in potency to the form of a mixed body; that is why the elements are matter for the mixed body. Considered under the form of a mixed body, it is in potency to a vegetative soul, for this sort of soul is the act of a body. In turn, the vegetative soul is in potency to a sensitive soul, and a sensitive one to an intellectual one.[42]

One would conclude from these words of St. Thomas that there is, indeed, a fluidity of forms in nature, and that there is a definite direction toward which these intermediary matter-form unities build, and that the union of matter with the highest form of soul is the natural end of nature and of the tendency within matter. St. Thomas himself thus concludes that man should appear only after a time of preparation for matter, for he says: "Because man is the most perfect of the animals, he, of all the animals, ought to appear last."[43] This doctrine of these "fluid" forms certainly makes St. Thomas an evolutionary thinker insofar as he uses it to explain the development of the human embryo in its early formative stages. As Dr. Phillips points out:

> St. Thomas, as is fairly generally known, held a view ... that what, by a process of evolution, becomes the human body existed, prior to its becoming so, in the two lower orders of life, the vegetative and the

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[42] Ibid., II,22,7.

[43] St. Thomas Aquinas, De Potentia, trans. On the Power of God, the English Dominican Fathers (Westminster, Md.: The Newman Press, 1952), q. 4, a. 2, ad. 33.

> sensitive. Beginning its life with a vegetative form or soul, as organization increases and advances far enough to make the foetus capable of sensitive activity, a corruption and generation taking place, the body receives a sensitive, and with further development an intellectual, or human soul. He thus admits specific evolution, or development within the individual, under the influence of a higher power, i.e. human life, or the souls of the parents; those in turn, as he points out, being, like all the activities and powers of nature, subordinated, as instruments, to the power of God.[44]

The early Christian fathers, then, were by no means absolute fixists whose thought was incompatible with the theories on the origin and development of species. Had the intellectual community of Europe retained this openness toward "fluidity" throughout the Middle Ages and into the 17th and 18th centuries, there might have been little argument with the evolutionist theories, either from philosophical, religious or scientific viewpoints. However, science gradually developed an attachment to the fixity and mathematical precision of the laws of nature through the successful experimentation of pioneers like Newton; and as the rationalistic period developed, reacting philosophical and religious thinkers grew to be more literalists as they judged scientific discoveries in the light of Sacred Scripture, and as they established a view based on an absolute creationism.

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[44] R.P. Phillips, Modern Thomistic Philosophy, Vol. 1 (new ed., London: Burns, Oates and Washbourne Ltd., 1939), p. 315. Phillips is commenting on a text of St. Thomas in S.T.I. Q118, a.2, Reply Objn 2, which states in part: "... it must be said that the soul is in the embryo; the nutriture soul from the beginning, then the sensitive, lastly the intellectual soul. We must therefore say that since the generation of one thing is in the corruption of another, it follows of necessity that both in men and in other animals, when a more perfect form supervenes the previous form is corrupted: yet so that the supervening contains the perfection of the previous form and something in addition." (First Complete American Edition of the Literal Translation of St. Thomas, Summa Theologica by the Fathers of the English Dominican Province, Vol. I, New York: Benziger Bros., Inc., 1961, p. 575.)

As Osborn says in summary:

> There arose in Europe a long Greek Period in the history of the evolution idea, extending among the fathers of the church and, later, among some of the schoolmen, as shown in their commentaries upon creation which accord very closely with the modern theistic conceptions of Evolution. If the orthodoxy of Augustine had remained the teaching of the Church, the final establishment of evolution would have come far earlier than it did, certainly during the 18th instead of the 19th century, and the bitter controversy between science and theology over this truth of nature would never have arisen. It was not until the 17th century that the Jesuit Suarez and others contended that the Book of Genesis contained a literal account of the mode of Creation, and thereby Special Creation acquired a firm status as a scientific theory of the history of the earth and of life in the contemporary philosophy and literature.[45]

Efforts at explaining the origin of the earth and of life in its prolific variety continued, however, through cosmological speculations scattered throughout the 17th and 18th centuries. Newton himself, having contributed enormously to the advance of science, "feared that his own laws of motion would be used to found theories on the origin of the earth."[46] The fears of Newton were realized when, within a decade of the publication of his Principia, there appeared a work under the authorship of William Wiston who later succeeded Newton in the Lucasian chair at Cambridge. Wiston lectured and wrote on astronomical and biblical topics, trying to prove the concordance of science and Scripture. In 1696 he wrote a work dedicated to Newton with the presumptuous and ambitious title: A New Theory of the Earth, From Its Origin, to the Consummation of All Things Wherein the Creation of the World in Six Days,

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[45]Osborn, From the Greeks to Darwin, p. 11.

[46]Greene, The Death of Adam, p. 17.

the Universal Deluge, and the General Conflagration, As Laid Down in the Holy Scriptures, Are Shown to be Perfectly Agreeable to Reason and Philosophy.[47] In this work, Wiston seemed to have a fixation for comets. He purported to prove, first of all, that the earth had been formed from a nebulous comet, that Noah's Flood had resulted from the near approach of another comet, and that "the terrestrial world would eventually be reconstituted in a conflagration ignited by still another comet."[48] Throughout the work he tried to demonstrate, as others would after him, how the events narrated in Scripture could have been produced by the operation of natural laws, and how science and Scripture would serve to confirm each other, "the one providing principles of explanation, the other historical data."[49]

There were also men of science who speculated philosophically on the possibility of a progressive development of life and on the origin of the Universe, though the religious and intellectual atmosphere prevented them from making much of an impact.[50] Even some of the greater thinkers may have shared

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[47] Ibid., p. 17. Ironically, Wiston was dismissed from the Lucasian professorship in 1710 for heterodoxy and failed election to the Royal Society largely because of Newton's opposition. cf. Greene, p. 349.

[48] Ibid., p. 17

[49] Ibid.

[50] cf. Osborn, who treats of the various speculations on evolution in his book, From the Greeks to Darwin.

in these speculations:

> There are reasons to think that Descartes and Buffon made the same discovery (as Wallace and Darwin) more than a century earlier, but they chose to withhold it from publication because evolutionism was about as popular in the 17th and 18th century France as Communism is now in the U.S.A. or Capitalism in the U.S.S.R.[51]

Finally, we have a theory of evolution presented by Lamarck, which,however, did not have nearly the impact that Darwin was to have a half century later. Lamarck begins his theory with the consideration that animals chose, by an exertion of the will, to conduct their lives in a certain manner. He states that this affects the organs involved. If the animal decides to use them in the appropriate ways, they will be developed: the muscles are enlarged as a result of their continued use, the sight is made keen by the continued practice of visual discrimination. The same is true for all the organs and faculties, and all these developments are inherited or passed on to the next generation.[52] The difficulties in this view are well presented by Waddington:

> One of the reasons why Lamarck's theories have been so much less attractive to biologist than Darwin's is to be found in the type of concept he employed. Darwin's theory of natural selection deals with hard facts which could be counted and entered in a ledger: numbers of eggs fertilized, of offspring which reach maturity and so on; all notions which the most hard-headed materialist can find congenial. Lamarck on the other hand started from the concept of the Will, an idea which gives most biologists a rather queasy feeling, since any theory which can find a place for it must involve notions beyond those necessary to cover the facts of the inorganic world.[53]

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[51]Dobzhansky, A Century of Darwin, p. 19.

[52]Waddington, A Century of Darwin, p. 7.

[53]Ibid.

The publication of Lamarck's theory introduces the 19th century and the atmosphere into which Darwin was born, studied, and published his findings. To complete this consideration of the development of the intellectual atmosphere centered around the idea of evolution, we shall view the condition of 19th century Scholastic thought, the heritage of Christian thought upon which were to be based so many of the later arguments both for and against evolution.

Looking at the philosophic atmosphere of the 19th century, one sees, first of all, that Scholastic philosophy remained one of the "ecclesiastical sciences." It was taught in the seminaries as a precious heritage of ancient thought, a bastion of truth shutting out the errors of fallacious thinkers. From its security one could supposedly judge contemporary intellectual movements.

> That which is today called Scholastic Philosophy is not, properly speaking, a corpus of doctrine, a system of science: it is rather a method for examining and judging human opinions which are contrary to metaphysical truths.[54]

This observation, written in 1833, and calling for a renewal of Scholastic Philosophy,[55] reflects the conviction

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[54] L'abbé Bautain, Philosophie du Christianisme, au Correspondance Religieuse (Paris: Bonnechose, 1835), p. 36. In the original: "Ce qu'on appelle aujourd'hui Philosophie Scholastique n'est point, à proprement dire, un corps de doctrine, un système de science: c'est plutôt une méthode pour examiner et juger les opinions humaines, contraires aux vérités métaphysiques."

[55] Ibid. The author claims that scholastic philosophy is limited to the language and spirit of the Middle Ages and this explains its sterility. cf. p. 37.

that philosophy was not fulfilling the needs of Christian thinkers. What was needed was a system of relevant thought that would act as a criterion for those who had to deal with the expansion of scientific knowledge - something to act as a support for faith confronting knowledge:

> The greatest evil of our age is that religious faith is lacking: it is lacking because we have separated faith from science, because we have declared them incompatible, if not contrary ... Philosophy, behold our last resource for coming to the truth when faith is dead.[56]

Scholastic philosophy, then, had become a museum piece, guarded, in this view, by a small group of the elite, no longer influencing the thinkers of the day. It had been left behind by the world of science somewhere down through the years. Even toward the close of the 19th century it was still considered to be out of touch with the intellectual community, as seen in this appraisal of traditional philosophy in France:

> It still penetrates very little into the scholarly world. It is cultivated in a certain circle; outside of this circle, it is known very little ... Scholastic philosophy has as yet penetrated neither the Institute nor the University. There is some esteem for certain of its tenants, but there is not that much esteem that there is an effort being made to understand it.[57]

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[56] Ibid., p. 14. The original: "Le plus grand malheur de notre siècle, c'est que la foi religieuse lui manque; et elle lui manque, parce qu'on a séparé la foi de la science, parce qu'on les a déclarées incompatibles si non contraires ... La philosophie, voilà notre dernière ressource pour revenir à la vérité, quand la foi est morte."

[57] Comte Domet de Vorges, La Philosophie Thomiste pendant les Années 1888-1898 (Paris: La Société Bibliographique, 1899), p. 20. The original: "Elle pénètre très peu encore dans le monde savant. On la cultive dans un certain cercle; en dehors du cercle, elle est à peu près inconnue ... la philosophie scholastique n'a encore pénétré ni à l'Institut ni dans l'Université. On y estime quelques-uns de ses tenants, on n'est pas arrivé à l'estimer assez elle-même pour chercher à la comprendre.

We can see, however, that some philosophers had started moving in the direction of Scholastic revival in Germany, Italy and Belgium.[58] This renewed interest in Scholastic Philosophy was concomitant with the revived scientific studies made in seminaries and other ecclesiastical circles. The renewed interest in the "worldly" sciences gave rise to a new movement of philosophic thought:

> Ecclesiastical philosophic teaching distinguishes itself today into two schools: one, which comprises almost all the courses established in the seminaries, remains attached to the ancient method, and we can call it Scholastic; the other, which occupies few chairs but counts many partisans in the young clergy, called itself the Philosophy of Common Sense, and even pretends to be the true Catholic Philosophy.[59]

This new "Catholic Philosophy" seems to have been an effort at turning the attention of philosophical thought toward the problems raised by the scientific discoveries of the era. Religious and political problems of the day were treated philosophically, indicating that a refreshing breeze of renewed life was stirring the surface of the waters of Scholasticism.[60] A leading thinker in Europe who contributed greatly to a renewal of Scholastic Philosophy during the last half of the 19th century was Msgr. Désiré Mercier, professor at the Univer-

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[58] Ibid.

[59] L'abbé Bautain, De L'enseignement de la Philosophie en France au Dix-neuvième siècle (Strasbourg: Février, 1833), p. 36. The original: "L'enseignement philosophique ecclésiastique se distingue aujourd'hui en deux écoles: l'une, qui comprend presque tous les cours établis dans les séminaires, est restée attachée à l'ancienne méthode, et nous pouvons l'appeler Scholastique; l'autre qui occupe jeune clergé, se fait appeler Philosophie de sens commun et prétend même être la vraie philosophie catholique."

[60] Ibid., p. 56.

sity of Louvain in Belgium. Professor Mercier, a scholastic philosopher of "less rigorous tendencies,"[61] held close to scholastic doctrine but at the same time "took into account new ideas" in order to make philosophy relevant.[62] Efforts like those of Mercier and of the school of "common sense" philosophy encouraged a renewed research in the philosophical masters, Aristotle and St. Thomas. This enabled Catholic thinkers to eventually see at least some compatibility between Darwin's theory of evolution and the traditional philosophy of the ancients.

In some areas, then, the 19th century was an era filled with the ideas and philosophical attitudes of the past, challenged by the vastly expanding store of scientific data of the present. During this time, the intellectual atmosphere was a combination of the inherited tradition of Aristotle, St. Thomas, and the Scholastic Philosophers; but it needed to be reinvigorated by a renewed study of the masters and of the rationalistic attitude inherited from the 17th and 18th centuries, which sought to unite all types of knowledge under the precision and stability of the geometric spirit. This atmosphere led to a rigorous and literal interpretation of the Bible, and led Christian thinkers faced with the facts uncovered by the natural sciences to the dilemma which separated the intellectual

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[61] Domet de Vorges, "Bibliographie de la philosophie thomiste de 1879 à 1888," XVIII, Annales de philosophie chrétienne (Paris: La Société Bibliographique, 1888), p. 596. The text: "Msgr. Mercier, professeur à l'Université, a des tendances moins rigoureuses. Très fidèle à la doctrine scholastique, il tient toutefois compte ... des idées nouvelles."

[62] Ibid.

community into two camps, for:

> It seemed as if a scientist who did not believe in creation was forced to believe in evolution. On the rebound, Christian philosophers thought that rejection of evolution was imposed by Christian dogma.[63]

Against this background, there arose the reactions to the theory on the origin of species -- reactions which reflected the confusion of the era. Lacking a clear insight into the fundamental religious and philosophical principles involved, each thinker reacted according to his own prejudices. This cluttered the intellectual atmosphere with so many arguments that it was not until the following century that the real difficulty that evolution presented to Scholastic philosophy was to be clarified. The lack of a set of commonly accepted philosophical principles anguished the 19th century mind, which longed for the unity of the Christian or, later, the rationalistic world-view. Such an atmosphere is exemplified in at least one author of the era as he observes at the close of the century:

> It is time to make haste, because the century is dying from the perturbation of all convictions, the unbridling of all passions, the contempt of all rules. This century so powerful in industry, so skillful in experimentation, so human and so generous in its aspirations, this century lacks a fixed doctrine, it does not know where to attach itself, it is carried away by every wind of doctrine, and its best instincts become traps which make it fall into its biggest errors.[64]

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[63]Andrew Van Melsen, "Philosophical Aspects of Evolution," in Symposium on Evolution (Pittsburgh: Duquesne University Press, 1959), p. 63.

[64]Domet de Vorges, Annales de philosophie chrétienne, XVIII, p. 602. The text: "Il est temps de se hâter, car le siècle se meurt par l'ébranlement de toutes les convictions, le déchaînement de toutes les passions, le mépris de toutes les règles. Ce siècle si puissant dans l'industrie, si habile dans l'expérimentation, si humain et si généreux dans ses aspirations, ce siècle manque d'une doctrine fixe; il ne sait où se rattacher, il est entraîné à tout vent de doctrine, et ses meilleurs instincts deviennent des pièges qui le font tomber dans ses plus grandes erreurs."

Reactions To The Theory of Evolution

The impact created by the publication of Darwin's theory can be treated on various levels: the emotional and religious, the philosophical and scientific. Though we are investigating the problem of evolution here primarily from the philosophical point of view, we feel it is important to see that many of the philosophical arguments were grounded in the emotional, religious or scientific spheres. Thus we have chosen examples of various types of argumentation used both for and against the theory of evolution. Though, as we have stated, it would be impossible to include every author of the era in this historical investigation, we have endeavored to consider those authors available to research which we considered to be representative of the various approaches to evolution. We will first present positions taken against evolution and then those favorable to the concept.

Emotional and Religious Reactions Against Evolutionary Theory.

Even before Darwin published his book, The Origin of Species, the conflict around evolution was developing. Forerunners of Darwin were writing on the issue during the first half of the 19th century.[65] There was a strong reaction against the theory of evolution by those who clung to a literal accept-

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[65]Cf. the historical sketch at the beginning of The Origin of Species spoken of in Part I of this chapter.

ance of Genesis.

> An example of this taking of position (against evolution) is had already in 1841 in the widely diffused manual by P.G. Perrone, in which, against the first evolutionists it is affirmed that the immediate formation of the body of Adam by God pertains to the faith, in the sense that it was not the product of a spontaneous evolution.[66]

This strong position, found in the theology manuals of the day and taught future priests, was reflected in the declaration of the regional council of Cologne in 1860, shortly after the appearance of The Origin of Species. Though this is not an official pronouncement by the central teaching authority of the Catholic Church, it is nevertheless a representative example of the thought of ecclesiastical leaders at that time. The council declared, in part, that the first parents were "created immediately by God,"[67] and that the theory of the spontaneous transformation of man's body from an imperfect nature toward actual human nature is "contrary to sacred Scripture and to the faith."[68]

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[66] Zolton Alszeghy, S.J. and Maurizio Flick, S.J., Il Creatore (Nuovo Corso de Teologia Cattolica, Vol. III, Parte II, Florence: Libraria Editrice Fiorentina, 1964), p. 277. The text: "Un esempio de questa preso de posizione si ha gia nel 1841 nel manuale diffusissimo de P.G. Perrone, in cui, contro i primi evoluzionisti, si afferma che appartienne alla fede la formazione immediata del corpo de Adamo da parte di Dio, nel senso che esso non fu prodotto per un evoluzione spontanea." The manual referred to is Perrone's Praelectiones Theologicae, 5, Tractatus de Deo Creatore, pars 3, propositio 1.

[67] Ibid., p. 278. The decree is taken from Collectio Lacensis SS. Conciliorum Recentium, 5, 292 and is quoted as: "I progenitori furono creati immediatamente da Dio (Gn. 2:7). Dichiariamo quindi del tutto contraria alla S. Scrittura e alla fede la sentenza de coloro i quali ardiscono asserire che l'uomo, quanto al corpo, è derivato dalla spontanea transformazione de una natura imperfetta, che di continuo migliorò fino a raggiungere la natura umana attuale."

[68] Ibid.

The end of the 19th century saw numerous authors throughout Europe attack the theory of evolution on the basis of religious principles.[69] At the turn of the century a champion for the anti-evolutionary cause who minced no words was found in the Jesuit H. Muckermann, whose books were published in English in the United States. Muckermann heaped scorn upon the "proofs" of the theory of evolution and upon their proponents. He ends by proclaiming that Darwinism is to be unconditionally rejected, that Haeckel's monism is a philosophical absurdity, and that the doctrine of man's animal descent is directly opposed to faith. He does admit, though, that a limited theory of evolution in certain animal species is "a harmless doctrine which belongs entirely to the domain of the natural sciences ... is not opposed to faith, nor does it contradict the principles of reason ... (and) is in full harmony with the Christian view of creation."[70]

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[69] Among those who wrote against evolution was R.P. Pio de Mandato who in 1892 published an article in Academia Romana, vol. Vii in which he absolutely rejected evolution as thesis or as hypothesis (referred to by Domet de Vorges, La Philosophie Thomiste, p. 137). Domet de Vorges also refers to the book Der Mensch, sein Ursprung und seine Entwichlung, published in Germany by Herr Gutberlet in 1896 in which the author pronounces the animal descent of man impossible as far as the soul is concerned and in no way demonstrated on the physical level. (cf. Domet de Vorges, La Philosophie Thomiste, p. 13.) At the close of the century, l'Abbé Eugène Barbier wrote in Sciences Catholiques, 15 janvier 1899 and 15 mars 1899, the article "La théorie évolutive en face du Dogme Catholique et de ses formules" directed against the article "La Doctrine Evolutive et l'Histoire de la Littérature" published by Mr. Ferdinand Brunetière in the Feb. 15, 1898 issue of Revue des Deux Mondes. Brunetière had compared the doctrine of evolution to Catholic Dogma, showing its development. Barbier replied that Catholic Dogma does not evolve and neither do people - at least not from apes. (cf. p. 32 of Barbier's article.)

[70] H. Muckermann, S.J., Attitude of Catholics Towards Darwinism and Evolution (St. Louis: B. Herder, 1906), p. 110. These conclusions, outlined in three points, are found on the same page (cf. also Muckermann, The Humanizing of the Brute), in which the author shows that instinct and intelligence differ essentially and that animals have no intelligence.

In dealing with the proponents of evolution, however, Muckermann's treatment is a good example of the somewhat less than scientific approach to the problem of evolution. He reacted vehemently against the possibility of degrading man's nobility. He dismisses Darwin with the statement, "Indeed, besides bearing the stamp of puerile naiveté, Darwin's theory is altogether insufficient in itself and in open contradiction with reality."[71] With Darwin dealt with, Muckermann turns to Haeckel with the words of Longfellow, "Let us see what the learned wag maintains, with such a prodigal waste of brains."[72] He then continues, "and what is Haeckel? We have said it. Herr Haeckel of Jena is a pretentious humbug, and adept in verbal jugglery, who has always learned his lessons well by heart, being as blissfully ignorant of logic and psychology as the whilom monkeys of his noble lineage."[73]

The most basic source of all the energy Muckermann expends in his damnation of evolutionary theory lies in his religious conviction of man's nobility and in his fear of evolutionary doctrines' effect upon established religion. This can be seen when he states, "Haeckel's generalization of Darwin's theory of natural selection is a philosophical and social monstrosity, a conception diametrically opposed to the Christian

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[71] Ibid., p. 16. The italics are those of Muckermann. He rejects Darwin's basis of natural selection (the prime cause of specific evolution) as insufficient "because in its futile attempt to furnish an explanation of the origin of useful characteristics and of the order and harmony so dominant in the world of living beings, it must have recourse to chance." (p. 22.)

[72] Ibid., p. 42.

[73] Ibid. Italics are those of Muckermann.

world-view and to the religion of God."[74] Muckermann attributed the popularity of the theory of evolution to a certain unscientific irrationalism in men, who

> are influenced not so much by a scientific impulse as by an indefinite, incomprehensible liberalism - a vague craze for revelation, if we be allowed to use the term. And what was the result of this fascination? That Darwinism was treated rather as a sort of new religion than as a subject of scientific import. It was followed by results usually consequent upon such an innovation and created champions who would have done honor to Mohamed - luckily the only weapons at their disposal were paper and ink. In the opinion of the intelligent, however, Darwinism has long since run its course, and the eulogies sounding its merits have proved to be funeral dirges.[75]

To Muckermann, then, Darwinism was a passing fancy which caught the imagination of low-minded men who were intent upon destroying religion; but who, in the long run, would prove merely to be examples of "how an entire generation can be hoodwinked."[76]

This repressive attitude was apparently shared by some authorities in the Church. Though there was no official document concerning evolution published until 1909, there are nevertheless indications of efforts at quieting Catholic writers who found no conflict between Catholic Dogma and evolutionary theory. In a later section of this chapter, the Catholic authors who sought to reconcile the doctrine of evolution with Catholic

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[74] Ibid., p. 74.

[75] Ibid., p. 24.

[76] Ibid., p. 23. Muckermann here quotes Dr. Hans Driesch as being of this opinion in the Biologisches Centralblatt (Vol. XVI, p. 355).

beliefs will be considered; but it must be mentioned here that official ecclesiastical opposition was effective in silencing some of them. The Dominican M.D. Leroy was called to Rome in February of 1895 after having published an opinion that evolution was contrary neither to Scripture, to the Fathers, nor to the Council of Cologne. In the same month he published a letter in which he stated that he had learned that his thesis had been examined by competent authority and judged untenable - that evolution in regards to the body of man was "against sacred Scripture and a sane philosophy."[77]

About the same time, Father John Zahm, C.S.C., a professor at Notre Dame University in the United States, wrote several works on the topic of science and religion. He mentioned the problem of evolution in his book Evolution and Dogma, commenting that several Catholic authors such as Mivart and Leroy had found no basic contradiction between evolution and Catholic Dogma, a position which he himself supported.[78] When he wrote his book, however, Professor Zahm "did not know that the good Father Leroy, called to Rome in February, 1895, ad audiendum verbum, had disavowed, retracted and condemned the

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[77]Alszeghy-Flick, Il Creatore, p. 278. The letter was published in Le Monde, 4 mars 1895 and also Civilta Cattolica, Série 17, Vol. 5, 1899, pp. 48-49. The book which Leroy had published will be examined below. Cf. P.M.D. Leroy, O.P., L'évolution restreinte aux espèces organiques (Paris: Lyons, 1891).

[78]Rev. John A. Zahm, C.S.C., Evolution and Dogma (Chicago: D.H. McBride and Co., 1896). The theory of Zahm will be presented in a later section of this chapter.

aforesaid theory by an authentic act, replete with his signature."[79] Finding that the Holy See was against any further diffusion of his own book, Zahm had it removed from circulation.[80]

Finally the Holy See did act in a public way. The first official document directed to the whole Church concerning the question of transformism was published in 1909 in a response from the Biblical Commission.[81] The document treated of several facts presented in the first three chapters of Genesis which could not be doubted in their literal historicity. Among these was the special creation of man:

> It seems that here the Biblical Commission wanted to inculcate not only that God had created the soul of the first man, but also a special action of God concerning the body: it speaks in fact of a special creation of the entire man.[82]

This was to be the document henceforth cited by those theologians and philosophers who opposed the theory of evolution as being against Sacred Scripture and the Catholic Faith.

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[80] A letter from Zahm to the Italian translator was published in Civilta Cattolica, series 17, Vol. 17, 1899, p. 125. Also there were published two letters from Msgr. G. Bonomelli who had originally supported Zahm's theory, in which he (Bonomelli) retracts his support (Civilta Cattolica, Vol. 20, 1902). Bonomelli states that the authority that had judged the work of Zahm was the supreme tribunal of the Holy See, but that the Holy See had not believed it opportune as yet to condemn the theory of evolution with a public act.

[81] Alszeghy-Flick, Il Creatore, p. 281.

[82] Ibid. The text: "Sembra che qui la Commissione Biblica voglia inculcare non solo che Dio ha creato l'anima del primo uomo, ma anche un'azione speciale di Lui reguardo al corpo: si parla infatti di speciale creazione dell'uomo interro."

Philosophical and Scientific Reactions against Evolutionary Theory

Before Darwin published The Origin of Species, the official philosophy textbooks purported to be presenting the wisdom of the ancients in the lines of Aristotelian-Thomistic thought, destroying, with irrefutable arguments, the "systems of the unbelievers."[83] These "unbelievers" were authors who had recourse to any power except God's in accounting for the present situation of the world. In order to fully eliminate all possible heterodox thought, the textbooks necessarily reduced all the systems of thought to a convenient small number of handy one-sentence summaries. This allowed for a quick and thorough disposal with no "left-over systems" unaccounted for. Thus: "all might be reduced to three classes, namely to the Fatalists, the Causalists and the Pantheists."[84] Next, the textbooks called for the formulation of a comprehensive, venerated principle which would act as the ultimate weapon. Thus: "There is nothing in the effect which is not in some way in the cause."[85] Then each of the heterodox systems would be presented in the form of a one-phrase resumé which would be dialectically opposed to the basic principle. Thus: "In the world there is found mind, intelligence, reason, all of which are in no way to be found in atoms, nor

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[83] Rev. Franz Rothenflue, S.J., Institutiones Philosophiae Theoreticae (Fribourg: J. Piller, 1842), p. 103. The author begins: "Refutatis systematibus incredulorum ..."

[84] Ibid., p. 92. The text: "Atamen ad triplicem fere classem omnes revocari possunt: nempe ad Fatalistas, Causalistas et Pantheistas ..."

[85] Ibid., p. 103. The text: "Nihil est in effectu, quod aliquo modo non sit in causa ..."

can they be there."[86] The conclusion is self-evident. One can only sweep up the pieces of the destroyed theories.

In this way, any theory that did not resort to the direct creative activity of God was destroyed as being "against reason." These systems of philosophical thinking, however, were confined mainly to the seminary where the Latin texts could be understood. The work of Fr. Rothenflue from which the above arguments were taken had been one of the official texts used in French seminaries during the 19th century.

Others tried to relate philosophy to the problems of the day and remove it from ecclesiastical domination. One of these was M. Buchez, a doctor of medicine who wanted to present a philosophy which was complete and Christian. Although Buchez wrote in 1839, he was already attacking the evolutionists of his day, mainly on the basis of their materialism.[87] Buchez proposed that there was some truth to be found in the discoveries of paleontology and archeology, in the successive appearance of new forms of life,

> but also one finds the evident marks of a law of progress of which each of the terms is so much separated, so much different from that which precedes and that which

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[86] Ibid.: "atqui in mundo reperitur mens, intelligentia, ratio, quae in atomis nullo modo insunt nec inesse possunt, ergo..."

[87] M. Buchez, Traité complet de philosophie, du point de vue du catholicisme et du progrès, Vol. II (Paris: E. Eveillard, 1839). The author treats of the evolutionists of his time, whom he sees as materialists, in this second volume of his work. For his criticisms of Materialism, cf. pp. 281-295.

> follows, that it is absolutely impossible to establish the least material transition among them.[88]

After accusing the evolutionists of having drawn conclusions which were not justified by scientific facts, Buchez continues to consider the arguments of evolutionists who portray man as merely a highly developed animal, with no faculties essentially higher than those found in the rest of the animal world. Reacting to this position of fatalism, which is incompatible with Christian belief, Buchez examines the activities of man which place him above the animal world and cannot be explained by mere physical forces. He concludes:

> Finally it suffices that each of us consult and listen to himself in order to be assured that he possesses the freedom to choose, that he chooses, that is, that he wills. But, freedom of choice is the direct negation of fatalism. It is thus proven by the facts that the general philosophic conclusion of materialism is false, and, consequently, that the doctrine itself is a dream of sick spirits.[89]

Buchez then goes on, in his third volume, to present a theory that attempts to reconcile scientific findings and the data of revelation. His theory of "progress" refers to a pro-

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[88] Ibid., p. 296. The text: "mais aussi on y trouve les marques évidentes d'une loi de progrès dont chacun des termes est tellement séparé, tellement différent de celui qui le précède et de celui qui le suit, qu'il est absolument impossible d'établir la moindre transition matérielle entre eux."

[89] Ibid., p. 297. The text: "Enfin il suffit que chacun de nous se consulte et se sente pour être assuré qu'il jouit de la liberté de choisir, qu'il choisit, c'est-à-dire qu'il veut. Or, le libre arbitre est la négation directe de fatalisme. Il est donc prouvé, par les faits, que la conclusion philosophique générale du matérialisme est fausse, et, par conséquent, que la doctrine elle-même est un rêve d'esprits malades."

gressive creationism. Instead of destroying his own work of creation, God simply creates a new potency in a species marked for extinction, enabling it to continue to reproduce and develop.

> Thus the Creator, in following the line of his activity, must have proceeded constantly by the creation of new beings, charged to act, each one according to a certain law, upon the ensemble of beings created previously. Behold the only way, according to us, in which it is possible to understand the series of modifications produced by the will of God, or, in other terms, the effects of supreme activity.[90]

All of this theoretical reasoning preceded the publication of The Origin of Species. As the controversy around man's origin rapidly expanded, even the Latin philosophical texts attempted to refute the godless efforts at explaining man's beginning. A good example is the work produced in France by Father Grandclaude in 1862.[91] This work destroys the theory of transformism in three arguments. His first argument points to the evidence of universal experience:

> No one has ever found an individual whose species among the minerals, vegetables or animals was in this marvelous state of peregrination to a more noble species: vg. an inanimate thing like a rock which was beginning to live, or a wolf that was taking on the form of a lion, or an ape that already had acquired a part of human nature.[92]

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[90] Ibid., Vol. III, p. 83. The text: "Ainsi, le Créateur, en poursuivant la ligne de son activité, a dû procéder constamment par la création d'êtres nouveaux, chargés d'agir chacun selon une certaine loi, sur l'ensemble des êtres créés antérieurement. Voilà seulement, selon nous, comment il nous est donné de comprendre la série des modifications produites par la volonté de Dieu, ou, en d'autres termes, les effets de l'activité suprême."

[91] L'Abbé Eugène Grandclaude, Breviarium philosophiae scholasticae, 3 vols. (Paris: Gaume frères et J. Duprey, 1862). This text was also used in French seminaries in teaching Scholastic philosophy.

[92] Ibid., Vol. II, p. 44. The text: "nullum enim umquam invenitum est individuum cujuscumque speciei inter mineralia, vegetalia aut animalia, quod sit in statu illius mirabilis peregrinationis ad nobiliorem speciem: v.g. res inanimata, ut lapis, quae vitam subripere incipiat; lupus qui leonis formam invadat; simius qui mediam partem naturae humanae jam assecutus sit."

Thus, he says, it is evident to all that species are fixed and immutable, and transformism is absurd.[93]

Grandclaude's second argument arises from the aims of evolutionists. They are proposing their theory either "to deny the existence of God and the creation of the world from nothing"[94] or "to establish an indefinite progress"[95] or, finally, "to reduce all activity to mechanical laws."[96] This is aimed at placing all beings on the same natural level, without radically diverse internal grades of perfection. But, says Grandclaude, "the scope and principles are perverse and inane figments," and therefore the theory is false.[97] He then continues to his third proof. If forms were convertible into other diverse species, then, "with the transformation completed, (the forms) would be at the same time the same and diverse; and since the transformation takes place through a lasting, successive motion, they would never be the same, nor diverse."[98] This last argument points to the real form-essence problem presented to Scholastic philosophy by the notion of transformism. It would be some time, though, before this Scholastic teaching was re-examined in the light of

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[93] Ibid.

[94] Ibid. The text: "Ut negent Dei existentiam et creationem mundi ex nihilo."

[95] Ibid. The text: "ut progressum indefinitum stabiliant."

[96] Ibid. The text: "ut omnem activitatem reducant ad diversas leges mechanicas."

[97] Ibid. The text: "Atqui scopus et principia sunt perversa et inania figmenta,ut jam sufficienter constat."

[98] Ibid. The text: "Si formae essent convertibiles in alias specie diversas, tunc peracta transformatione essent simul eaedem et diversae; et cum transformatio fit motu diuturno et successivo; numquam esset eaedem nec diversae."

evolutionary theory.[99]

Then there were evolutionists who rejected the arguments of their contemporary, Darwin, but retained the theory of evolution, convinced that it would prove to be a better explanation for the existence of things than creation.[100]

On the other hand, Christian writers also saw more than religious difficulties with the evolutionary explanation of life. There appeared in 1888 a thorough and well-balanced treatment of the problem of evolution by A. Farges in the revue Annales de Philosophie Chrétienne, which was meant to be a resumé of the debate on evolution to that point.[101] In the first part of his work, Farges presents three possible explanations of evolutionary theory which would be acceptable from the Christian point of view, all accepting the notion of the fixity of species: 1. Continued creation in which the creator "would draw creatures more and more perfect, not from nothingness, but from pre-existing matter."[102] 2. In a variation of this first theory "one could also suppose that these more and more perfect species had been drawn by God

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[99] As will be seen below in the last part of this chapter, the philosophic argumentation seems to have remained at this point until almost the mid-20th century.

[100] A. Farges, "L'évolution des espèces," Annales de Philosophie Chrétienne (mai et juin, 1888), quotes M. Perrier who argues against those who would give man the highest development of all organs (p. 261), and M. Contajean who demolishes all the arguments for transformism but then retains the theory because it is the only way to suppress the miracle - he himself being atheist(p. 280).

[101] Ibid. The article will be treated here.

[102] Ibid., p. 147. The text: "aurait tiré, non pas du néant, mais de la matière préexistante, des créatures de plus en plus parfaites."

from less perfect species already created, not from just any matter."[103] 3. Finally, one could envisage a type of "active evolution": "God could have created at the same time all the animal or vegetable species, in a virtual state."[104] This theory would be a return to the proposal of St. Augustine.

Opposed to these three possible interpretations which try to reconcile evolution with the fixity of species, there are the theories that make evolution an absolute law, denying the unchangeableness of species. Here again there are three possibilities: 1. "Some suppose as possible, universal evolution of the three kingdoms."[105] This means, in other words, a development, through life's beginnings to its ultimate perfection in man's faculties. 2. "Others suppose only a restrained evolution in each kingdom, in which there would be several prototypes to begin each line of living beings."[106] 3. Finally, "others intend evolution, universal or restrained, in a purely passive sense."[107] Beings do not develop of themselves, through some interior force, but are produced by exterior forces working on them from the milieu.

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[103] Ibid., p. 147. The text: "On pourrait aussi supposer que ces espèces de plus en plus parfaites ont été tirées par Dieu, non pas d'une matière quelconque, mais des espèces moins parfaites déjà créées."

[104] Ibid., p. 148. The text: "Dieu aurait pu créer en même temps toutes les espèces animales ou végétales, à l'état virtuel."

[105] Ibid., p. 148. The text: "Les uns supposent comme possible l'évolution universelle des trois règnes."

[106] Ibid., p. 148. The text: "Les autres ne supposent qu'une évolution restreinte à chaque règne."

[107] Ibid., p. 148. The text: "Enfin d'autres entendent l'évolution universelle ou restreinte, dans un sens purement passif."

Having presented various evolutionary theories, Farges goes on to critically examine them. The first part of his article is given to disproving the possibility of "active evolution," the development of new beings through the activity of some inner force. He sees this as impossible because of the notion of the fixity of species, which, he says, is a positive and all-embracing law of nature.[108] Farges then presents arguments against passive evolution, which is based upon exterior influences, as in the theory of Darwin. He examines means by which passive evolution must come about and shows them to be insufficient causes for the development of new species.[109]

Farges finds it impossible, then, to accept the theories of the evolutionists, and likewise deplores the excessive words of those who spoke out in the name of religion. He thought that the attacks made in the name of the Bible "have not been able to contribute to persuading the ignorant that the proof of evolution would be the ruin of the spirituality of the soul and of the existence of God."[110] He thus looks to science to clarify the issue which it has raised, leaving the question to paleontology for proof: "It is the paleontological discoveries, and not

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[108] Ibid., p. 168.

[109] Ibid. Farges covers these in the segment published in the June issue, showing that the law of heredity does not transmit characteristics as Darwin claimed, that natural selection does not cause changes in species, and also that usage and non-usage are not the answers needed. Cf. pp. 255-260.

[110] Ibid., p. 264. The text: "les attaques ... n'ont pas pu contribuer à persuader aux ignorants que la preuve de l'évolution serait la ruine de la spiritualité de l'âme et de l'existence de Dieu."

research into the fixity of species actually living that can solve the question."[111] He concludes, then, by leaving the question to science, and professing the conviction that religion has nothing to fear from the discoveries of science or from the eventual outcome of the research into the question of evolution. The believer can still see the hand of God in nature:

> If we come to know one day that the organized beings had been little by little transformed, we will look upon them as plastic substances which an artist pleased himself to mold during the immense course of the ages (of formation) ... so that the statue-maker, with a lump of clay, produced a thousand forms following the impulse of his genius. But we will not doubt that the artist who molded was the Creator himself, because each transformation carried a reflection of his infinite beauty.[112]

In the following year another work appeared, examining the various claims and presuppositions of the theory of evolution and concluding once again that science had not at all shown in a convincing way that evolution was a real possibility.[113] This book by Jousset seems to accomplish its purpose, for "there are points which very happily put the evolutionists in contradiction

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[111] Ibid., p. 264. The text: "Ce sont les découvertes paléontologiques, et nullement les recherches sur la fixité des espèces actuellement vivantes, qui peuvent trancher la question."

[112] Ibid., p. 281. Farges is here referring to the words of M. Gaudry in Les ancêtres de nos animaux. The text: "Si nous reconnaissons un jour que les êtres organisés ont été peu à peu transformés, nous les regarderons comme des substances plastiques qu'un artiste s'est plu à pétrir pendant le cours immense des âges (de formation), ... ainsi que le statuaire avec un morceau d'argile, produit mille formes suivant l'impulsion de son génie. Mais, nous n'en douterons pas, l'artiste qui pétrissait était le Créateur lui-même, car chaque transformation a porté un reflet de sa beauté infinie."

[113] P. Jousset, Evolution et Transformisme (Paris: Librairie J.B. Baillière et Fils, 1889). The conclusions of what the author calls an "anthropological study" are found in eleven simple points, pp. 223-226.

with their laws of selection and progress."[114] At the same time the real purpose of the book is evident, a religiously motivated purpose aimed at producing "a little volume that one can read easily and rapidly, and whose conclusions amply suffice to convince readers of good faith of their noble and divine origin."[115] There is an interesting element added to this treatment, however. Besides the usual arguments brought against the notion of the eternity of matter and the laws of selection and transmission, the author makes a study of the savage. He concludes that, contrary to the evolutionary scientists who claim that primitive man is an example of the state from which civilized man came, a step closer to his ape-ancestors, the savage is rather a fallen man who was once civilized. "He is incapable of civilizing himself by his own forces and degrades himself more and more, and, left to himself, ought to fatally disappear."[116] Thus the savage cannot be used as an example of a lesser-developed human being, even in his physical characteristics, for "the prolonged savage state imprints on the body itself a characteristic degradation."[117]

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[114] Ibid., p. VII. This is from a letter of congratulation sent to the author from the Very Rev. J.H.L. Monsabre of the Preaching Brothers, and printed in the book as part of the preface. It reads in part: "Il y en a de piquantes qui mettent fort heureusement les évolutionistes en contradiction avec leurs lois de sélection et de progrès."

[115] Ibid. The text: "un petit volume qu'on peut lire facilement et rapidement, et dont les conclusions suffisent amplement pour convaincre les lecteurs de bonne foi de leur noble et divine origine."

[116] Ibid., p. 225. The text is from conclusion number 9: "Le Sauvage actuel est un civilisé déchu. Il est incapable de se civiliser par ses propres forces, il se dégrade de plus en plus et, abandonné à lui-même, il doit fatalement disparaître."

[117] Ibid., p. 226. From conclusion number 10: "L'état sauvage prolongé imprime au corps lui-même une dégradation caractéristique."

The disproportion of the face and head, and many other scientifically measured physical differences which are found in the savage "are deformities due to the absence of intellectual culture during infancy."[118] In other words, the author wanted to show that even the strongest arguments used to uphold evolution from the scientific point of view can be reversed to uphold the more acceptable concept of the "nobility and divine origin" of man ... more acceptable, that is, to those who feared Christian principles could not coexist with evolutionary theory.

Turning their attention to the many criticisms leveled at the explanations of the origins of species, scientists were already at this time reconsidering the basis of evolution, looking more toward the generative process than the milieu. Thus new theories of evolution were preparing the way for the acceptance of the Mendelian gene-chromosome system, which would be "discovered" at the turn of the century. For instance, in 1899 P. Busquet, a medical doctor and bacteriological scientist, published his "Fragmentation Theory." He drew on the store of knowledge about cell development which had been continually expanding, and proposed that evolution was due to fragmentation within a cell during the developmental process of a being, and not to natural selection.[119] This, he explains, is the only way to account for the facts discovered by science: "why forms of

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[119] P. Busquet, Les êtres vivants: Organisation-évolution (Paris: Carré et Naud, 1899). The author points to the evidence that the branching off of beings occurs at the base of zoological groups, not at their terminus points, and thus it is useless to dispute over the stability or transformability of presently existing beings. Cf. p. 177.

real transition are so rare and why paleontology itself is silent in this regard."[120] Thus the evidence of breaks within the paleontological line of life-form development will eventually be explained scientifically. This will eliminate the need for the successive-creation theories, and focus attention on the more central issue of what it is that evolves, that is, what is the species referred to by both scientists and philosophers.

Favorable Reactions to the Theory of Evolution

The scientific discoveries that linked man with the animal world in his origins gave what seemed to be ample proof to theorists who saw man limited to the material world of physical forces. Thus there appeared new explanations of reality, brushing aside the "mythical" teachings of religion and their recourse to a Supreme Being. Creating thereby for themselves new religions, these overzealous scientists aroused a flurry of defensive reactions from religious thinkers. A good example of such a scientist is Arthur Vianna de Lima. He published a work on the theory of evolution which appears to be mainly an effort at proposing his own philosophy of monism against what he refers to as the philosophies of materialism and spiritualism, both of which are false "because they are exclusive and founded upon pure abstractions."[121]

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[120] Ibid., p. 174. The text: "Ceci explique pourquoi les formes de transition réelles sont si rares et pourquoi la paléontologie elle-même est muette à cet égard."

[121] Arthur Vianna de Lima, Exposé Summaire des Théories Transformistes de Lamarck, Darwin et Haeckel (Paris: Librairie Ch. Delagrave, 1886), p. 1. The text: "spiritualisme et matérialisme sont deux systèmes faux parce qu'ils sont exclusifs et fondés sur de pures abstractions."

Vianna de Lima sees in evolution a proof of his convictions that matter itself is more than an inert, inactive, passive principle and that the dualistic distinction between spirit and brute matter is an error.[122] Elated with an account of reality that is based upon the only source of knowledge worthy of man's attention, the experimental sciences, the author proclaims:

> Only transformism gives us a rational and truly scientific conception of the world. Strictly applying the law of causality, it considers and ties together, under a unified and mechanistic point of view, all the beings and phenomena of nature, all the discoveries, all the facts methodically observed -- Its great force is not only to have been founded upon the solid base of contemporary science with the aid of experimental methods, the only sure ones, but above all because it itself is subject to evolution, to advancement.[123]

Having found what he believes to be the key to understanding and explaining the universe, then, Vianna de Lima turns against what he considered "falsehoods" of his time, especially in the area of religion, which had served to delay the progress of knowledge for so long.

> The biblical legend of creation and the religious dogmas drawn from Scripture have had the most deplorable influence; throughout a long series of centuries they have completely paralyzed all free scientific research, and

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[122] Ibid.

[123] Ibid., p. 2. The text: "Seul, le transformisme nous fournit une conception rationnelle et vraiment scientifique du monde. Appliquant dans sa rigueur la loi de causalité, il considère et relie entre eux, sous un point de vue unitaire et méchaniste, tous les êtres et les phénomènes de la nature, toutes les découvertes, tous les faits méthodiquement observés ... Sa grande force n'est pas seulement d'avoir été fondé sur les solides assises de la science actuelle et à l'aide des méthodes expérimentales, les seules sûres, mais surtout d'être lui-même susceptible d'évolution, d'avancement."

> even today when the truth has triumphed over all their more or less naive or absurd antiquated doctrines, there are still intelligences incapable of breaking completely the bonds of narrow despotism which have held them enslaved for so long a time.[124]

Continuing to drag the dispute far from the field of science and sane philosophy, Vianna de Lima goes on to prove his thesis with observations of criminals, savages and apes. He endeavors to show similarities between "present day inferior humans" and their closest ancestors.[125] Thus he says that inveterate, instinctive criminals are distinguished by certain specific characteristics; for instance, "the cranial projection in front is notably larger in the murderer than in the normal man,"[126] and the brains of these beings are lighter than normal, even though, as Vianna de Lima notes, it has been found that the heads of those guillotined were heavier than normal, due to pathological alterations.[127]

In contrast to the studies that linked the criminal and savage to an earlier stage of development, there are findings

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[124] Ibid., p. 270. The text: "La légende biblique de la création et les dogmes religieux puisés dans l'Ecriture ont eu sur les esprits la plus déplorable influence: pendant une longue suite de siècles ils ont complètement paralysé toute libre recherche scientifique, et même aujourd'hui que la vérité a enfin triomphé de toutes ces doctrines surannées plus ou moins naïves ou absurdes, il est encore des intelligences incapables de s'affranchir complètement des liens du despotisme étroit qui les a tenues si longtemps asservées." He has much more to say about religion - that creation is impossible (p. 275) and that religious sentiment is a passing phase of development (p. 174).

[125] Ibid., p. 116.

[126] Ibid., p. 117. The text: "La projection du crâne en avant est notablement plus grande chez l'assassin que chez l'homme normal." "

[127] Ibid., p. 118.

which demonstrate a "humanization" of the higher animals. There is the case, for instance, of the dying agony of the female ape, Mafuca, which was "moving and entirely human in all its details."[128] This ape apparently had a great affection for her zookeeper and so, just a few moments before dying, she hugged the zookeeper, then "looked for a long time at her friend, kissed him three times, lay down again, stretched out her hand to him a last time and died."[129] It is not surprising, then, that Vianna de Lima can say in the introduction to his book that the human being is merely "the most complex and elevated form of animality."[130]

This was characteristic of the school of thought that made an effort at reducing all knowledge, and all of reality, to the unity and simplicity of evolutionary theory. This certainly reflects the tendency of thinkers in previous centuries to try to incorporate all things into one complete, stable system; but, in this case, the stability was the law of continued development and the unity was the reduction of reality to plain, though active, matter. Not all evolutionists disclaimed religion in this way, however. Scholars like Alfred Russel Wallace preferred

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[128] Ibid., p. 65. The author states: "Le professeur Hartmann a raconté l'agonie émouvante et entièrement humaine dans tous les détails de Mafuca, l'intelligente femelle d'anthropoide du jardin zoologique de Dresde."

[129] Ibid. The text: "... regarda longuement son ami, l'embrassa trois fois, se recoucha, lui tendit une dernière fois la main et expira."

[130] Ibid., p. 11. The author states: "L'homme n'est point ce dieu tombé qui se souvient des cieux ... mais purement la forme la plus complexe et élévée de l'Animalité." He adds that the difference between man and the closest of species is one of quality, not of essence.

to follow in the path of Darwin and allow for the possibility of some divine, guiding force. In the case of Wallace, this guiding power took the form of some will-force:

> If, therefore, we have traced one force, however minute, to an origin in our own Will, while we have no knowledge of any other primary cause of force, it does not seem an improbable conclusion that all force may be will-force; and thus, that the whole universe is not merely dependent on, but actually is, the Will of higher intelligences or of one Supreme Intelligence.[131]

Despite the excessive enthusiasm displayed by proponents of the evolutionary theory like Vianna de Lima, and encouraged by guiding-force proponents like Wallace, there arose toward the end of the 19th century a small group of Catholic writers, steeped in the traditions of scholastic philosophy and bound by the teachings of the Bible. They tried to reconcile evolution with the religious and philosophical principles of Orthodox Christianity. Among the first of these to write after the publication of The Origin of Species was St. George Mivart. In 1871 he presented his theory in London, stating that man's body could develop through evolution and that the doctrine of the spirituality of the soul could still be retained. As he concluded his work, Mivart summarized his essential points:

> Man, according to the old scholastic definition, is "a rational animal" (animal rationale), and his animality is distinct in nature from his rationality, though inseparably joined, during life, in one common personality. This animal body must have had a different source from that of the spiritual soul which informs it, from the distinctness of the two orders to which those two existences severally belong.

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[131]Alfred Russel Wallace, Natural Selection (London: Macmillan & Co., 1870), p. 367.

> Scripture seems plainly to indicate this when it says that "God made man from the dust of the earth, and breathed into his nostrils the breath of life." This is a plain and direct statement that man's body was not created in the primary and absolute sense of the word, but was evolved from pre-existing material (symbolized by the term "dust of the earth"), and was therefore only derivatively created, i.e. by the operation of secondary laws. HIs soul, on the other hand, was created in quite a different way, not by any pre-existing means, external to God himself, but by the direct action of the Almighty, symbolized by the term "breathing:" the very form adopted by Christ, when conferring the supernatural powers and graces of the Christian dispensation, and a form still daily used in the rites and ceremonies of the Church.[132]

The opinion of MIvart was criticized by other Catholic writers, "but ecclesiastical authority did not intervene; in fact, in 1876 Pope Pius IX conferred the title of doctor in philosophy on Mivart."[133] Some years later, in 1891, Cardinal Z. Gonzales corrected the theory of Mivart, saying that "one could reconcile this opinion (of Mivart) with the faith if one adds that God exercised a special action on the body,making it capable of receiving the spiritual soul."[134] In this way one could not say

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[132] St. George Mivart, F.R.S., On The Genesis of Species (London: Macmillan & Co., 1871), p. 282. Italics those of Mivart.

[133] Alszeghy-Flick, Il Creatore, p. 280. The text: "... ma l'autorità ecclesiastica non intervenne, anzi nel 1876 Pio IX conferì al Mivart il titolo de dottore in filosofia." Alszeghy adds that the difficulties which Mivart had in the latter part of his life, around the end of the century, were not caused by his ideas on evolution.

[134] Ibid. The text: "Secondo lui, si potrebbe conciliare con la fede quest'opinione; se si aggiunge che Dio ha exercitato un' azione speciale sul corpo, per renderlo capace de ricevere l'anima spirituale." The Cardinal published his opinion in Spain in 1892. Cf. Cardinal Z. Gonzales, La Bibbia y la ciencia, 1, id.2(Sevilla, n.p. 1892). For a reaction against the theory of evolution, cf. the article published in the Roman Academy review by R.P. Pio de Mandato, Academia romana, Vol. VII, 1892.

that Adam was the son of a brute, even if his body were produced by an animal generative process. This explanation did not provoke any reaction by ecclesiastical authority.[135]

About the same time, Rev. M.D. Leroy, O.P., took up the opinion of Mivart, explaining that, philosophically, it could be said that not even the body of man would be, properly speaking, the product of evolution, for the body becomes human only at the moment in which it is fused with the spiritual soul.[136] "One can thus admit that the substructure, that is, the matter destined to receive the soul, was the product of evolution. This opinion could not be said to be contrary to Scripture, nor to the Fathers, and not even to the decree of the provincial council of Cologne."[137] However, in February of 1895, Fr. Leroy was called to Rome, and in the same month he published a letter in which he stated that he had been informed that his thesis, examined by competent authority, "was judged untenable in what was concerned with the human body because it is against Sacred Scripture and the principles of a sane philosophy."[138]

Rev. J. A. Zahm, C.S.C., a contemporary of Fr. Leroy and a professor of physics at Notre Dame University in the United

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[135] Ibid.

[136] Ibid.

[137] Ibid., p. 278. The text: "Si puo però ammettere che il substratum, cioè la materia destinata a ricevere l'anima, sia prodotta dall'evoluzione. Questa opinione non si puo dire contraria né alla Scrittura, né ai Padri, e neppure al decreto de Concilio provinciale de Colonia."

[138] Ibid. The text: "... era stata giudicata insostenibile, in quanto concerneva il corpo dell'uomo, perché in contrasto con la S. Scrittura e con i principi di una sana filosofia." The letter is published in Le Monde, 4 mars 1895, and in Civilta Cattolica, Série 17, vol. 5, 1899, pp. 48-49.

States, wrote several works on the science-faith relationship, and, in 1896, published his book Evolution and Dogma. In his opinion, evolution as applied to plants and animals was not contrary to Catholic doctrine; but, in reference to man, the soul must be considered the product of the direct action of God, though the body could have been prepared by the evolutive process:

> Evolution, then, I repeat it, is contrary neither to reason nor to Scripture. And the same may be said of the diverse theories of Evolution which, during these latter times, have had such a vogue. Whether, therefore, we accept the theory of extraordinary births, the saltatory Evolution of Saint Hilaire and St. George Mivart, or Darwin's theory of natural selection, which takes account of an infinitesimal increment; or Weismann's theory of heredity, which traces specific changes to the germ-plasm, we are forced to admit that the ultimate efficient cause of all the changes produced, be they slow or sudden, small or great, is the Creator himself, acting through the agency of second causes, through the forces and virtues which He, Himself, communicated to matter in the beginning. Such being the case, it is obvious that Evolution does not exclude creation, and that creation is not incompatible with Evolution.[139]

However, Fr. Zahm also was informed that the Holy See disapproved of the further distribution of his book, so he had it taken out of print.[140]

Thus, as the century of Charles Darwin came to a close, those writers who attempted to reconcile faith and evolution were quietly issued a warning about the dangers of their position.

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[139] Rev. J.A. Zahm, Ph.D., C.S.C., Evolution and Dogma (Chicago: D.H. McBride & Co., 1896), p. 423. Cf. other books written by the same author: Catholic Science and Catholic Scientists (Philadelphia: H.L. Kilmer & Co., 1894) and Bible Science and Faith (Baltimore: John Murphy & Co., 1894).

[140] Cf. above, note 80 covering this. His book had already been translated into French: L'évolution et le dogme (Paris: P. Lethielleux, 1897), and was being translated into Italian when Zahm stopped publication.

The attitude of "wait for science to clarify the issue" seems to describe the situation imposed upon Christian thinkers. Such an attitude is aptly expressed by Fr. N. Boulay who, referring especially to the work of Fr. Zahm, commented that there were too many "approximations" yet to be clarified in the theory of evolution.[141] Fr. Boulay, a doctor of science and professor at the Catholic University of Lille, published an examination of the geological eras and estimated the age of man to be more extensive than previously thought. He added, however, that what was then known by science still did not disagree with the Bible.[142]

At the very close of the century, in his book on evolution and dogma, Boulay called upon philosophers and scientists alike to investigate the real issue involved. This was an indication that the polemics of the past were coming to an end, so that Christian philosophers would cautiously be able to turn their attention to serious considerations of the problem of the origin of species. Thus, Boulay wisely cautions:

> Before going further, the great question to resolve is in that of species: the ancients, Aristotle in particular, and the Scholastics possessed very clear notions of genus and species; but with the exception of the human species, they did not make any applications.[143]

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[141] Boulay, L'Evolution et le Dogme, p. 20.

[142] L'Abbé M. Boulay, L'Ancienneté de l'homme d'après Les Sciences Naturelles (Paris: Librairie Ch. Poussielgue, 1894). Cf. p. 80 in which he concludes that man is older than science had previously estimated.

[143] Boulay, L'Evolution et le Dogme, p. 15. The text: "Avant d'aller plus loin, la grande question à résoudre est dans celle de l'espèce: Les anciens, Aristote en particulier, et les scholastiques possédaient très nettes les notions du genre et de l'espèce, mais à l'exception de l'espèce humaine, ils n'en ont pas fait l'application."

It was around these notions handed down by the ancients that the problem of evolution in philosophical thought was to become centered in the new 20th century.

Throughout this chapter we have presented a number of historical and categorical examples of the treatment evolutionary theory received in its early development. These examples are merely representative, not exclusive, of the main currents of thought and its development. Muckermann exemplified emotional vehemence and religious conviction, while Vianna de Lima represented ascientific rationalism and demythologism. Others, Grandclaude, Farges, and Jousset, point to more philosophically systematic attempts to delineate the issue. Buchez, Mivart, and Zahm all represent arbitrators in the conflict; and, naturally, the cautious, sometimes punitive, voice of the Church can be heard throughout.

The Emergence of a Clear Philosophical Problematic

The polemics of the 19th century were now left behind as the 20th century opened. On the one hand, determined scientists were more interested in accumulating the scientific evidence needed to solidify the position of evolutionary theory than in denigrating philosophical positions, and, on the other hand, Scholastic philosophers were more interested in returning to the original texts of the great philosophers than in reacting against a scientific theory not yet completely understood. Christian scientists, following the leadership of the paleontologist Pierre

Teilhard de Chardin, channeled this energy into an investigation of nature's secrets, open to accepting the conclusions the evidence demanded.[144] At the same time little new was contributed to the understanding of the nature of evolution by Scholastic philosophers until the passing of several decades had established evolution as a highly respected and widely accepted theory. That philosophers were now looking at the problem with clearer minds can be seen in efforts at accepting the possibility of evolution in the light of the principles of Aristotle and St. Thomas. Men like Henri Grotten and L.E. Otis produced texts from the founders of Scholastic thought and found possible explanations for the development of new and higher forms of life within the limits of Scholastic principles. Following St. Thomas, Otis concludes that man, as the union of potency with the highest form, is the natural end of Nature.[145] Turning to the problem of efficient causality in the process of evolution, he says that all causes can be traced back to the First Cause, God, who works through secondary causes to guide the course of the universe. Thus, what appear to be superior effects are produced by inferior causes under the guidance of the Supreme Cause.[146]

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[144]It was decided not to consider the works of Pierre Teilhard de Chardin within the context of this paper. In my opinion, the unique contribution to the study of evolution made by this scholar cannot be adequately treated from the viewpoint to which this paper limits itself: that of the Thomistic philosophic tradition.

[145]Père L.E. Otis, La Doctrine de l'Evolution, Vol. 2 (Montréal: Fides, 1950). Cf. pp. 60-62.

[146]Ibid., pp. 101-102.

These speculations led to a growing awareness of a difficulty which philosophers were unable to solve without making appeal to the First Cause as the source of new-form production. Henri Gratton sees the basis for new species in the formative principle; but, instead of investigating the nature of form, he avoids the problem by making form submissive to the exigencies of the matter: "if, then, in corporeal beings the substantial form has to compare essentially with prime matter, it will be subject to the alterations and mutations which the prime matter permits."[147]

This is the conclusion one must draw from these philosophers: the matter-form doctrine can allow for evolution, if God is directing the process. This line of thinking seems to culminate in an address given by Rev. Lucien Dufault, O.M.I.. In his address he calls this directive divine intervention "natural," because it acts in accord with the nature of matter and form:

> 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 organic 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 ... Fixism is not the only alternate

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[147]Rev. Henri Gratton, O.M.I.,"Notes Philosophiques Concernant le Problème de l'évolution des Espèces Vivantes," Revue de l'Université d'Ottawa, 21 (janv.-mars, 1951), p. 9. The text: "Si donc dans les êtres corporels, la forme substantielle doit composer essentiellement avec la matière première, elle sera soumise aux altérations et mutations que permet la matière première."

> and rightly so, because fixism is a consequence of materialism.[148]

Thus the circle is complete. If the theory of evolution was considered an invention of materialistic theorists before it was scientifically sound, it was now fixism that received the same indictment. In either case, however, philosophy goes beyond itself to appeal to God's word and power. The opinion of Fr. Dufault raises another question, however, closely related to the central philosophical problematic: that is the question of form. Fr. Dufault sees the course of evolutionary history as a divinely guided passing from form to form until man is reached.

> Teleological evolution conceives the cosmos as a work of divine art; God has been preparing the world from the beginning of time for the coming of man ... none of the different species of living beings is a necessary part of the cosmos; each species is contingent ... transitory, and the cosmos can be conceived without the help of anyone in particular ... (but) the cosmos cannot be conceived without man and his essential component parts ... Thomistic Evolution is not transformism, since the brute animal is not transformed into 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 being.[149]

Fr. Dufault is clarifying the issue here, but fails to allude to the problem his position raises: the form must be more than the passing entity which matter temporarily seizes while working toward the human soul. Form is one of the principles of

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[148] Rev. Lucien Dufault, O.M.I., "The Philosophical and Biological Implications of Evolution," Proceedings of the American Catholic Philosophical Association, XXV (1952), p. 77.

[149] Ibid., p. 78.

being and, in a sense, the principle of fixism. Aristotelian-Thomistic philosophy views the existence of substantial forms in bodies precisely because of the character of stability which bodies manifest through the mutability that can also be seen in them. These "inferior forms" should, by nature, be impediments to evolution, rather than making evolution possible, as Fr. Dufault would say. Unless one overlooks the role of formal causality in Scholastic philosophy, one must ask the question of what happens to the form when matter progresses to some higher level through the help of "an adequate efficient cause."

Both matter and form are the intrinsic principles of being, and the essences of bodies are constituted by the uniting of these two principles. Existence then gives being to the unity.[150] Thus any being is given its self-identity, its resistance to transience, through the form, no matter how inferior the form might be considered, no matter how far the being is from man. The Dufault position, though, would place a transitoriness in all beings except man. The only true species, then, the only true matter-form composition, would be man. By reason of their forms, things are what they are, and herein lies the problem of evolution for Scholastic philosophy.

At last the period of preparation has come to an end and a real philosophical problematic has emerged. Within this extensive chapter, we have presented a historical discussion of the

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[150] St. Thomas Aquinas, De Ente et Essentia, trans. (Being and Essence) by Armand Maurer (Toronto: Pontifical Institute of Medieval Studies, 1949), p. 31.

development of evolutionary theory as well as both the positive and negative reactions to that theory, whether emotional or religious, philosophical or scientific. Throughout, there is an implicit assumption in the ideas discussed that every production of a new being in the evolutionary process involves this matter-form unity or essence. In the writings of these thinkers, then, we find a confusing identification between two notions of species: those new species which science says evolved, and the old fixed species which Aristotle and St. Thomas said were essentially different from one another. The problem of species in the light of evolutionary theory and Scholastic philosophy demands, then, a reconciliation between transient and absolute form. This is the problematic philosophy must investigate.

CHAPTER II

ATTEMPTS AT RESOLUTION OF THE PROBLEM

As we have seen from the examples we have presented, Scholastic philosophy had been definitely challenged by the theory of evolution. That the challenge existed was sufficiently obvious; but the delimitations and terms of its context were not yet formed. Philosophers now could turn their cognitive efforts toward formulating solutions, since the intellectual atmosphere was now conducive to philosophic investigation, and the religious and scientific controversies were more or less removed from the theater of influence. As a first step, the exact specifics of the problem had to be formulated and articulated in the philosophic terminology of Scholasticism. The basis of such an articulation appeared in an article written by Charles De Koninck of Laval in 1937.[151] The publication of this article signaled the beginning of a new phase in the philosophical problem of evolution. Systematic efforts at resolving the problem of species itself had finally begun.

Initial Principles Formulated

The first important concept De Koninck expressed in his

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[151]Charles De Koninck, "Réflexions sur le problème de l'indéterminisme," Revue Thomiste, XLIII (1937). The article is centered on the indeterminism-determinism problematic, that is, the role of chance in the universe. Within this context De Koninck brings out points important to the present consideration.

article is that there is a basic difference in the methods used by the experimental sciences and philosophy in attaining the objects of their science. Thus he says that all science tries to reduce the complex to the more simple for the purpose of understandability, but that this term "simple" is understood in different ways by the different sciences. That this equivocation exists is a fact which must be brought into consideration in this area. Thus "in experimental science a rock is infinitely more simple than a cell,"[152] and "man is incontestably the most complex."[153] However, in philosophy, it is exactly the contrary which is true. "The animal is more simple than the plant, and of all the beings which the philosophy of nature studies, it is man which is the most simple."[154] Stated in other terms:

> Experimental simplicity is inversely proportional to ontological simplicity. The philosopher will say that the scientist explains the superior by the inferior, the perfect by the imperfect. And so we can say in advance that in the measure in which an experimental explanation of man is possible, it will consist in studying him in the perspective of what is experimentally more simple than he, not to identify the complex and the elementary, but to derive one from the other. It is thus entirely natural that the scientist tries to derive man from the animal, the animal from the plant, and to see the whole hierarchy of natural species erected in the direction of a continually growing and more complex organization. The philosopher who denies

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[152] Ibid., p. 393. De Koninck states: "En science expérimentale une pierre est infiniment plus simple qu'une cellule."

[153] Ibid. The author continues: "De tous les êtres qu'étudie la science expérimentale, l'homme est incontestablement le plus complexe."

[154] Ibid. The text: "L'animal est plus simple que la plante et de tous les êtres qu'étudie la philosophie de la nature, c'est l'homme qui est le plus simple."

> even the possibility of an evolutionary theory denies the very essence of the scientific method.[155]

De Koninck here clearly points to the necessity of studying the two methods of knowing. He indicates that the objects attained by these two different methods ought to be organized according to two different hierarchies. This will prove to be an important insight of great assistance in the efforts at solving the problem of species.

A second important element which De Koninck adds to his philosophical consideration of evolution is that of chance, or, put another way, of contingency in nature. The notion of leaving to chance or fortune the direction of nature's development seemed to be incompatible with traditional philosophic conceptualization. Traditionally, nature's generational process was seen to uphold the axiom: like produces like. The occurence of a "surprise" in nature, that is, of a failure to reproduce with a maximal exactitude on the formal level, is not the result of the external element of chance, but rather of an internal disposition, according to De Koninck. He thus says that "it is the insufficient determination of nature which makes possible the events which

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[155] Ibid., pp. 393-394. The text: "En d'autres termes, la simplicité expérimentale est inversement proportionnelle à la simplicité ontologique. Le philosophe dira que le savant explique le supérieur par l'inférieur, le parfait par l'imparfait. Ainsi nous pouvons dire par avance que dans la mesure où une explication expérimentale de l'homme est possible, elle consistera à l'étudier dans la perspective de ce qui est expérimentalement plus simple que lui, non pas pour identifier entre eux le complexe et l'élémentaire, mais pour dériver l'un de l'autre. Il est donc tout naturel que le savant cherche à dériver l'homme de l'animal, celui-ci de la plante et à voir toute la hiérarchie des espèces naturelles s'ériger dans le sens d'une organisation toujours croissante et plus complexe. Le philosophe qui nie la possibilité même d'une théorie évolutionniste nie l'essence même de la méthode scientifique.

pass beyond the very limits of nature."[156] There remains in nature, then, a certain "margin of indetermination" which can be seen in the production of life-forms which fail to attain the exactitude of form dictated by their progenitors:

> So that the contingency proper to chance presupposes a contingency, a mutabilitas, in the natural cause. Whatever the perfection of the form might be, there still remains in the composition a margin of indetermination which exceeds it, and which can make it miss and produce an effect that is in no way predetermined in either a particular or a universal nature, because this margin exists for the whole universe.[157]

In accepting De Koninck's view, then, it would be possible to see within nature the capability of producing, if not new forms, at least slight modifications within the forms-in-existence. These modifications would prepare for the eduction of new forms in time. And in this, it can be said that "chance and fortune are, in their own way, necessary for the finality of the world."[158] This is an evolutionary view that incorporates directed, not

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[156] Ibid., p. 241. The text: "C'est l'insuffisante détermination de la nature qui rend possible des événements qui débordent les limites mêmes de la nature, limites entre lesquelles il y avait du jeu."

[157] Ibid., pp. 241-242. The text: "De sorte que la contingence propre au hasard présuppose une contingence, une mutabilitas dans la cause naturelle. Quelle que soit la perfection de la forme, il reste toujours dans le composé une marge d'indétermination qui l'excède, et qui peut faire manquer, voire réussir, un effet nullement prédéterminé dans la nature, ni particulière, ni universelle, puisque cette marge existe pour l'univers tout entier."

[158] Ibid., p. 251. Thus, De Koninck says: "De même qu'un acte libre peut comporter des conséquences heureuses nullement visées dans la détermination, de même la matière a des réserves que la nature déterminée ne peut exploiter. La nature universelle n'est pas seulement la somme des natures particulières: Le tout a une surabondance propre que les parties ignorent. Le hasard et la fortune sont à leur façon nécessaires à la finalité du monde. Cependant cette nécessité ne prédétermine point les rencontres déterminées qui auront lieu en fait, pas plus que la nécessité de vouloir la béatitude ne nous prive du libre arbitre."

arbitrary, progression.

> One sees also in what sense we can speak of the creation of possibles. (Evidently, creation is taken here in the broad sense.) And this idea applies not only to chance and to fortune, but even to nature. We have already said that the sub-human cosmic species are not absolutely certain as far as their structures are concerned, nor are they a priori true. Each species is new in its structure. Once established it constitutes a determined point of departure for other species in which the determination of their roots will be, in a certain sense, prolonged: this determination has opened the world to essential structures which would not have been determinately possible without it.[159]

Finally De Koninck turns to the question of natural species itself, giving an insight which will prepare for Mortimer Adler's development of the essential hierarchy. De Koninck sees that what exists in nature are not species, but sub-species, produced by the evolutive process in an irregular and unforseeable manner, but in an entirely forseeable hierarchy of "natural species." In the lengthy quotation we give below, Dr. John Deely tells us that De Koninck faultlessly outlines "all the essential concerns and decisive inter-implications of the traditional and modern species problematics."[160] De Koninck shows that the historically existing kinds are not at all natural species, but a priori levels

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[159] Ibid., pp. 251-252. The text: "On voit aussi en quel sens nous pourrions parler de création de possibles. (Evidemment, création est pris ici dans un sens très large.) Et cette idée s'applique non seulement au hasard et à la fortune, mais même à la nature. Nous avons dit déjà que les espèces cosmiques infrahumaines ne sont pas absolument certaines quant à leur structure, ni vraies a priori. Chaque espèce est nouvelle dans sa structure. Une fois établie, elle constitue un point de départ déterminé pour d'autres espèces dans lesquelles la détermination de leur source sera d'une certaine façon prolongée: cette détermination a ouvert le monde à des structures essentielles qui n'eussent pas été déterminément possibles sans elle."

[160] Deely, "The Philosophical Dimensions of the Origin of Species," p. 318.

or grades which cannot exist as such, but only "as realized in genetic populations of substantial individuals."[161]

> For the purposes of illustrating this idea, let us suppose a finite intelligence contemplating the universe at the period when there was no actually living thing. This intelligence would have been able to foresee with infallibility the emergence of man in this world, and also all those factors which condition absolutely the determination of matter in the line of the human composite: it would have foreseen the plant and the brute, but would have found it impossible to envision all the concrete modes according to which these natural species would be realized. These species, which are quasi-genera in relation to the sub-species, are fixed a-priori, because there is no intermediate point between "to be" and "to live," "to know" and "to understand." ... The inorganic, the plant and animal are boundary-species and certain. But it is impossible for the determination proper to the sub-species which realize these natural species in a historical fashion to participate in this positive certainty. Otherwise, the modes according to which the animal or the plant would be realizable would be actually determined in matter ahead of time ... that is to say that there would not only be an idea of matter, but settled ideas.
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> The intelligence which we have imagined would know with certitude that matter would receive a human form, but it would not be able to say much about the intermediate forms. The throng of sub-species possible is undefinable -- between the highest forms of vegetative life and the lowest forms of animal life there is yet again an indefinable number of possibles -- and consequently it belongs to the order of the unenvisionable. If one wishes to advance, one must straddle the intermediate forms, each step establishing a clear discontinuity without actual intermediates. Doubtless the structure of the ladder will be determined in a certain measure by the substances given at the outset ... but the number and interval of the stages could not be given in advance ... The surprises which matter reserves for us are undefined. One would have no way of discerning in the initial composite (or composites) a rigid plan of the hierarchy to be established, as if the universe were a multiplication table or matter a subject which received forms coming from without, as the Platonists imagined.

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[161] Ibid., p. 317.

> There is therefore a dimension of the unforseeable in the order of natural determinations: All the sub-species belong at any moment in the existence of the world to the order of future contingents. The hierarchy of these species belongs to history. One understands then why the sub-species "cow" inasmuch as it is cow is philosophically indefinable. It has a determinate truth only a-posteriori, like the actual divisions of a continuum.[162]

Although this text deserves commentary, we think it is sufficiently clear to serve as a good summation of De Koninck's position.

The Proposal of a Solution

It was not long before the principles established by De Koninck were incorporated into the effort at solving what now more and more clearly appeared to be the central issue in the evolution problematic -- the notion of species. The immediate question to be solved, then, is centered around the identification of real natural kinds existing in the world. In order to solve the ontological and epistemological problems of species as set forth by De Koninck, there had to be found a means of discriminating between the "natural species" of philosophers and the "arbitrary" or systematic species of Darwinian experimental scientists

The direction from which the solution had to come was seen by Mortimer Adler. He wrote in 1940: "The question, in short, concerns the criteria by which we are able to select that one from a series of nominal definitions which signifies a species, a real essence."[163] Dr. Adler has developed the main lines of

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[162] De Koninck, "Réflexions sur le problème de l'indéterminisme," pp. 234-235.

[163] Mortimer J. Adler, The Problem of Species (New York: Sheed and Ward, 1940), p. 37.

his solution in a number of publications over a period of several years. His arguments are somewhat clarified through the objections and notions of Jacques Maritain, to whom Adler addresses himself.[164] The importance of Adler's works, taken as a whole, is expressed by Dr. Deely:

> Dr. Adler's reflections on the problem of specific natures and the hierarchy of essences have been continuously sustained and developed over more than thirty years. In fact, they constitute the most profound contribution to the question yet made, but their very nature is such that the early writings cannot be rightly understood unless taken together with the later, much briefer essays. To judge Dr. Adler's position on the book The Problem of Species alone, therefore, would not only be a mistake, it would necessarily result in a serious misunderstanding. There are four essays which, in my opinion, must be taken as a unit, and it is necessary for the serious reader to accomplish for himself the interrelations and corrections that obtain among them. These four works are, in chronological order: The Problem of Species; "Solution of the Problem of Species;" "The Hierarchy of Essences;" and "The Philosophers Give All the Answers and Establish None," ch. 4 of The Difference of Man and the Difference it Makes. Together, these four constitute the necessary point of departure for philosophical work in this area, whether one accepts their conclusions or not. What Kant said of his own work on metaphysics in his Prolegomena, I say here of Adler's work on the philosophical problem of species: "He who undertakes to judge or, still more, to construct a theory of species and essential differences must satisfy the demands there made, either by adopting Adler's solution or by thoroughly refuting it and substituting another. To evade it is impossible."[165]

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[164] One might be referred to the foreword to The Problem of Species which was written by Maritain and answered by Adler, and also to the reference made to Maritain's objections made by Adler in his article, "Solution of the Problem of Species," The Thomist, III (April, 1941), fn. 80, p. 343.

[165] Deely, "Philosophical Dimensions of the Origin of Species," fn. 124, p. 135. The last two works referred to and not yet cited are Mortimer Adler, "The Hierarchy of Essences," The Review of Metaphysics, VI (September, 1952) and The Difference of Man and the Difference It Makes (New York: Holt, 1967). For the text to which Deely refers, cf. Immanuel Kant, Prolegomena to Any Future Metaphysics (New York: Library of Liberal Arts edition, 1950), p. 11. The emphasis is that of Deely.

Adler begins, then, what he considers the main philosophical task at hand, which is "to clear away the accumulated underbrush which obscures the field of vision."[166] He does this by turning his attention to the ontological-logical problem as it occurs in epistemology in relation to species. It may be possible to say that the science of logic considers, in its own way, the objects of all the other types of knowledge. Yet realizing this does not solve the problem of how these two spheres of knowledge must be related to one another. Hence, one must proceed to clearly delineate these two cognitive methods, avoiding the past mistakes of employing, but failing to recognize the employment of, the logical concept of species for an ontological point of view in designating existing natures.

> Although the spheres of logic and of ontology (in the broadest sense) are co-extensive, the two kinds of science are not simultaneous; each in its own way has a certain priority over the other. Thus, in the order of analysis, the logician has priority with regard to the notion of species, for species is exclusively a second intention; and when the philosopher of nature or the natural scientist uses this notion, he borrows it from the logician. This is seen in the fact that any employment of the word "species" or the word "specific" in the first intention is a derivative usage. (The concept species is a second intention even when it lends its significance to the word "species" as used in the first intention to designate a specific nature; and even when it enters, as a second intentional note, into the signification of a concept, such as man, which is primarily a first intention.) But, in the order of learning and discovery, first intentions are prior to second intentions, and here the student of nature, philosopher or scientist, take priority. Nature itself is prior to knowledge of nature, and knowledge of nature, in turn, is prior to knowledge of knowledge. If there were not in fact substances differing specifically (i.e., diverse in specific nature), we could not in truth form concepts of these natures, which contained the intention of

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[166]Adler, The Problem of Species, p. 279.

> specificity, and hence we could never have derived the concept species itself. This fact about priority is extremely important to the philosophy of nature. Although he must listen to the logician with regard to species and genus, the philosopher of nature speaks first when it comes to saying how many specific natures there are, how they share generic natures, how they are ordered, etc. There need be no conflict between logic and ontology in the consideration of these problems, in which they both have an interest; but there will be conflict, with consequent confusions and errors, unless the two spheres of knowledge are well-ordered to another. Thus, it is not for the logician alone to say whether the concept man is truly a specific concept; he can say what the formal properties of any concept must be in order for it to be a species or a genus; but the interpretation of the facts of nature in the light of strictly ontological principles is indispensable for the final determination whether this or that concept is a species or a genus. Logicians, or readers of logic, who fail to realize this fall into grave error, the sort of error which can become an obstacle to truth in the philosophy of nature, insofar as the student of nature must employ the logical concepts of species and genus. But falsity in the philosophy of nature can also cause errors in logic; if the logician is misled by the naturalist to make wrong discriminations among concepts (e.g. between those which are and those which are not properly specific), he may develop a false or confused analysis of species and genus. In fact, both of these mistakes have actually happened in the history of philosophia perennis: falsity in the philosophy of nature has caused errors in logic, and errors in logic have been an obstacle to reaching the truth about nature.[167]

Philosophical reflection, then, is given the task of disentangling this logical-ontological crossover. The clarification of this issue should thus be able to establish the reality of existing species. If there actually is a number of real species, "of essentially distinct kinds in the world of physical things,"[168]

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[167]Adler, "Solution of the Problem of Species," pp. 302-303. One could also consult the same article by Adler, fn. 87 on p. 347 where the author adds that one cannot infer from man's ignorance that there are more species than he knows.

[168]Adler, "The Hierarchy of Essences," p. 3.

they will be recognized by the order of hierarchy in which they exist. The matter of hierarchy here is presented as a hypothetical proposition: if these essentially distinct kinds exist, then "these specific natures or essences are ordered in a perfect hierarchy."[169] The importance of this investigation becomes clear in the course of Adler's study, for its results lie within two primary propositions relevant to the problem of evolution, one in metaphysics, the other in the philosophy of nature.

> It is an indispensable connecting link between them. The metaphysical proposition asserts the existence of a plurality of individual physical substances, each composite of matter and form. The proposition in the philosophy of nature asserts the existence of a small number of natural kinds that are the specific or essential natures of these physical substances.[170]

Put in more general words, the problem considered here is the challenge that the theory of biological evolution presents to Scholastic philosophy. Therefore the investigation must take place within the confines of that philosophical system, more specifically in terms of the matter-form concept of the hylomorphic doctrine. Within that world view, one must admit that some beings exist that differ radically, while others differ only accidentally or superficially. This must be understood if man is to be considered essentially higher in kind than the animals.

But what of the beings below man? Authorities estimate that there are more than 800,000 types of animals and more than

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[169] Ibid.

[170] Ibid.

200,000 types of plants known to science, and each of these is called a "species."[171] One must establish the relationship between these "species" and the essential natures that are seen to exist. If"man" possesses an essential nature, then "plant" and "animal" and "element"also seem to be the breaking off points among those things which differ essentially in kind. Hence arises the necessity of clearly distinguishing the elements of this problem if a solution is to be achieved. As we have pointed out, this is precisely where so many scientists and philosophers of the 19th century have failed.

> They use the words "degree" and "kind" without qualifying them by such critical modifiers as "real" and "apparent", "superficial" and "radical." The reader will find that the philosophical and scientific literature on the subject of man's difference is simply not intelligible without these distinctions, especially the distinction between a radical and a superficial difference in kind. He will see that if the only distinction available were the one between difference in kind and difference in degree, the scientists who acknowledge that man differs in kind but who also maintain the continuity of nature and the evolutionary principle of phylogenetic continuity would be unable to do so without contradicting themselves.[172]

Toward a Hierarchy of Essences

The central argument here concerns itself, then, with the hypothetical proposition of the hierarchy of essences -- hypothetical because the reality of the essences need not be considered at this point. If a hierarchy of essences can be established, however, it would be a simple step to relate that

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[171] Ibid., p. 6.

[172] Adler, The Difference of Man, p. 32.

hierarchy to actually existing beings. This would become our criterion for defining real species and the conclusions for the evolutionary problematic would be clear.[173]

The first step of Dr. Adler's argument is concerned with "the intelligibility, not at all with the reality, of a three-fold distinction of the modes of differentiation."[174] Up to this point, Adler has introduced two notions central to his discussion: that of essence and that of natural kinds. The first presupposes a distinction between essence and accident, and the second presupposes a distinction between difference in kind and difference in degree. Now, the possibility for there being more than one existent thing in the universe rests in the relational notions of sameness and difference.[175] If everything were the same as everything else, and nothing different, then all would be identity. This is clear in itself. But, that there can exist sameness and difference rests in the supposition that an entity is determinate. This aspect, then, must be considered first.

"I shall use the word 'perfection' to signify any distinct respect in which the being of a thing or the understanding of it can be completed or made determinate."[176] If finite beings are not identical or non-distinct, then they are distinct; and they

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[173]Adler, "The Hierarchy of Essences." Cf. the first and introductory section of the article, p. 3.

[174]Ibid., p. 11. The argumentation is taken mainly from this article and can be found on pages 11-26. Cf. also Adler's "Solution of the Problem of Species," sections III-V, pp. 307-360.

[175]Ibid. This point which Adler makes is rather obvious, it seems to this author.

[176]Ibid., p. 12.

must neither possess nor lack all the same perfections. Now, perfections can be related to one another in four ways.[177]

1. X and Y may totally exclude each other, so that if a being has one, it cannot have the other at the same time. These would be related as contraries - one negates the other.

2. X can be asymmetrically related to Y so that whatever possesses X must also possess Y, but the opposite need not be true: whatever possesses Y need not possess X. Thus you have cumulative perfections.

3. The two perfections, X and Y, may be inseparable - whatever possesses one must possess the other.

4. The two perfections may be coincident: some entities may possess X and Y, some may possess just X or just Y.

In the problem of differentiation under consideration, the third and fourth type of relation do not contribute any help. Inseparable perfections are the same as one single perfection, and coincident perfections are contingent: they can, but need not, be together. Neither type can serve as grounds for differentiation.

Thus there are three possible sources of differentiation: one single perfection, contrary perfections, and cumulative perfections. This differentiation between two entities can be logically expressed in three ways: a single term subject to quantitative variation; two terms that are positive; or two terms, one of which is positive, the other negative. These two sets of

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[177] Ibid., pp. 12-13. The four relations of perfections are taken summarily from Adler.

differentiation (that of the perfections possessed, and their logical expression) can be combined, leaving three possible expressions after the six impossible combinations are eliminated.[178] Thus of the nine combinations, there remain three possibilities of differentiation:

> They are: 1. the difference between the two things may be rooted in one and the same perfection possessed by both in different quantities, in which case it will be signified by a single positive term with varying quantification that signifies more or less of the same; 2. the difference between the two things may be rooted in two perfections related by contrariety, in which case it will be signified by two positive terms, each signifying the possession of one of the two contrary perfections; 3. the difference between the two things may be rooted in one of two perfections related cumulatively, that one being the cumulative perfection, in which case it will be signified by a positive and a negative term, the former signifying the possession, the latter the rejection, of that one perfection.[179]

Of these three, the first can be seen to represent a difference in degree, and is thus no longer of interest here.[180]

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[178] Ibid., p. 14. The impossible combinations are given in fn. 8 of the same page: "1. A single term varying quantitatively cannot be significantly combined with contrary perfections, nor 2, with cumulatively ordered perfections, since the more and less which gives difference in degree must be more and less of the same. 3. Two positive differences cannot be rooted in a single perfection, for that could provide no basis for their diversity; nor 4, can two positive differences be rooted in cumulatively ordered perfection, since the accumulated perfection is always co-present with the cumulative one, and so cannot be a source of difference. 5. Positive and negative differences cannot be rooted in a single perfection, for, since all difference is relative to sameness, a single perfection possessed by one thing and rejected by the other cannot account for their sameness as well as their difference. 6. Positive and negative differences cannot be rooted in contrary perfections, for contrary perfections can be the source of differentiation only if both are affirmed, not if one is negated."

[179] Ibid., pp. 14-15.

[180] Ibid., p. 15. The problem at hand concerns difference in kind, not merely difference in degree.

The second and third represent a difference in kind in which one has a perfection not possessed by the other. The first, which will be called mode Alpha, is the "symmetrical relation of contrariety between two perfections and by two positive differences, each rooted in one of the two contrary perfections."[181] We will show that this mode represents an accidental difference in kind. The second, mode Beta, is characterized by "the asymmetrical relation of cumulation between two perfections and by a positive and negative difference rooted in one of these two, always the cumulative one, never the accumulated one."[182] We will show that this mode represents an essential difference in kind; and if these essential differences must be hierarchically ordered, it will follow that essential kinds, the ontological parallel of the logical reality, must also be so ordered.[183]

These two modes can now be stated in terms of "genus," "difference," and "species."[184] In mode Alpha there would be

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[181] Ibid.

[182] Ibid.

[183] This reasoning will become clearer at the end of the chapter as the second, more metaphysical, step of the argument is completed.

[184] Adler defines his terms in this way: "Let 'genus' signify whatever is common to two kinds differentiated, i.e., let it signify one or more perfections which the things being differentiated possess in common. Let 'difference' signify a perfection (or a set of inseparable perfections) possessed by one kind and rejected by the other. Let 'species' signify a kind as constituted by one or more perfections which it has in common with another kind, combined with the perfection possessed or rejected by which it is differentiated from that other. Hence whether the kind under consideration is essential or accidental, defining the species requires us to state its genus and its difference." Cf. "The Hierarchy of Essences," p. 16.

three distinct perfections involved in the differentiation: The two species being differentiated would be separated by the positive differences of two contrary perfections, one rooted in each, and at the same time their common genus would signify a third perfection which each possesses, uniting them to that genus. In ordering these species, then, one species could not be said to be higher than the other because one possesses a perfection lacked by the other and the other possesses a perfection lacked by the first.

In mode Beta, however, the differentiation between two species involves two, not three, perfections. There is a cumulative relation between the perfections, and therefore the two species are separated by a positive and a negative difference rooted in the same perfection while the genus common to both species is signified by a distinct perfection. In this differentiation one species possesses both of the perfections. It possesses the genus perfection in common with the other species, and also possesses the second perfection (the positive difference), while the second species lacks it (the negative difference). The first species is thus higher, the second, lower. This fact gives a hierarchical ordering to the species differentiated according to mode Beta.[185]

In the second, more metaphysical, step, Adler attempts "to show that essentially distinct kinds must be differentiated according to mode Beta, and so will always be hierarchically

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[185]Cf. section 10 in Adler's "Solution of the Problem of Species," pp. 311-323, for the development of this mode, with diagram on p. 317. Adler also presents diagrams of these two modes, cf. "Hierarchy of Essences," pp. 17 and 18.

ordered."[186] The argument is summarized in seven propositions which follow from the matter-form structure of individual substances:

> The propositions are: 1. The definable essence of an individual substance composite of matter and form is itself composite of matter and form. 2. Whereas the matter of the individual substance is individual or signate matter and both substantial and accidental forms enter into its constitution, the matter of the definable essence is universal or common matter and only a substantial form enters into its constitution. 3. In the definable essence, as in the individual substance, the matter is to the form as potency is to act, or as determinability is to its determination, and the union of matter and form is the unity of an actualized potentiality. 4. The matter of the definable essence being common, not prime, it is not pure or infinite potentiality, but a definite or limited potentiality, a determinate determinability; and this requires that it somehow have some form. 5. The union of common matter and substantial form in the definable essence is the source of the unity peculiar to an essential definition, wherein the genus signifies the common matter and the difference the substantial form. 6. The whole essential difference between two kinds within a single genus lies in the diversity of their substantial forms, and what is essentially common to them must be found in matter that is determinately capable of being differently actualized by these diverse substantial forms. 7. Hence the form that gives the common matter signified by the genus its determinate determinability must be the same form that is signified by one of the two differences and cannot be contrary to the diverse form that is signified by the other difference.[187]

This last proposition, which states that two forms acting within matter cannot be related as contraries, helps solve the problem. Mode Alpha, in which two positive differences signify contrary perfections, is eliminated. Adler believes that Aristotle saw this conclusion in stating that substantial forms cannot

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[186] Adler, "The Hierarchy of Essences," pp. 18-19.

[187] Ibid., pp. 20-21.

be related as contraries.[188]

Since the genus must be common matter, and not the completely indeterminate prime matter in the definition of the definable essence of each species, but, on the other hand, is not signate matter, then it must be in potentiality to a substantial form and not to an accidental form. Thus there is the substantial form involved in the signification of the genus which must be either "identical with one or the other of the diverse substantial forms signified by the specific differences, or it must be diverse from both."[189] If that first substantial form involved in the signification of the genus were diverse from both, then it would have to be related to them either by contrariety or cumulation. This was shown in the discussion of the possible relations of perfections. But it cannot be contrariety because the union of contraries is impossible. On the other hand, if there were a relation of cumulation between the forms, another impossibility is involved. This is because the two substantial forms signified by the differences could not differentiate if they were related to each other by cumulation; "nor could they be related by contrariety for then one and the same substantial form (the one involved in the signification of the genus) would be accumulated by each of the two contraries."[190]

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[188] Ibid., p. 21. Adler here refers to Aristotle's Categories, Ch. 5, 36, 24-27. He adds however that Aristotle never gives the reason for this impossibility and, in fact, contradicts himself on this point. Cf. fn. 16a, p. 21.

[189] Ibid., p. 22.

[190] Ibid., p. 23. This is impossible because only prime matter, and not common matter which is not indeterminate, can be in potentiality to contrary forms.

Thus the substantial form involved in the signification of the genus cannot be diverse from both diverse substantial forms signified by the specific differences. Since this is the case, it follows that the second possibility must be true. The substantial form involved in the signification of the genus must be identical with one or the other of the diverse substantial forms signified by the specific differences, "and must be related by cumulation, not contrariety, to the substantial form signified by the other."[191] This would mean that "the differentiation of essentially distinct kinds involves only two, not three, substantial forms (or essential perfections)."[192] This would rule out mode Alpha and prove that mode Beta is the pattern to which essential differentiation must conform.[193]

We must now consider the ontological significance of these two elements: the negative difference and the generic term. Adler once again turns to the issues with his excellent analytical capacity. Let X be the cumulative and Y the accumulated substantial form which constitute the whole essential difference between species A and B. It must be remembered that there are two perfections involved here, and yet they form a genus and two species ordered hierarchically. Now Y, a form virtually present in common matter, makes that common matter the genus which is determinately determinable, that is, prepared for a determination,

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[191] Ibid., p. 24.

[192] Ibid.

[193] Mode Alpha would thus involve not essential, but accidental differentiation. Species thus differentiated would not be hierarchically ordered and could be referred to as the species of the natural sciences.

by form X. The genus is, as yet, in the state of privation of form X, but is potential to it. This genus can accumulate form X, uniting with it, and giving it actual presence in species A. On the other hand, the genus (the virtually present form Y) can reject form X and make form Y actually present. This would constitute species B.

> When they are co-present, as in species A, the cumulative form is actually present and the accumulated form is present only as virtually included. Hence species B is constituted by the actual presence of substantial form Y, species A by the actual presence of substantial form X, and the genus common to both by the merely virtual presence of form Y, the accumulated form which either can be actual by itself to constitute the essential difference of the lower of the two species, or can be virtually included by form X, the actual presence of which constitutes the essential difference of the higher species.[194]

It is seen here, then, that a substantial form (Y) can be present in three distinct conditions: virtually present in the common matter (genus), identical with the substantial form signified by the negative difference (species B), and co-present with the substantial form by which it is accumulated (X), signified by the positive difference (species A).

Having established the principle of the hierarchical ordering of essential kinds, Adler can then proceed to the solution of the problem of species (natural essential kinds) for traditional philosophy. If the theory of the hierarchy of definable essences is true, then an analysis of that hierarchy will provide an insight into what must be natural species. That

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[194] Ibid., p. 25. The stress is that of Adler.

analysis will give the following conclusions:

> Since in the hierarchy of definable essences, only the definition of the highest is constituted by a positive difference signifying a perfection that is specific; since in all essential differentiations except the one that divides the highest genus into two species, the positive difference always signifies a perfection that is generic and the negative difference that same perfection as specific; and since all the perfections of inferior species, being also generic, are possessed by the highest species in addition to its own specific perfection, it follows, first, that it is impossible to formulate and establish the definition of any species in the hierarchy of essences without formulating and establishing the whole hierarchy; and second, that the highest species is the first principle of the whole hierarchy, not in its being, but in its being known.[195]

Translated into the terms of the problem at hand, this would mean that a definition of man would be the key to unlock the answer to the question of the number and kind of natural species. If "we cannot know the definition of man's essence without thereby knowing all other essential definitions, and ... cannot inductively establish any of these definitions without establishing all,"[196] then it is clear that there is only a small number of natural existing species, probably four.[197]

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[195] Ibid., pp. 28-29. In this simple sketch of what appears to be Adler's central contribution to the efforts at solving this problem presented to traditional philosophy by the evolutionary notion of the origin of species, only the essential order, referring to natural or essential species, has been considered. For a more complete consideration, as well as the consequences involved in the knowledge of accidential kinds, cf. Adler's two articles, "Solution of the Problem of Species," and "The Hierarchy of Essences.

[196] Ibid., p. 29.

[197] This would follow from the essential notes found in the definition of man as a rational animal: being, living,knowing and understanding.

We are thus led back to De Koninck's "finite intelligence contemplating the universe" before there existed living things, which would have been able to foresee that there are not intermediate points between "to be," "to live," "to know," and "to understand." Arriving at an understanding of man, this highest species of material substance, the philosopher can come to know the entities below man in this hierarchy of essential beings. He can thereby present to evolutionary science the boundary species of real essences, and leave to experimental science the task of determining the sub-species proliferating the course of evolutionary history down through the ages.

CHAPTER III

ARBITRATION OF THE DISPUTE

In the preceding sketch of the stages of development in the evolution controversy, we have endeavored to show why it was nearly a century after the publication of The Origin of Species before Scholastic philosophers had succeeded in defining the basic philosophical issue in terms of the species problematic. Scientists, philosophers, and theologians all spoke of evolution in terms of species evolving, but each read into the other's statements his own tenuous conception of what it was that evolved. Each interpreted evolutionary theory in terms of his own religious or humanistic beliefs concerning the meaning, the nobility, and the future of man. The first half of the 20th century was already coming to a close before the real philosophical issue was delineated through the efforts of Charles De Koninck and Mortimer Adler. This prepared the way for a more thorough treatment of the entire philosophical dimension of the problem of species in a scholarly work by John Deely.[198]

The attention of philosophers has now been focused on the notion of species, and the distinction between essential

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[198]The publication referred to here is that already cited above: John Deely, "The Philosophical Dimensions of the Origin of Species."

difference in kind and accidental difference in degree has been made. It is possible, then, to take the final step in discussing the realities of the world with which the sciences deal -- the actual existing beings which are the subject of evolution. In other words, a thorough treatment of the evolution problematic at this point calls for a discussion, first of the relationship between species as defined by philosophy and the real natural kinds of being investigated by the empirical sciences; and second, of the reasons for the historical confusion of the two; and finally, of the possibility of a solution for the evolution problematic concomitant with Aristotelian-Thomistic principles.

Species in an Evolutionary World-View

The basic difficulty involved in the evolution controversy, we have seen, centered around the misunderstanding of the issue at hand. But added to this misunderstanding,which divided philosophers, scientists, and theologians, was the controversy within science itself:

> Much of the sound and fury surrounding evolutionary theory is due to a misapprehension of sorts. Evolution initially had no pretensions to the status of a Weltanschauung, nor did it seek to serve as a substitute for the Christian doctrine of creation.... The theory of evolution actually grew out of a conflict between two distinct and opposing biological theories. It was a family quarrel. The dominant biological theory was that of a fixed and immediate creation of species. This of course has little or no reference to the theological doctrine of creatio ex nihilo. Nor is the concept of the fixity of species a logical deduction from the philosophical doctrine of the

> immutability of essence, although the genus and species of Linnaeus do carry some of the logical and conventional characteristics of the Aristotelian genera and species.[199]

This raises the question of species as it developed in the sciences in relation to evolutionary theory; for "to attempt a delineation of that question would be fatuous if we do not first see what has been the outcome of this 'family quarrel,' and secure our understanding of the articulations of nature in terms thereof."[200] The question, then, concerns itself with "what is the metalogical status of real natural kinds,"[201] in the sciences, as it has developed from the days of Charles Darwin. It should be remembered that, for Darwin, species was a term arbitrarily given, for the sake of convenience. In Darwinian evolutionary theory, species would not be considered real. The development of criteria, including the findings of Mendelian genetics, has changed the notion of species in the sciences. It is striking that a survey of the definitions and statements concerning species made by leading evolutionists today can conclude that "all of them imply the reality of species and entirely neglect the idea that it is only a construct of the human mind."[202]

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[199]William E. Carlo, Philosophy, Science and Knowledge (Milwaukee: Bruce, 1967), p. 118.

[200]Deely, "The Philosophical Dimensions of the Origin of Species," p. 133.

[201]Ibid., p. 134.

[202]Jean R. Beaudry, "The Species Concept: Its Evolution and Present Status," Revue Canadienne de Biologie, 19 (September 1960), p. 224.

The scientific acceptance of the reality of species can only be resultant upon an understanding of the process of speciation through differential gene transmission. Here variations are produced in a population and are accumulated as a stable acquisition of that population until the "threshold of specific discontinuity"[203] is reached and the population is subjected to the "intervention of so-called isolating mechanisms."[204] In other words, science today would see a two-pronged influence necessary in the production of a new species. Gene mutations produce variations which become stable. These variations can build up to reach the point of specific discontinuity; but, having reached this point, there is then needed the intervention of some element which will isolate the population. This element prevents the transferral of those variations to the population to which it had been united by interbreeding. Evolutionary science thus explain

> A mutation produces discrete differences and to this extent its appearance (like that of an individual organism as such) is an instantaneous and discontinuous evolutionary event, whether its effects be small or large. But it is populations, not individuals, that evolve. For a given mutation, regardless of its "size" (i.e., visible morphological impact) to become involved in the origin of a new and especially of a highly distinctive group of animals it must spread through a population and while doing so and thereafter it must become integrated in a new sort of genetic system. It is very nearly impossible to imagine these processes occurring except by transition over a long sequence of generations, and certainly no conclusive, or even really suggestive, opposite example is provided by the paleontological record.[205]

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[203] Deely, "The Philosophical Dimensions of the Origin of Species," p. 139.

[204] Ibid.

[205] George Gaylord Simpson, The Meaning of Evolution (New Haven: Yale, 1949), pp. 233-234.

At this point, Darwin's "natural selection" enters in, allowing the variations, if they are viable, to separate from the parent stock and survive the ensuing reproduction process of the generations produced.[206]

Overall, then, the scientific notion of species has undergone considerable development since the time of Darwin and The Origin of Species. Evolution is now seen to center in real, existing species, which are produced by differential gene transmission and isolating influences. These are the elements which make evolution possible and constitute its ontological characteristic, indicating that science would uphold a real hierarchical development of complexity. Here the discussion meets with Dr. Adler's insight which was developed in Chapter II: the development of a hierarchy of essences, or of beings, is an ontological characteristic of the evolutionary process.

This whole development, making it possible to formulate a definition of species in their proper causes acceptable to the evolutionary sciences today, is clearly stated:

> From the standpoint of explanation by proper causes, then, there are three stages or levels in the evolutionary process and establishment of species: the origin of genetic diversity constitutes the first level; once arisen, the mutations are scattered throughout the population -- they enter its gene pool, where they come under influence of selection, migration, and geographical isolation, thus establishing the second level of the evolutionary speciation process, where the impact of environment effects the historical changes in the living populations; finally a third level is reached when the sustained operation of

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[206]One may here be referred to Raymond J. Nagar, The Wisdom of Evolution (New York: Doubleday, 1963), p. 90.

> isolating mechanisms achieves a relative fixation of the diversity cumulatively attained on the preceding two levels, so that a stabilization through a new genetic equilibrium is effected both within and among the evolving groups.[207]

Species for the evolutionary sciences thus constitute a certain "group unity structured intrinsically through interaction, that is, a concrete universal."[208] This can be defined as "a community of individuals possessing common essential sets of genes, and actually, or potentially related (proximally) through interbreeding."[209]

At this point, we can review the light provided by Dr. Adler on the question of the possible modes of differentiation. We have seen that only mode Beta, arranged hierarchically, could fit the definition of a radical difference in kind. Differentiation according to mode Beta thus involves those entities which constitute ontologically essential or radical differences in kind. Now, if only modes Alpha and Beta can ontologically account for the ways in which things can differ in kind, and if only mode Beta can logically account for the radical or essential differences in kind, then mode Alpha must characterize superficial differences in kind. Those beings arranged according to mode Alpha would differ only superficially or accidentally, as opposed to radically, in kind. Can this be the point at which the now established scientific definition of species fits into this discussion? We would say yes, for the being defined in terms of

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[207]Deely, "The Philosophical Dimensions of the Origin of Species," p. 147.

[208]Ibid.

[209]Beaudry, "The Species Concept: Its Evolution and Present Status," p. 151.

genetic structure is not portrayed according to an essential definition.

> If this is well understood, it will be seen that any definition of the individual organism in terms of its genetic structure is not and cannot be an essential definition of what kind of organism it is simply, for the genetic structure is a "compound" inasmuch as it is in the Aristotelian sense at the level of materia secunda, i.e., materia jam actuata -- otherwise, it would not be an empirical and directly manipulable arrangement -- "and no compound as such can enter into the definition of a form." Thus an organism is not a genotype, although every organism must have a genotype.[210]

Certainly it can be said that this developmental study of the nature of species has confirmed our conviction that species for the philosopher must be defined in terms of radical or essential differentiation. Speciation involves the production of a real substantial form. These species are arranged hierarchically, according to degrees of perfection; and there is only a small number of these essential species, probably four. On the other hand, species for the evolutionary scientist is the sub-species within these degrees of essential perfection, arranged accidentally or superficially different in kind according to mode Alpha. It also becomes clear that in terms of species as natural kinds, historically studied in the course of the evolutionary eras, the radical kinds which are termed species according to mode Beta are not species at all. Instead, they are the various grades or levels of being which De Koninck's viewer could foresee would appear at some time in history, realized ontologically in genetic populations of actually existing individuals.

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[210]Deely, "The Philosophical Dimensions of the Origin of Species," p. 313. The author, in this passage, quotes St. Thomas, In II de anima, lect. 1, n. 222.

The study of species in the problem of evolution has thus made possible this clarification, enabling both philosopher and scientist to understand that the context in which they place themselves dictates the nature of the species being considered. Henceforth the study of species must always involve this careful distinction. So with both philosopher and scientist alike:

> We can see that things which differ according to mode Alpha are always kinds definable in terms of characteristics or traits which are rooted in the composite, whereas the things which differ according to mode Beta are always kinds definable in terms of a property which follows necessarily from the substantial form as consequent on it alone and due neither to the signate matter nor to the objective circumstances of the thing's existence or operation. In traditional terms, all definitions worked out on the pattern of mode Alpha may very well be real descriptive definitions which capture a distinctive life-style and syndrome of characters proper to a stable and unique population within the natural world, but from the side of the metaphysical composition of essence as an a priori established within a determinate grade of being by reason of a formal property convertible with its formal or "specific" difference, such definitions are not and could never become essential.[211]

Traditionally, the definitions of what were considered natural species were more or less descriptive definitions, capturing natural life-styles and characteristics of populations. Metaphysically, however, such definitions cannot be considered essential. Those descriptive definitions are concerned with the accidental unities which the course of history alone could determine. They deal, for instance, with the structure and function of Pterodactyles. A definition according to mode Beta, however, refers to the intrinsically determined essential unity,

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[211] Ibid., p. 315.

or irreducible grade of being, to which the Pterodactyle belongs. Thus differentiation according to mode Beta will always refer to a radical difference in kind. In metaphysical terms, there are as many specifically different substantial forms as there are mode Beta differences.

Toward Understanding and Eliminating the Ambiguities

It is perhaps rather clear now that the history of the philosophical problem of evolution is marked by a somewhat general failure to understand the nature of species, giving rise to the grossest misunderstandings and unrelated argumentations. Dr. Adler would agree with this observation, as he comments, "most of the philosophical perplexities in post-Darwinian thought are due to ambiguities and uncertainties in the notion of species itself rather than to the discovery of any radically significant facts."[212] We must make an effort at trying to understand the reasons behind these uncertainties and ambiguities in order to appreciate their long, unfortunate history. Some of the reasons have been brought out in the course of the first chapter, making reference to the philosophical and religious atmosphere of the age, but these reasons could perhaps be organized more clearly. Thus, "the ambiguities and uncertainties in question ... can be traced to seven sources, four of which are matters of properly philosophical argumentation, one socio-cultural, one psychological, and one theological."[213]

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[212]Adler, The Problem of Species, p. 10.

[213]Deely, "The Philosophical Dimensions of the Origin of Species," p. 252. See the entire 6th section.

1. The world-view consciousness at the time of Darwin was centered in the long-established cultural conception of the "eternal heavens" in which all things were rationally ordered. Scientists busied themselves with discovering this universal rationalism and promulgating natural laws. Thus, the natural rhythms of the earth, the tides, the seasons, were considered explicitations of such stable and definite order.

2. Since such a rationalistic, nature-oriented consciousness prevailed in Darwin's time, it was inevitable that the metaphysical notion of essence would be applied to what was recognized as natural kinds. All natural commonly known kinds, then, were incorrectly given metaphysical dimensions with essential differences in form according to this socio-cultural consciousness.

3. This led to what Dr. Adler called "a confusion of the logical and ontological meaning of property."[214] In giving natural kinds metaphysical dimensions, it was necessary to list which differences were essential. Thus a syndrome of accidents of each natural kind was interpreted as an empirical sign of an intrinsic property. That intrinsic property was then designated as convertible with the essence.

4. Thus an ambiguous criterion for essential differences was created. The ontological notion of property was replaced by the logical notion. This led to a circle of interdependence in which the ontological question (how many essential species are there?) was answered by the epistemological question (how many radical kinds do we know?). This confusion of ontology and logic

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[214]Adler, The Problem of Species, p. 189.

continued through the discussions on evolution until it was brought out by Adler, and still exists today. In ancient times ontology made itself dependent upon logical criteria for the determination of species and continues to do so today, thereby violating the principle of parsimony. It does this by positing the ontological distinction of species while admitting that this distinction cannot be verified, since the essences of these species cannot be known. We thus retain the distinction on the grounds of our ignorance.

5. The philosophical principle of proper causality also appeared to be violated by evolutionary theory. In evolution more perfect beings came from less perfect progenitors. This seemed to destroy the law of causal proportion: nothing can be in the effect that is not in the cause.

6. This sixth source of ambiguity and uncertainty is related to the development of Aristotelian thought through medieval times. St. Thomas Aquinas, the greatest of the Aristotelian thinkers, did not confine his thought to purely philosophical questions. He used the principles of Aristotle in the presentation of systematic theological treatises. These principles thus became the unifying force between the disciplines of theology and philosophy as medieval scholars recognized the same immutable heavens in the scriptural texts as well. This was seen in the sequential production of each living being brought about by a special divine creative act. The Church, then, assumed the posture of denigrating a theory of secondary causes, though enlightened Biblical studies

in modern times have lessened the opposition.[215]

7. Finally, in respect to man's psychology it should be noted that our intellectual past is certainly influential and formative. Science builds from past experiences and discoveries, and the respected texts of the past, as well as the attitudes built up, share no little weight in man's reasonings. If he wishes to accept the possibility of the natural origin of living kinds, man must realize that some traditional texts, valuable in their own way, cannot be expected to be favorable toward evolutionary theory, especially when written in an era unfamiliar with such theory.[216]

In summary, then:

> Such then are seven of the major sources of ambivalence and equivocation in the traditional problematic of species: the notion of an unchanging causa regitiva keeping the relation of generator to generated within fixed limits; an insufficiently critical appraisal of the order of natural kinds in the light of the metaphysics of essential constitution; and abandonment of the autonomy of ontological principles in the effort to systematize the diversity of nature in terms of morphology; a partial abandonment in the face of evolutionary data of the methodological principle of parsimony; a tendency to conceive of causal interrelations reductively rather than factorially; the theological argument that God "intervened" at the origin of every species; a respect for authority which has blunted the thrust of much of the traditional analyses. It is their cumulative and mutually reinforcing effect that is denoted in the expression, "the error of univocally ontologized kind-essences."[217]

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[215]Numerous works have appeared recently, discussing biblical literary forms, and concluding that revelation does not exclude evolution. Cf. a book already cited,Haag,Haas,and Hurzeler, Bible et Evolution.

[216]Some of the texts of St. Thomas may be examples of the case in point. Cf. Adler, The Problem of Species, pp. 228-230.

[217]Deely, "The Philosophical Dimensions of the Origin of Species," p. 264.

Attempts at a Resolution of the Issues

Philosophy has come a long way from its first reactions to the theory of evolution, not only in attempting to find solutions to the issues created, but also in attempting to understand its own initial reactions and the reasons behind the ambiguities and misunderstandings. Attempting to describe and understand the evolutionary problematic and its development, this study and its understanding of the contributions made by Dr. Adler and Dr. Deely points to a direction and a true development-toward-solution of this evolution problematic. Some of the answers being sought may, after all, be appearing already in the understanding here. But, on the other hand, it perhaps would be profitable to attempt, at this point, a delineation of the outstanding issues.

It can be seen, then, that evolution involves the gradual appearance of life forms upon the earth over a long period in time, developing from the simplest unicellular organisms to the most noble form of creaturehood embodied in man. This is the commonly accepted notion of evolution. The evolution of Darwin, however, is not the evolution of the scientist today. Very basically, it should now be clear that the foundation of evolution is not Darwin's natural selection, though this is an element; nor is its basic science paleontology. Rather, the possibility of evolution rests in the gene-mutation-transmission system, discovered and studied in Mendelian genetics. The development of life forms (the essence of evolution) begins with genetic mutation

in individuals, spreads through a population of sexually-united organisms, and is made to survive through the influence of various isolating factors. All this is meant to show that science today, in contrast to Darwinian theory, accepts species as really existing, genetically distinct populations.

Accepting the notion of species from evolutionary science then, one can turn to the analysis of the ontological-logical confusion prevailing over the concept of species. This real species treated by evolutionary science is arranged according to the means of differentiation in mode Alpha. The philosophical conclusion here is that such species are differentiated in kind by superficial differentiation. This would leave the philosophical terrain open for the really existing essential kinds differentiated according to mode Beta, which differentiates according to essential perfections and arranges these species, which must be a small number, in a hierarchical ordering. The steps in this hierarchy can be known by the essential perfections accumulated in man, the highest point in this hierarchy of living beings, and established as "to be," "to live," "to know," and "to understand." Thus the really existing essential kinds or species for philosophy are seen to be these four substantial forms of the levels of being which one finds realized in the innumerable life-forms of populations which are the "scientific" species.

Having been analytically led to an understanding of the problem of species, and aware of the causes which contributed to its prolongation down to this day, we have reached a certain

plateau in the development of the study of evolution as related to traditional philosophy. Understanding the pseudo-issue caused by the scientific tendency of reductionism will perhaps be the key to a solution of further difficulties presented to philosophy by the theory of evolution and mentioned in the course of this paper, but not yet treated specifically.[218]

The central issue still unsolved in this philosophical excursion is the issue of evolutionary progress itself -- the passage from lower to higher life forms, or grades of being. In order to clarify this, there are several points which could be brought out.

We should begin by accepting the fact that, "in terms of the hylomorphic composition of bodies, it is impossible to deny that it is the degree of complexity in the scale of organization of organic structures and functions which is the true measure of ontological perfections and consequently the criterion of progress."[219] This principle must be accepted, as St. Thomas would agree.[220] Yet it could be a very difficult task to try to decide in particular cases whether a certain plant or animal were more complex than another.

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[218]In order to fully understand the importance of the difficulties which were experienced with notion of species, and which were here merely sketchily presented, one must study the works of Adler and Deely already cited.

[219]Deely, "The Philosophical Dimensions of the Origin of Species," p. 318.

[220]Cf. the consideration given to St. Thomas in Chapter I, pp. 17-19, also: "The higher the soul the wider is the range of its activities, and the wider its active range the more, and the more distinctly diversified, organs or bodily instruments are required by it." St. Thomas, In I de anima, lect. 14, n. 208.

It could also generally be agreed that, ultimately, the result of the evolutionary forces upon living beings is the preservation and development of beings which are more capable of surviving, beings more complex and versatile in their organizational structure. Evolution thus acts in the direction of more superior beings.

Further, we need not be concerned with our own experience which tells us that no one has ever seen a rock beginning to live or a wolf taking the form of a lion. That experience does not make it necessary to appeal to the intervention of causes outside the beings themselves.

> It is necessary and sufficient, ... to attend simply to one fact and one principle which in truth holds the key to most of the problems generated in philosophy by the evolution of life, whether they center on the relation of essence to existence or on the origin of "species." The fact is that the process by which evolution has taken place must be found in the individual generations of organisms. The principle is the involution and mutual activation of the causes: causae ad invicem sunt causae.[221]

It is sufficient to look at individual beings which undergo mutations and thus carry on the process of evolution. The effect is not the result of the efficient cause alone, De Finance has shown.[222] This means that one must take into account the dispositions of the pre-existing being in which the mutation takes place. Thus in a cause and effect relationship, the effect of the efficient cause can be modified in some unexpected way by that upon which the efficient cause acts. Those modifications

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[221] Deely, "The Philosophical Dimensions of the Origin of Species," p. 320-321.

[222] De Finance tells us: "There is more in the cause and the effect than in the cause alone." Cf. Joseph de Finance, Existence et Liberté (Paris: Vitte, 1955), p. 263.

would certainly not take place if the "patient" of the efficient cause were some purely plastic material. Also, because of the philosophical principle that the corruption of one form is the generation of another, and that forms are corrupted per accidens, we have added incentive for serious consideration of the form being corrupted. The final dispositions of a being, then -- the accidental dispositions -- prepare and help account for the eduction of a new form.

> The whole question turns on the problem of organization. The total range of diversity in the universe of physical beings is rooted in the peculiar disposition and composition of parts in each unity, that is, in the individuating disposition; but because there are four irreducible levels of material existence, this individuating disposition must also always include a specifying disposition.[223]

There is no such thing as "creationism" existing in the world of human experience today, for beings do not simply appear, they are fashioned out of pre-existing matter. This means that the form existing in the entity determines the determinability of that entity in the eduction of a new form. Thus the new form educed is always proximally prepared for in the old. This is also the case where the four irreducible levels of material existence are involved: the form in inanimate matter, for instance, can be brought to such a degree of organizational complexity that it may per accidens be a causal element in the eduction of a simple life-form in that entity, while per se the inorganic matter is merely the inadequate potentiality for the

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[223]Deely, "The Philosophical Dimensions of the Origin of Species," p. 323.

life-form.

> This is the basis for the prior possibility in principle of so-called "equivocal generation:" the origin of living matter out of non-living matter by reason of a fortuitous dispositioning of the latter in a chance (or laboratory controlled) series of causes. That this is possible follows from the very nature of the soul as the first act of a body disposed through organization to sustain in being the operations of life. It does not matter by what agencies this organization is effected: the sole condition essential and primary for educing a soul (= for constituting a living being) is the production of an organization suited to life; the actual processes through which this organization is constituted are accidental and purely secondary considerations. A univocal cause, on the other hand, need not be proportioned to its effect except per accidens, in the general way that any material substance is able to act on another by very reason of belonging to a common ontological genus. In this way, as the investigations of biochemistry sufficiently indicate, the structures of the living world are potentially latent throughout the whole of secondary matter; for which reason again a concatenation of special circumstances could efficaciously though in a per accidens way disposition the specific (ontologically specific) organization of a living being which otherwise pertained to any one of the circumstanced entities only potentially and indeed inefficaciously. In such a case, there would be no violation of the principle of causality and no need for a "special" divine concursus (still less intervention), any more than there are instances of either of these in our everyday experience. The soul is but the first actuality of a disposed physico-chemical structure.[224]

From the viewpoint of the experimental sciences, the effect of such a process would involve only a superficial difference in kind. But, from the ontological viewpoint, the effect would constitute a radical or essential difference in kind; a new level of being had been attained, a new form educed.

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[224] Ibid., pp. 324-325.

Also, according to De Koninck, one could predict the various levels of existence attainable by material beings even before they existed. It is inevitable, then, once the growth process began, that the myriad of beings developing from the initial thrust of life would rise in organization and adaptability, bridging the levels through the evolutionary eras until the ultimate possibility of essential form eduction had been reached. And each advance in development could not have been greater in intensity or degree than the possibilities-for-advancement inherent in the individuals of each existing population at one period, rooted in the particular disposition of the accidental form-from-which. Hence there has been the unimaginably slow progress of evolutionary history extending over an immensity of ages which man can barely appreciate.

> We see, therefore, how the problem of the "higher" from the "lower" poses itself within the order of ontological grades. It is a mistake and a complete misunderstanding to state the issue in terms of dogs generating humans or butterflies generating mice. The authentic philosophical question is whether there is some form of physico-chemical organization which could under some circumstances be so disposed by the cosmic agents environing it as to require the eduction of a living form; and beyond that a question of whether there is any form of vegetative life which could under some circumstances give rise to some form capable in however imperfect and rudimentary a way of sensitive life. And from the standpoint of the definition of the soul through its proper subject and the involution of the causes, it is impossible to say that an affirmative answer to this question involves a contradiction.[225]

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[225] Ibid., p. 326.

The philosophical aspect of the problem of evolution, then, is seen at this point. The philosopher can know more essential definitions than he had previously thought, and evolution forced him to the realization of this fact. Speaking from traditional philosophy which accepts the hylomorphic composition of existing beings, it can be said that every essential definition possessed is a natural species, a radically different kind. But, in knowing man, one can come to know an essential hierarchy of souls, or essential definitions, leading up to him in the various levels of being.

The philosophical debate has thus led to this understanding of species through its encounter with the evolutionary theory, an understanding which places "real" species in one of two types of hierarchy. No longer can a species be considered a fixed way of existence in an entity, open to no possibilities of differentiation other than those of individual traits. But, in one hierarchy, that of the scientist, species is the existing natural population (the gene-set) which is differentiated from every other natural population by the realization of its particular mode of experientially demonstrable organization and adaptation capabilities. For the philosopher, though, species is the entity constituted by an essential definition of beings arranged in a hierarchy of irreducible grades of being through the addition or subtraction of a unit difference or perfection. And in this sense, for the philosopher, "there are but four species: corporeal substance, living corporeal substance, sensitive cor-

poreal substance and rational sensitive corporeal substance."[226]

Stated in terms of this new understanding of the nature of species and the elements involved in the development of "existential" species, as opposed to the natural or essential species, it is clear that it is possible for the philosopher and scientist to work together again in their efforts to come to know the wonders of the world about them. Hopefully, they would work under a theology no longer fearful that the nobility and wisdom of God's creative work was being destroyed. Perhaps, then, there is foundation to the optimism of Dr. Adler in his view that "there is evidence that we may be entering on a fresh historic moment when, after the frustrations and confusions of modern times, we may be able to reap the fruits which belong properly to a culture in which science finds its place alongside philosophy and theology in the fulfillment of human enlightenment."[227]

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[226] Ibid., p. 329.

[227] Adler, The Problem of Species, p. 277.

CONCLUSION

Has the dispute between traditional philosophy and science and the dispute among philosophers themselves over the problem of species been settled? With this question in mind it would perhaps be useful to review the contents of this paper.

We began this study as an effort to understand the elements and issues involved in the problem of evolution. We thus have presented a consideration of the notion of evolution Darwin gave to the world in his systematic account of the origin of species over a century ago. We have considered the legacy of philosophical thought in which men of wisdom sought to account for the fixist-transformist dichotomy their experience of nature presented to them. We then investigated the reactions to the theory of evolution which were founded in religious and moral, as well as philosophical, principles. A narrowing of concentration on the real philosophical issues evolved as religious thinkers began to understand that God was not made a superfluous entity by the theory of evolution. At this point we could see a definite advance in the problem-solving efforts. De Koninck's fabrication of an intelligent being able to foresee all the levels of existence possible in this universe led to the Adlerian analysis of the problem of species. Finally, we have shown how John Deely

could incorporate Adler's conclusions concerning the logical-ontological confusion into which species had been thrown and Adler's distinction between radical difference in kind and superficial difference in degree, relating them to the contemporary world of science and philosophy.

We hope that this long series of considerations has produced, if not the final solution, at least some understanding of the complexities involved in the development of an answer to the challenge hurled at traditional philosophy by the theory of evolution. The conclusions emerging from this study can be judged in the light of the contribution they make to the store of philosophical understanding, but not in the light of some vague desire for an apodictically proven, all-embracing solution. Philosophy is an ongoing learning process, a world of knowledge in evolution. This does not mean, however, that an understanding of the real problem, and the solution involved, has not been accomplished. We must take the humble attitude that:

> Certainly, the work of philosophy is not yet finished; on the contrary, there is evidence that we may be entering on a fresh historic moment when, after the frustrations and confusions of the first few centuries of modern times, we may be able to reap the fruits which belong properly to a culture in which science finds its place alongside philosophy and theology in the fulfillment of human enlightenment. A fruitful rapprochement between natural philosophy and the natural sciences is just becoming possible, after years of misunderstanding and destructive feud, and such promise bears directly on the remaining difficulties in the problem of species.[228]

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[228] Ibid.

That fruitful rapprochement between natural philosophy and the natural sciences has led many to believe that the protagonists in the dispute were ignorant of many facts, poorly rational, and unsure of their ground. In a real sense this could certainly be true. Each contributor to the polemic proceeded on the basis of his own notion of species, whether he argued that no one ever saw a lion give birth to anything other than a lion, or that apes can be more noble than criminals and savages, or that the ancient thinkers accepted the notions of spontaneous generation or transitory forms. All of them were speaking about what they considered species to be, not recognizing that there might be more than one notion involved. Developments in both science and philosophy, then,have made possible the present conclusions.

Within the maturing process of evolutionary science during the past century was the decisive establishment of the science of genetics, attributable to Mendel. This pointed to the real foundation of the evolutionary thrust in nature; and these Mendelian genetics, in turn, made it possible for the experimental sciences to establish their definition of species, a definition which expressed an existential reality and provided a workable object for the analytical efforts of traditional philosophy.

Scholastic philosophy, then, strongly challenged, was able to turn away from its preoccupation with the defense of the nobility of man and reconsider its own notion of species.

The ensuing analysis produced an understanding of the philosophical sources of confusion: the equivocation in the notion of essence as it was being applied to entities in nature, the confusion of the logical and ontological use of property in the differentiation of species, all of which led to reducing ontology to logic in the predication of essential differences on the basis of a syndrome of accidents. The understanding of the causes behind the ontological-logical confusion of species thus led to the crucial differentiation of "species" according to the disciplines of philosophy and the evolutionary sciences.

This clarification of the notion of species, then, along with its hierarchical construction of essential grades of being or natural species, according to the hylomorphic composition of reality, is the pivotal element in attempting to solve the difficulty presented traditional philosophy by evolutionary theory. We can see now that the theory of evolution has been the cause of clarification. In this sense the problem of evolution certainly has had resolution. We now understand philosophy as defining species by way of the essential differences in kind arranged in hierarchical order. That which is specifically different among existing things is "to be," "to live," "to know," and "to understand." The empirical sciences, on the other hand, define species as those living beings which, for philosophy, vary according to the accidental perfections possessed, linearly and not hierarchically.

Further studies will undoubtedly be made to broaden the understanding of the essential principles of metaphysics and the

philosophy of nature of the Scholastic tradition in the light of the implications of the evolutionary world view. However, the attempts at resolving the ambiguities and misunderstandings do indicate a truly fruitful advance in insight, made possible by a study of the philosophico-scientific evolutionary problematic. Certainly this advance is not, nor ever will be, complete, so let us not habitually ignore the ever-present ocean of mystery still before us.

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Rev. Roger Schwietz, O.M.I.

Thesis Resumé:

THE PROBLEM OF SPECIES ACCORDING TO ARISTOTELIAN-THOMISTIC PHILOSOPHY AND THE BIOLOGICAL THEORY OF EVOLUTION

The purpose of this thesis is to investigate the philosophical controversy over the theory of evolution. The hypothesis states that the public presentation of the theory of evolution through the publication of Darwin's book, The Origin of Species, brought a growthful challenge to philosophy of the Aristotelian-Thomistic tradition. The exact nature of that challenge was at first unclear, thus causing an initial period of confused reaction. Alarmed by what appeared to be an attack on traditional doctrines concerning the nature and dignity of man, philosophers reacted against evolutionary theory, often confusing the reasoning process with emotional and religious argumentations. The 20th century eventually brought a clarification of the issue, however, permitting the true philosophical problematic to emerge. This problematic is centered in the notion of species, and recent investigations have attempted to resolve that issue.

The thesis begins, then, with an historical consideration of the theory of evolution, and of the reactions of philosophers to that theory. First, the theory of evolution as proposed by Charles Darwin is presented. Then, in the second section of Chapter I, examples of evolutionary elements in

thought before Darwin are given, beginning with Aristotle, working through St. Augustine and St. Thomas Aquinas, and finishing with the intellectual climate of the 18th and 19th centuries.

The third section of Chapter I presents authors chosen to elucidate the various reactions to the theory of evolution. First there are the reactions against evolution which are founded in emotional or religious arguments. Consideration is given to the regional council of Cologne of 1860, the uncompromising words of H. Muckermann, and the dealings of the Holy See with the Catholic pro-evolution thinkers.

Next there are those who argued against the possibility of evolution on philosophical or scientific grounds. The examples chosen here are the 19th century Latin textbooks of Rothenflue and Grandclaude, the French monographs of Buchez and Farges, and the attempt at a new scientific explanation for evolution by Busquet.

Excessive enthusiasm in favor of evolution is then seen in Arthur Vianna de Lima, followed by the more cautious proposals concerning the compatibility of evolutionary theory and Catholic dogma by Mivart, Gonzales, Leroy and Zahm.

Following the reactions to the theory of evolution, the final section of Chapter I presents some initial efforts at clarifying the basic philosophical issues. These efforts, exhibited in the works of Gratton, Otis and Dufault, indicate

that a fruitful philosophic investigation into the problem of evolution was now possible. Fr. Dufault in particular exemplifies the attitudinal change that took place among Aristotelian-Thomistic philosophers. The biological theory of evolution was now seen as a well-founded scientific possibility. The question that remained, however, concerned the need for divine concursus or intervention in the evolutionary process.

The second aim of this thesis, a clarification of the issues, is presented in Chapter II, with its consideration of Charles De Koninck and Mortimer Adler. These men focused attention on what is seen as the basic issue involved in the evolution problematic: the problem of species. De Koninck pointed out that experimental simplicity is inversely proportional to ontological simplicity, indicating that the objects attained by these two different methods of knowing are, themselves, different. Building from that point, Adler clarified the logical-ontological crossover and showed that species attained by the philosophy of nature is essentially differentiated and hierarchically arranged. The number of those natural existing species is small, probably four: "to be," "to live," "to know," and "to understand."

The third chapter of the thesis pulls together the various threads of the species problematic, aided by the work of Dr. John Deely. The reasons for the furor caused among philosophers by the theory of evolution are outlined, and

special attention is given to the problem of the appearance of life-forms. The only essential condition for educing a soul through equivocal generation is the production of an organization suited to life. As the investigations of biochemistry demonstrate, the structures of living beings are potentially present in non-living matter. A combination of special circumstances is all that is needed to efficaciously, though in a per accidens way, dispose that organization of a living being which had previously been simply potentially present.

Thus the solution to the evolutionary problematic lies in the notion of species. The philosophical question is not whether dogs can generate lions, but whether there is some form of physico-chemical organization which could under some circumstances be so disposed by the secondary causality of the factors constituting its environment to require the eduction of a living form, and if some vegetative organization could likewise be so disposed to give rise to some rudimentary sensitive life. The conclusion of this paper is that an affirmative answer to that question is contradictory to neither the definition of the soul nor the notion of causality.