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# THEORY OF EVOLUTION AND FAITH IN CREATION ON THE HISTORY OF A TENSE RELATIONSHIP

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*This overview of the history of the idea of evolution includes the work of many European scholars often omitted from such accounts, particularly in the United States. It provides a case study in the origin of cultural tensions, owing to the attempts of some scientists and theologians, without sufficient interdisciplinary understanding, to undermine public confidence in each other's proper authority.*

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In the ongoing fight concerning the concept of evolution as a description of the reality of the universe, a large number of misunderstandings remain as to what should be considered a part of evolution and what is just part of a special theory of evolution. Before turning to the history of the concept of evolution, it seems necessary, at least to me, to clarify that this concept is not necessarily linked with a definite theory of evolution. Evolution in its general sense is neither Lamarckian nor Darwinian (explanations below); rather, it is only a descriptive term stating that everything within the universe has come forth through a process of becoming. Becoming in this context designates not simply the process known in biology as ontogenesis: the transformation of the highly densified information contained in a zygote into a living being of the same kind, a process that does not produce anything really new. Evolution, on the contrary, means exactly this: the appearance of new realities that did not exist before a particular point in time, through a process of becoming. The concept of evolution in its most general meaning thus states that the more comes forth from the less. This applies not only to the history of becoming from the pro-

tozoa to *Homo sapiens*,<sup>1</sup> but to the history of science and knowing, as well. The history of the idea of evolution is itself a good example of evolution.

The development of the idea of evolution is linked with the history of the conception of becoming. In striving for continuity, for stability, for security, for eternity—as it was expressed in very early funeral rites—human beings resented the idea that becoming should be of fundamental importance. The Eastern philosophers solved the “problem” of becoming by ascribing futility to all the outcomes of this process, declaring it to be Maya, just appearance. Only the return to the “eternal one,” the divine whole or nirvana, which absorbs all individuality, is necessary for a meaningful existence. Falling into the world of Maya and re-ascending to the true world of the “eternal one” are the two aspects of a cyclic process, in which becoming is, at best, of secondary importance. Similar cyclic visions were developed in Taoism, e.g., in the belief that all things “come from the originative process of Nature and return to the originative process of Nature.”<sup>2</sup> Later on, the book of I Ching, which was written under Taoist influence, introduced the cyclic principle of *yin* and

*yang*, both produced by the Great Original One. With this background, it is understandable why modern Chinese thinking did not turn to Darwin and the idea of evolution. Their expository textbooks on the world of Western thought mention names like Spencer, Huxley, Kropotkin, Bergson and the process philosophers,<sup>3</sup> but not Darwin.

In the Occident, the idea of evolution is at least implicitly contained within the cosmologies of the pre-Socratics. Thales (6th-7th century B.C.E.) had everything evolve out of the water. Anaximander (6th century B.C.E.) taught that the lineage that started with initial slime and led finally to the human being, had to pass, for example, through the stage of fishes. Xenophanes (6th century B.C.E.) recognized the fossils to be the remains of a once-living, but different, flora and fauna. The idea of a kind of general evolution out of prefabricated parts was developed by Empedocles (5th century B.C.E.). In his view, most accidental structures were discarded because they were not viable; in other words, the viable ones were selected. The explanation of the appearance of living forms through chance and selection is not, in fact, a very modern theory.

When Parmenides (6th century B.C.E.), and in his footsteps Plato and Aristotle, made the idea of being the center of their metaphysics, this early start to thinking the world to be radically within the horizon of becoming was lost. To Aristotle—and with him the Middle Ages and modern times<sup>4</sup>—becoming was essentially only the reconstitution of a past state of matter. Becoming, in this worldview, is repetition—the reproduction of something that has already existed. Within such a vision, everything is contained in the beginnings, and anything really new cannot come into being. Certainly, there were other attempts to go beyond the philosophers' principle of being, and to understand becoming in its property to produce really new forms of being. The atomists, known through the didactic poem *De natura rerum* by Titus Lucretius Carus (99-55

B.C.E.), are the most prominent example. For Lucretius the human race originated in natural processes, first by pure chance and selection. Its evolution started with primitives living in caves, passed through a culture of hunters and gatherers, produced civilization that mastered metallurgy, and finally reached the high culture of the Roman Golden Age. Lucretius had only minor influence on the thinking of the following centuries, which were dominated by neo-Platonism, by the Stoa, and later on by Aristotelianism. But often the fact is overlooked that there was a Lucretius-renaissance at the beginning of modern times, which spread the ideas of the atomists, mostly through clandestine groups.<sup>5</sup>

Among the Arabs, Avicenna (980-1037 C.E.), whose influence on occidental thinking is well known, presented the idea that the human race had its origins in an earlier form of animal. In considering Avicenna's mystical interpretation of the universe, a definite theory of becoming should not be expected. Picking up Plotinic ideas, he thought in terms of the emanation of the multiple from the one and the return of the multiple to the one. The ideas of Avicenna are reminiscent as of Hindu cosmology, as well as of the speculations of Nicholas of Cusa or of Teilhard de Chardin, at least in consideration of the return of the multiple to the one.<sup>6</sup>

In the Christian world of the West, the biblical story of creation was taken to be an historical report on the appearance of the species. It is certainly not a mistake to suppose that this understanding of the text by the vast majority of thinking people was not very helpful in furthering the idea of evolution. The experience of Galilei, who tried with insufficient proof to impose the heliocentric cosmos, shows how difficult it is to think in a way other than that of the vast majority. As far as the cosmic time frame is concerned, scholars relied on the dates of the Bible. They calculated the movements of the stars, the planets, and the sun quite exactly for each day of this universe—though

they evidently missed the fact that the universe did not start on Day Zero, as calculated. As late as 1852, the Oxford University Press published a set of tables, indicating the times of sunrise and sundown, starting with the sundown of Day One, 24 April of the year 0 A.M.,<sup>7</sup> or 4005 B.C.E.

Given this very restricted time frame in the mind of most people of the time, it is surprising to find that Leonardo da Vinci (1452-1519), on the basis of his observations of Alpine marine fossils—which he recognized as such, started to reflect on the process of sedimentation, mineralization, and natural erosion. As a result of his speculations, he proposed a minimum age of 200,000 years for the earth, a proposition some people might have considered highly dangerous. As a brilliant observer he also noticed the similarity between apes and men<sup>8</sup>—two hundred years before Linnaeus and Lamarck.

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Giordano Bruno (1548?-1600), who was a very controversial man in his time, and who is today often celebrated as a “martyr of science,” believed in the eternity and infinity of the universe (the influence of Lucretius). According to Bruno, the spiritually endowed matter within the universe deployed itself creatively in its becoming. It is questionable whether his ideas can be said to be evolutionary, since his vision was strictly cyclical. At any rate, the time was

not yet ripe for such an idea, even among the most prominent scientists. This becomes evident when turning to Carl Linnaeus (1707-1778) who, in 1735 and 1766, published the first comprehensive classification of the flora and the fauna since Aristotle. He introduced the system of binomial classification, which allowed every living being to be classified according to its genus and species—the same classification system still in use, though somewhat refined. Human beings were classified by Linnaeus among the primates as *Homo sapiens*. This has been refined to *Homo sapiens sapiens* to differentiate today’s humanity from earlier human forms.

In the nineteenth century, Linnaeus’ classification became one of the principal arguments in favor of evolution, and it still is today. Linnaeus himself was absolutely alien to such an idea, convinced that his system described the species just as they sprang from the hand of God in the first days of creation.

A French contemporary of Linnaeus, Pierre Louis Moreau de Maupertuis (1698-1759), influenced by Lucretius, developed the idea of selection and chance changes, the same as chance mutations. Such chance changes might, through alteration in environmental and geographical conditions, explain anatomical changes in a species, if

enough time were allowed. He employed probability calculus to reason his theory of heredity in an empirical study of albinism and polydactylism.<sup>9</sup> Neither in its method nor in its theory has modern neo-Darwinism reached better models of explanation than that of Maupertuis.

In his *Histoire naturelle*, Georges Louis Leclerc Comte de Buffon (1717-1788),<sup>10</sup> another contemporary of Linnaeus, explained that species do change and conse-

quently bring forth new species. According to his view, all species may have evolved from a single species existing in the distant past. He found support for this hypothesis in the parallelism of organs and the involution of organs. Buffon did not offer a theory of evolution—which in my opinion makes him superior to the neo-Darwinists—but this deficit was certainly not the reason for the condemnation of his doctrine by the theologians of the Sorbonne.

Buffon did not limit his ideas about evolution to the realm of living species. He linked the appearance of the planets with a solar event in which a big comet hit the liquid surface of the sun, flinging out into space a sort of matter-fog that contained the mass of the future planets. He constructed a history of the earth that is very close to present ideas in geological dimensions. Based on the fossil layers, whose specificity was clear to him, he distinguished seven epochs, each of which was measured in millions of years. This, for the theologians of his time, was an absolutely unacceptable idea; only recall the time frames mentioned above.

Johann Friedrich Blumenbach (1752-1840), while not explicitly a forerunner of

ogy as the science of the natural human diversity.<sup>11</sup>

In England, the successful physician and botanist Erasmus Darwin (1731-1802) had formulated clearly the question of the origin of species and life. In his treatise, *Zoonomia: or the Laws of Organic Life* (1796) he proposed the idea that all life developed from one primordial filament existing on the surface of the earth—an evolution that had started many millions of years in the past and was not yet finished. Erasmus Darwin, like many of his romantic contemporaries, speculated on a future open for the evolution of some kind of superhuman being.

It is astonishing that practically all these names linked with the history of the idea of evolution—and I did not mention them all—are omitted from the textbooks that teach about this topic. Science has adopted a very ahistorical way of thinking: in its own short view of its past, it replaces historical truth by hagiographic stories. Most people have the impression that the notion of evolution did not really exist before Darwin. Perhaps Erasmus Darwin receives an occasional mention, but only because he was Charles Darwin's grandfather.

The other man mentioned is Jean Baptiste Pierre Antoine de Monet, Chevalier de Lamarck (1744-1829), the "pet hate" of the Darwinists. Without any doubt, he was the first to try to develop a viable theory of the biological evolution.

He was educated for the office of clergy, as was Darwin; but after a short time in the army, he turned toward science, first to meteorology and then to botany and zoology. As a botanist he elaborated a new analytical system of classification.<sup>12</sup> Professor of zoology at the Jardin des Plantes in Paris, he introduced the differentiation between the in-

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an evolutionary understanding of reality, made an important contribution that prepared the ground for it. He employed comparative anatomy to elaborate the morphological differences of geographically separated human populations. At the young age of twenty-three, he published his thesis, which is the starting point of physical anthropol-

vertebrates and the vertebrates; and he distinguished the groups of Crustacea, Arachnida and Annelida.<sup>13</sup> This highly important work of his is rarely mentioned today.

Everybody, however, knows about the first modern theory of descent, which Lamarck developed in his *Philosophie zoologique*. The rather vulgarized description of this theory as the inheritance of acquired qualities makes it an easy target for Darwinists. Lamarck's doctrine is much more differentiated, in fact. It distinguished between what is known as function-Lamarckism (whereby an organ is developed by use and is lost by nonuse) and psycho-Lamarckism (whereby new qualities of existing organs may appear by a "need" for them). A real refutation of Lamarck's ideas has yet to be proposed, though Darwinists have a habit of citing the experiments by August Weismann. He experimented with cutting the tails off mice for many generations, and wondered that their progeny continued to be born with tails. These experiments fail to consider, however, the essential points of Lamarck's theory: cutting off the tails neither takes away their function nor does it create a "need." The question is still open.<sup>14</sup>

Nevertheless, Darwin had an easy mark in the theories of Lamarck, whose work he mentions only briefly. The old Anglo-Saxon/French rivalry in science was in favor of Darwin. (Newton *versus* Descartes is another example; Robert C. Gallo<sup>15</sup> *versus* Luc Montagnier<sup>16</sup> is a more recent one; yet another is Stanford *versus* CERN, over the confirmation of the Z-boson ( $Z^0$ ). Besides that, even in his lifetime Lamarck was a whipped dog—and easy to continue to whip. His superior at the Jardin des Plantes, George Baron de Cuvier (1769-1832), made his life hell. He did not want to share the opinions of his competitor. The fact that Cuvier, from 1822 on, was also the supervisor of the Protestant theological faculties in France may indicate the sources of the resistance against the rather revolutionary ideas of Lamarck. Both Cuvier and Lamarck were fully aware

of the fossil evidence and they did not have any essential disagreement in the zoological field.<sup>17</sup> Based on the fossil evidence, Cuvier developed the idea of consecutive "eons," each one ending in a catastrophe, the evidence for which is found in the fossil record. The recolonization of the earth by a new fauna could start in either of two ways: 1) the migration of surviving species from other regions unaffected by the catastrophe, or 2) by divine re-creation. Cuvier viewed the latter to be the more probable.

This interpretation shows Cuvier quite in line with the tradition of the physico-theologians, who tried to prove God the Creator from the evidence in complex anatomical structures, in the behavior of animals, and even in stones. The most prominent name in this field is William Paley, whose *Natural Theology* was rather a latecomer after the *Insecto-Theologia* by Friedrich Christian Lesser<sup>18</sup> and other continental authors. But in his time, Cuvier was referenced not only by other workers in science, but by the large majority of philosophers, as well.

Inmanuel Kant, after having elaborated the reasons to accept the idea of evolution of living beings, had this to say about the hypothesis:

...a risky adventure of reason: and there might be only few, even among the most ingenious scientists, who have never have it cross their mind. For you cannot say it is senseless, as is the *generatio aequivoca*, where-with we understand the production of an organized being through the mechanism of raw unorganized matter. It would still be *generatio mixta* in the most general meaning of this term, inasmuch as only something organic is produced out of another organic, even though among this kind of being something specifically different, e.g., when certain aquatic animals become, by and by, amphibians; and, after some generations, out of these land animals arise.<sup>19</sup>

The idea of evolution has been expressed here in a general, but correct, manner. Reflecting further on it, Kant stated:

*A priori*, within the judgment of pure reason, there is no contradiction. But experience does not show us an example of this; according to inexperience, all generation that we know about, is *generatio homonyma*, not only *univoca*, as contrary to the generation out of unorganized matter; it produces a product which is of the same kind as the generating being even in its organization; and *generatio heteronyma* is, as far as our experience of nature goes, to be found nowhere.<sup>20</sup>

A small step from this point would have been sufficient to reach a theologically acceptable idea of evolution. But it is obvious that Kant had very serious doubts about this possibility, as he expressed with the rhetorical question, "Are you in a position to say: Hand me matter, I will show you how to generate a caterpillar!"<sup>21</sup>

In 1785, thirty years after he (anonymously) published *Allgemeine Naturgeschichte*, Kant was still more outspoken:

The smallness of the degrees of difference among the species is (since the number of species is so high) a necessary consequence out of their number. Only a relationship among them—such that either one genus had sprung from another and all from a single original genus, or from one single generating mother's womb—would lead to ideas that are so monstrous that reason recoils from them.<sup>22</sup>

Kant fully subscribed to the idea of creation meaning the creation of each species individually, which presupposes the creation of at least one pair for each species. The question, "Why is it necessary that such a pair exists?" is answered by: "This alone makes an organized whole, even though not within a single, individual body."<sup>23</sup>

Thus, in refuting the idea of evolution Cuvier could appeal to philosophers of his time, who are still highly respected today, even among scientists. Hegel, who quoted many pages of Cuvier, and Lamarck, as well, in his *Enzyklopädie der Wissenschaften*, rejected any possibility of evolution:

Nature is essentially mindful. What Nature forms is definite, limited, and enters existence as such. Even though the earth was in a state devoid of living being, with only chemical processes, etc., there is, nevertheless, once the lightning of life hits matter, immediately a definite, completely formed being, like Minerva jumping fully armed from Jupiter's head. The Mosaic story of creation is still doing it best, when it says naively: one day the plants came into existence, another day the animals, and another day humankind. Humankind did not originate in animalkind, nor animalkind in the plants; everything is completely what it is at its moment of creation.<sup>24</sup>

Hegel's view was anti-evolutionary:

Nature is to be considered as a *system of steps*, each of which proceeds by necessity out of the other and is the next truth of that one out of which it results—but not in such a way that the one would originate *naturally* out of the other. [Metamorphosis applies only to the such a concept.]...It was a clumsy idea of older, and even newer, natural philosophy to consider continued formation and the passage of one natural form and sphere to a higher one, as an externally efficient production: which, in order to make it *clearer*, was relocated backwards into the *darkness* of the past.... From such nebulous, basically sensual notions, especially the so-called "proceeding," e.g., of plants and animals out of the water and the "proceeding" of the more developed animals out of the less developed ones, etc., from such notions intelligent consideration must abstain.<sup>25</sup>

This anti-evolutionary position was rather general among the leading philosophers and scientists of the first decades of the nineteenth century, and one might wonder how it became possible for Charles Darwin's opus, *On the Origin of Species*, to be immediately received by a large public.<sup>26</sup> Evidently, there must have been a change in the general opinion.

In 1843-46, Robert Chambers had published his *Vestiges of the Natural History of*

*Creation*<sup>27</sup> in England. In this work, he presented a deistic and vitalistic theory of adaptive organic transformism (evolution) and of cosmic development. The book is full of factual errors, pointed out early on by Hugh Miller and Adam Sedgwick, but this did not hinder the book's publication in numerous editions and translation into many languages. Darwin himself gave rather late recognition, in the sixth edition of his *Origin of Species*, to the fact that this book was of essential importance in preparing the ground for his work to be accepted:

In my opinion it has done excellent service in this country in calling attention to the subject, in removing prejudice, and in thus preparing the ground for the reception of analogous views.<sup>28</sup>

But Chambers' book alone could not explain why Darwin's ideas were received within the philosophical and in the scientific world. It should be recognized that science had increasingly settled on a level of materialistic-mechanistic interpretation of reality. This interpretation became added in with a faith in the unlimited possibilities of science, which was spread largely by popularizers and authors. Enlightenment attitudes not only in France, but elsewhere as well, had an anti-ecclesiastic and especially anti-Catholic tendency. Many years before the French Revolution, *The Berlin Monthly*<sup>29</sup> was filled with polemics against Roman Catholics and their superstitions. The materialism of the French Encyclopedists, Baron d'Holbach chief among them, was widely spread among the intellectuals of the time; religion was accepted only as a means to domesticate the lower classes. In Germany, Feuerbach (1804-72) opened the way to an atheistic understanding of reality, and at least the popularizers among the scientists made these ideas their own.

There is no doubt that quite a large number of nineteenth-century natural scientists thought themselves charged to refute faith in God, since everything is to be explained

scientifically. In a rather naive way, Jules Verne expressed this conviction when he had the protagonist of his *Journey to the Centre of the Earth* declare, "However great the miracles of Nature may be, they can always be explained by the laws of physics." This expression of scientific materialism—as it would be called today—with its unshakable faith in science, which believed itself to be the heroic fighter against the irrational faith in God of Christians and of all other religions in general, were represented in Germany most evidently by Karl Vogt, Jakob Moleschott and Ludwig Büchner. They were not philosophers who, like Holbach, taught a speculative atheistic materialism, but men of science, of the laboratory.

Karl Vogt<sup>30</sup> (1817-1895) was a zoologist at the University of Giessen, which he had to leave in the context of the 1848 revolution. He withdrew to Geneva, where he worked mostly in the field of paleontology. He is known for his violent defense of a materialistically interpreted Darwinism. A year before Darwin published his magnum opus, Vogt had translated Robert Chambers' *Vestiges of the Natural History of Creation* into German. When Darwin's theory was published in 1859, Vogt started preaching it, because he considered this theory to be supportive of his materialism. In his *Vorlesungen über den Menschen (Lectures on Man)*, a curious discrepancy is found between his calmly expounded scientific arguments and his controversy with the biblical texts that is totally ignorant of the historical-critical method. This new biblical scholarship, at least in the Protestant world, was already past its first steps. For Karl Vogt, Noah's ark was a barrier to scientific development, and it had to be surmounted. Concerning Cain, he asked where his wife had come from. And he wondered why the Roman Catholic Church in Paris did not like him! He is probably the only scientist who managed to end a serious work of scientific inquiry with a defiant wave of the fist against

yapping dogs (the clergy of Paris) and the words, "Let them bark till they can bark no more."<sup>31</sup>

This aggressive posture of the popularizers is by no means an exception among the representatives of nineteenth-century scientists. Thomas H. Huxley was celebrated as the great protagonist against Bishop Samuel Wilberforce by contemporary literature, and praised as St. George killing the dragon Samuel Church doctrine was described as immobile in its dogmatic state and as unable to adapt to progressing knowledge. Belief in God's absolute revelation was a blockage to the progress of knowledge—an insurmountable barrier. This combative attitude became most clearly exposed in John William Draper's *History of the Conflict between Religion and Science*, a book showing only black and white, and full of banalities. Most readers today would discard it quickly as nonsense. But in its time it was one of the most frequently read books, translated into many languages: French, German, Italian, Spanish, Polish, Russian, Portuguese and Serbian—and quite naturally it was put on the *Index librorum prohibitorum* by the Roman Curia (4 September 1876). It displays the same kind of accusations against religion that are as old as Lucretius: that the history of the Church is marked by bloody suppression, that all knowledge is suppressed by the Church, and that only science can free humanity. Draper's faith in the liberating effect of knowledge brought forth by science, shows a strange collection of inventions beneficial to people, all due to science—and opposed to faith, especially Roman Catholicism. The following list, far from complete, may give an idea of Draper's argumentation: telescopes, balloons, diving bells, thermometer, barometer, schools, newspapers, hospitals, canals, sanitation, census reports, cotton gin, medicines, manures, photography, railways, sewing machines, rifles, and warships.<sup>32</sup> Evidently, in this context, faith in science is much more important than validity of arguments against Christian faith.

What does photography prove against faith? To be honest, it must be said that most of the scientists of Draper's day considered his arguments to be nonsensical babble. But he evidently expressed what people of his time wanted to believe: namely, that science is the great human liberator that will free the race from all misery, in which the Church—and especially the Roman Catholic Church—wants it to languish.

Draper, in the name of science, fought the Roman Catholic Church relentlessly, and there was plenty of usable material in the texts of the *Syllabus of Errors* and the First Vatican Council to show the antiscientific stance of the Catholic Church. His picks up on such condemning statements as these:

All truths of religions derive from the natural potency of human reason. It is the first parameter according to which man may and must all truths of any order.<sup>33</sup>

Divine revelation is incomplete, and, because of this, is submitted to a constant progress, which must correspond to the progress of human reason.<sup>34</sup>

Strict rationalists were naturally provoked beyond bearable limits by such declarations. Feuerbach had already recognized religion as some kind of projection. Miracles could not be proven by experiments; they contradicted scientific insight. The *Syllabus* may certainly be called opposed to science. The antimaterialistic stance, as well, becomes evident as in the following anathema:

Whoever is not ashamed to affirm that there is nothing besides matter, he be excluded.<sup>35</sup>

The doctrine of evolution in its most general form is condemned as a sort of pantheism:

Whoever says that the physical as well as the spiritual finite things, or at least the spiritual ones, emanated out of the divine substance, or the divine essence, and by manifestation and evolution becomes everything or, even worse, that God is the universal or indefinite being that

constitutes itself by determining the distinct universe of beings according to genera, species and individuals: he be excluded.<sup>36</sup>

The Roman Catholic Church clearly claimed the right to delimit the autonomy of human reason:

Whoever says that human reason is independent in such a way, that God could not command belief, he be excluded.<sup>37</sup>

And it is easy to understand why critical scientists felt perplexed by such sentences as the following:

Whoever says that human sciences must be handled with such autonomy that its assertions are to be held true and may not be disaffirmed by the church, even if they contradict the revealed doctrine, he be excluded.<sup>38</sup>

Whoever says that it is possible that according to the progress of science one might be obliged to understand the propositions of faith defined by the Church sometimes differently from the meaning by which the Church understood and understands them, he be excluded.<sup>39</sup>

Certainly such assertions coming from the Church must be understood with relation to the attacks it was receiving, especially those coming from the popularizers like Draper and Vogt. Draper aired his ideas for the first time in Oxford in 1860 before the British Association, while the audience was waiting for Huxley and Wilberforce to start their well known debate. Vogt taught that human beings did not exercise free will and that all thought and action were just the reaction to preceding physical states or processes. Such denial of human responsibility provoked a necessary response from the moral theologians. It would be a mistake to read the Roman Catholic teachings as a reaction to the modern sciences of the nineteenth century. Rather, they have to be seen as reactions to the materialistic ideological usurpation of scientific knowledge, a usurpation that itself pretended to be scientific.

Vogt did not need Darwin's theory, even though he judged it to be very useful as a contribution for the defense of his ideas. Jakob Moleschott used similar means. He was born of a Dutch freethinker father, and beginning in 1847 he taught physiology in Heidelberg. He made the ideas of Feuerbach and D. F. Strauß<sup>40</sup> mostly his own. Moleschott's central scientific realization was linking the law of the conservation of matter, proposed by Lavoisier, with the law of the conservation of energy proposed by R. Mayer. From this linkage of matter with energy, he concluded that all processes of soul and mind are material-physiological in nature. In his *Lehre der Nahrungsmittel—Für das Volk*,<sup>41</sup> Moleschott stated, "No thought without phosphorus," which became a slogan for many decades. Feuerbach, who was one of his spiritual fathers, wrote the following ironic review, much to Moleschott's irritation:

Man is what he eats [Der Mensch ist, was er ißt]... Formerly we heard: In the beginning was God. Today we hear: In the beginning was the belly... The old world made the spirit the father of matter, the new one makes matter the father of the spirit.<sup>42</sup>

But Feuerbach's harsh critique was powerless against the popularity of Moleschott.

Unlike Vogt, Moleschott was a rather sober man, who was no fighter for his ideas. In 1852, in his book, *Der Kreislauf des Lebens (The Cycle of Life)*, he proposed that people abandon the use of cemeteries in favor of cremation, because cremation would bring corpses back into the cycle of life as fertilizer, instead of removing them from it in tombs. This suggestion made Moleschott one of the most controversial figures among the German scientists. Harassed by the public, he had to go abroad—but only as far as Italy. In Italy there were a number of protests staged against Moleschott by Roman Catholic students—probably none of whom had ever read one of Moleschott's contro-

versial books. He concentrated on his scientific work in the second half of the nineteenth century. He died in 1893 in Rome, after the city was no longer under papal government. His name became a sort of slogan for a materialistic worldview, but he hardly bothered, in fact, to defend materialism during his time in Italy.

It was quite another matter with Ludwig Büchner (1824-99),<sup>43</sup> who fought all his life for his materialistic "Weltanschauung." In 1855, four years before Darwin's *Origin of Species*, he published his book, *Kraft und Stoff* (*Force and Matter*). By 1904, it had been reprinted twenty-one times, and it was translated into fifteen languages. Journals and reviews criticized the book as bungled, but it was a strong seller, nonetheless. The core of his materialistic thinking centered around the idea of a purposeless universe; the appearance of life and humankind were unplanned, chance events of nature. The Darwinian description of evolution was helpful to him in defending his materialistic worldview. It is matter who thinks, not the spirit. Human intellectual forces are just a secretion of matter—an epiphenomenon.

This book by Büchner might be considered to be *the* popular, vulgarizing presentation of the opposition between faith and science; it did not give a serious elaboration of the tension between faith and knowledge, but set them in opposition to one another in a combative posture. To Büchner, as to most of his readers, it was evident that force and matter were concepts that might be interchanged. Thus, it is meaningless to speak of "spiritual" forces. The process of *creatio ex nihilo*, as seen by Christian faith or by any other religion, was to be refuted, since matter is eternally conserved and cannot be

augmented nor diminished. The old Lucretian notions, with the help of the first law of thermodynamics, experienced a happy revival. Any limitation on space could not be imagined—as Lucretius already said; consequently, space must be infinite. All life resides in organic matter, out of combinations of cells that arose out of living matter.

***It would be a misunderstanding to read the Roman Catholic teachings as a reaction to the modern sciences of the 19th century. Rather, they have to be seen as reactions to the materialistic ideological usurpation of scientific knowledge, a usurpation that itself pretended to be scientific.***

In the end, this world will be destroyed, because the laws of thermodynamics are unrelenting.

With the most absolute truth and with the greatest scientific accuracy can we say today: there is nothing miraculous in this world.<sup>44</sup>

In such a universe, devoid of goal and purpose, there is no room for any religion. The universe is the product of the blind, unchangeable necessity of the laws of matter. Priests, then, are either ambitious or they are charlatans; and all faithful people are fanatics. Only ignorant laymen could believe in a personal God. Such conclusions were unavoidable for the educated person following the ideas of Büchner.

Such perspectives are not really great visions of the future. These days, when materialistic ideas are wide spread, the radical striving for happiness demonstrates in many ways the hopelessness and the futurelessness of modern humanity. A century and a half ago, Büchner had to realize that reading his books turned people to melancholy. They

complained about the hopelessness to which his books exposed them. He tried to console his readers with the thought that standing under the merciless law of nature begets feelings of humility, or of repose, out of which grow self-contentment and self-respect.

Not as the humble and submissive slave of a supernatural master, nor as the helpless toy in the hands of heavenly powers, but as the proud and free son of Nature, understanding her laws and knowing how to tutor them to his own use, does the creature of modern civilization, the Freethinker, appear... the incarnation of the mightiest effort of Nature.<sup>45</sup>

These are only a few examples of so-called scientific ideologies of a generally materialistic color. There is no need to examine the materialistic faith of Ernst Heinrich Haeckel, who tried eagerly to win members for his Monist Union,<sup>46</sup> through which he spread the Darwinist evolutionary doctrine. It was no longer science that was proclaimed, but a scientifically ensconced religion.

Thus, no clear-cut picture may be found, with honest scientists in the service of truth on one side, and on the other side, benighted ecclesiastic theologians, still thinking in the Dark Ages. Actually, up to the nineteenth century, there was little fighting between science and theology. The utterings of the churches against science are rather to be looked at as something like trench warfare: one keeps the enemy at a distance without really knowing much about it. This view may make those antiscientific statements more understandable from a human standpoint. From a theological standpoint, though, they are more justified than the claim of the proponents of science—or at least of those who thought of themselves as the missionaries of a materialistic worldview, preaching that science would be able to explain the world completely, once all the material prerequisites of the material process were discovered.

The late nineteenth century was deeply impressed with these notions. Between the

teaching of the Roman Catholic Church, at least, and science thinking in an evolutionary mode, a large gap had opened; and with the faith in the superiority of science, there was little doubt as to where truth was to be found. This general belief is most succinctly expressed by the answer of a fourteen-year-old Harrow schoolboy. When asked, "What did Darwin do?" he replied, "Darwin disproved the Bible."

It might appear that Rome and the Catholic Church only disapproved of the idea of evolution, following a theology in the style of "*Roma locuta, causa finita*" [Rome has spoken, the case is closed]. But no less a man than John Henry Newman stated: "I cannot imagine... why Darwinism should be considered inconsistent with Catholic doctrine."<sup>47</sup> He made it quite clear why he thought so:

There is as much want of simplicity in the idea of distinct species as in that of the creation of trees in full growth, or rocks with fossils in them. I mean that it is strange that monkeys should be so like men, with no *historical* connection between them, as that there should be no course of facts by which fossil bones got into rocks. The one idea stands to the other as fluxions to differentials... I will either go the whole hog with Darwin, or, dispensing with time and history altogether, hold not only the theory of distinct species but also that of the creation of fossil-bearing rocks.<sup>48</sup>

When the English anatomist and biologist St. George Jackson Mivart converted to Catholicism and, therefore, had to leave Oxford University, he taught in London at St. Mary's Hospital Medical School and published *Lessons from Nature* in 1876. He accepted the notion of evolution but argued against Darwin's theory of mutation and selection. Instead, he proposed an innate plastic power of "individuation" that would explain the production of new species.<sup>49</sup> Huxley, as well as the Roman Catholic Church, turned against Mivart in his attempt to bridge the gap between religion and science. This Church looked with growing dis-

approval at his publications, and in 1892/93 they were put on the *Index*. When he published a few journal articles in January 1900, he was excommunicated by Herbert Cardinal Vaughan. Some years after Mivart's death, this judgment was nullified on the ground that he was mentally ill at the end of his life.

The ideas of Mivart were picked up by others. The Dominican, M. D. Leroy, put forward his version of them in his book *L'Evolution restreinte aux espèces organiques*. An American exposition followed, by J. A. Zahm in his book, *Dogma and Evolution*. In Belgium, Canon Henry de Dorlodot taught quite positively on evolution.<sup>50</sup> In France, Pierre Teilhard de Chardin started to write on evolution during World War I. It must be pointed out that, to date, Teilhard has presented the most comprehensive essay integrating the world, understood as evolutionary, into theology. His life, marked by his banishment from an academic career at the Catholic University of Paris and his exile from France, is well known.<sup>51</sup>

But these were only some isolated Roman Catholic avant-gardes, fighting for a positive understanding of evolution and of science in general. In a wider view, neither among the theologians nor among the scientists was there any great readiness to talk with one another. Theologians liked to use arguments from the realm of science, but quite often without any real understanding and mostly for apologetic purposes. A nice example is a professor of dogmatics named J. Bautz, who taught in Münster. He used the example of volcanos to demonstrate the existence of hell in the center of the earth,<sup>52</sup> an argument that exposed him to general ridicule and earned him the nickname "Höllensbautz." That being said, it should be acknowledged that some of the so-called scientific claims were no less ridiculous—for example, Haeckel's declaration, "We now know that the soul is the sum of the plasma movements in the ganglion cells." Only in Haeckel's case, nobody laughed.

The profound abyss between Christian believers and those believing in science was well illustrated by Dostoyevsky in his novel, *The Possessed*,<sup>53</sup> in the episode about a young lieutenant who had attacked his superior in a rage, biting him into the shoulder. This is the description of his settling into his rural quarters:

[He had] thrown two icons out of the window and hacked one of them with a hatchet. On the shrine in his room he had placed the books of Vogt, Moleschott and Büchner and had lighted church candles before them.

In view of the harshness of the controversy, which to this day has not totally disappeared, some vestiges of hope for better relations sometimes appear among theologians as well as among scientists. It is somewhat astonishing that there never was a formal condemnation of the theory of evolution by the magisterium of the Roman Catholic Church. Vatican I made no explicit decision against the doctrine of evolution; it essentially just repeated the principle that there is no possibility of a contradiction between faith and science. The most respected theologians of that time were nevertheless convinced that they had to refute the idea that the human body and the human race had arisen through evolution, and they declared those who held such opinions to be heretics. Thus, it really is amazing that the efforts of Monsignor Benigni to have evolution condemned by the Roman Catholic Church as heresy in 1925 did not succeed—thanks to the opposition of Cardinals Ehrle, Mercier, Bourne and Maffi.<sup>54</sup> This did not deter Cardinal Ruffini and other theologians of the "integrist" camp—as they are known in retrospect—from defending, up into the 1950s, the opinion that the human body was created directly by God and did not arise through of evolution. The last defensive statement of any importance to this question was the encyclical, *Humani generis*,<sup>55</sup> which admitted the possibility that the human body may have arisen by evolution, but with the restriction that human beings must have had a

monogenetic origin, that is, an origin in a single pair of parents.

Today it might be stated that, at least within the Roman Catholic Church, there is no longer any resistance to the notion of evolution. With the publication of the writings of Pierre Teilhard de Chardin, which began upon his death in 1955, there was quite a stirring of interest and great discussion, most of it only inside the churches. Vatican II, and most especially the pastoral constitution, was influenced by his thought, even to the very choice of words, if we are to trust the commentary of Joseph Cardinal Ratzinger on *Gaudium et Spes* (the Second Vatican Council, 1962-65). It is evident that Teilhard's ideas have not, even to this day, been adequately received, neither in science nor in theology. Theologians like to quote him, especially to show that there is no incompatibility between Christian faith and evolutionary theory. But mostly they are contented just with this statement, without asking the hard questions about what kind of fundamental changes in theology will follow if this world is an evolving creation.

***Thus, no clear-cut picture may be found, with honest scientists in the service of truth on one side, and on the other side, benighted ecclesiastic theologians, still thinking in the Dark Ages.***

Today, the battle around evolution has practically ceased. But this does not mean that any fundamental changes in the presentation of the doctrine of creation have been made in the theological manuals; this does not differ essentially from that in the manuals of the last century. By having pushed the process of demythologization ever further (most often combined with a growing sociologization), theology and faith largely got rid of the difficulty with confronting the knowledge of science. Even more, trans-

scendalization has opened up a region in which, by definition, no empirical proof is possible. Except among the fundamentalists in some regions of the United States and Australia, where they exercise some influence as "creationists," and except for the few dispersed integrists in the Roman Catholic world, no theologian today is seriously concerned about scientific theories such as the theory of evolution—though exceptions do make the rule.

The existence, side by side, of these two realms of knowledge—which consider one another as mutually irrelevant—is not without consequences. With science, the narrowing of the horizon of cognition to the empirical, experimentally provable—and/or to the mathematically expressible—has led to the incapacity of science to speak about the spiritual dimension with competence. This is clearly demonstrated by experimental psychology, for example, which is barely able to recognize the nuances of the spiritual. The innumerable theories of human psychology that keep appearing, and the schools linked with these theories, may be sufficient indications of this state of affairs.

It might be said that the controversy today is no longer maintained by strongly opposed positions on either side. Attempts to deliver a theory of science as a secure basis of the sciences have not succeeded with a really convincing proposition.

The discussion has withdrawn to the question of true and false judgments, and this has given scientists a much clearer feeling for the preliminary nature of their knowledge and especially of their worldview—if they dare to try one. The claim to refute religion or faith is alien to most scientists of today, even though there might be a few grandchildren of the Haeckels and the Drapers around.

The fight is over, but there is no victor. The fighters lost interest in their fight without overcoming their opponents. The inter-

est of science in refuting theology, with few exceptions, no longer exists. Nor does theology feel itself menaced by science; theology generally considers science to be irrelevant—and therewith, the theory of evolution.

Looking at the present situation, the whole fight between theology and science appears rather superfluous. The idea of evolution was used, as Haeckel intended, as a weapon to destroy Christianity and all other religions. Unfortunately, this fight stopped theological thinking from seriously addressing the question of the importance of the process of evolution for the Christian faith. Even now, thinkers get stuck in an apologetic, defensive stance, which inhibits a positive integration of the evolutionary character of the universe into a theology of creation.

On the other hand, it must also be stated that the inability of the scientists to liberate themselves from their materialistic prejudices has trapped them in the rationally unacceptable theory of neo-Darwinism, which seems to be breaking up today—but only very slowly.

The question of whether, in the long run, theology can survive while continuing to ignore the results of science, especially evolution, has yet to be answered. This is a question that cannot be treated by giving an historical overview such as this. The answer will be found, rather, by starting from theologically given presuppositions, e.g., from the article of the creed, that this universe—which is explored by science—is God's creation.

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### Endnotes:

1. Some philosopher or other worker in the field of human sciences might look with dismay at the idea that human knowledge itself is a part and continuation of the evolutionary process. But this is an evident fact inasmuch as the human being has never ceased to be a part of the evolutionary process. It is not a matter of nature on the one side, humanity on the other. The latter is a part of nature, and nature's process of becoming did not come to a standstill with the human being.

2. Chang, p. 204.

3. *Ibid.*, pp. 743-5.

4. Exceptions like Whitehead and his school of process philosophers, or Teilhard de Chardin or Bergson confirm this statement rather than contradict it.

5. Cf. Giambattista Vico (1688-1744), for example, who belonged to one such clandestine group in Naples for some time; his ideas, largely exploited in Europe by plagiarism, show clear resonances with Lucretius.

6. Teilhard de Chardin, pp. 109-32.

7. Annus Mundi—Year of the World: cf. General Tables of the *Fasti Catholici* or

*Fasti Temporis perpetui* from 1 a.m. of the year 4004 B.C. to 6004 a.m. of the year 6000 A.D.

8. This similarity had been already noted by Galen, whose knowledge about anatomy was largely based on the dissection of apes. Only during the late Middle Ages—by order of the Pope—did anatomists begin to abandon the taboo concerning the dissection of human corpses.

9. His theory was based on an atomistic dualism: all matter possesses a certain degree of sensibility, intelligence and memory. The influence of Lucretius and Vico are noticeable here.

10. This history comprises 44 volumes!

11. Blumenbach, *Collectio; Institutiones*, vol. 4.

12. Lamarck.

13. He also introduced the term "biology" into science.

14. There are many points that remain unanswered by the purely neo-Darwinist scenario. The highly complicated and complex structures in many features of existant fauna, including the human species, evidently transcend currently proposed explanations.

15. Chief of the tumor cell biology laboratory, National Cancer Institute.

16. Institut Pasteur, Paris. He sent to Gallo a specimen of the French isolate of the AIDS virus that Gallo claims to have discovered.

17. Cuvier.

18. This work was translated into Italian and French and was republished twice (1740, 1757).

19. Kant (1797), A 365-6, note.

20. *Ibid.* Cf., "Matter, which is the basal stuff of all things, is...bound to certain laws. Left to them, it must produce, by necessity, beautiful combinations. It does not have any freedom to deviate from this plan of perfection. Since it is thus in the state of being submitted to the wisest

intention, thus it must be placed by necessity into such harmonic conditions by a first cause that rules over it, and therefore, there is a God, just because nature, even in chaos, cannot be otherwise than regular and orderly.” Ibid., XXIX-XXX.

21. Ibid., A XXXIV-XXXV.

22. Akademie Ausgabe T.8, 54.

23. Kant (1797), A 376.

24. Hegel, par. 339.

25. Ibid., par. 249.

26. The first edition sold out in one day.

27. The opus was published anonymously. The author was identified only in 1884, years after Darwin’s death.

28. Historical sketch from the sixth edition, p. 58.

29. Cf. selected articles in Hinske.

30. He was not one of the really great scientists of his time. Certainly his books sold enormously well—the same is true today for the popularizing works of writers of a materialistic bent. Vogt’s book were considered to be outdated in the first half of the twentieth century, especially in as much as his defense of a materialistic worldview is concerned. The 1934 edition of the encyclopedia, *Der Große Brockhaus*, still devoted seventeen lines to him, though more recent editions stopped mentioning him.

31. Chadwick, p. 167.

32. Draper, pp. 321ff.

33. *Omnes religionis veritates ex nativa humanae rationis vi derivant; hinc ratio est princeps norma, qua homo cognitionem omnium cuiuscunque generis veritatum assequi possit ac debeat.* (D. 1704)

34. *Divina revelatio est imperfecta et idcirco subiecta continuo et indefinito progressui, qui humanae rationis progressui respondeat.* (D. 1705)

35. *Si quis praeter materiam nihil esse affirmare non erubuerit: Anathema sit.* (D. 1802)

36. *Si quis dixerit, res finitas tum corporeas tum spirituales aut saltem spirituales e divina substantia emanasse, —aut divinam essentiam sui manifestatione vel evolutione fieri omnia, —aut denique Deum esse ens universale seu indefinitum quod esse determinando constituat rerum universitatem in genera, species et individua distinctam: A. S. (D. 1804)*

37. *Si quis dixerit, rationem humanam ita independentem esse, ut fides ei a Deo imperari non possit: A. S. (D. 1810)*

38. *Si quis dixerit, disciplinas humanas ea cum libertate tractandas esse, ut earum assertiones, etsi doctrinae revelatae adversentur, tanquam verae retineri neque ab Ecclesia proscribi possint: A. S. (D. 1817)*

39. *Si quis dixerit, fieri posse, ut dogmatibus ab Ecclesia propositis aliquando secundum progressum scientiae sensus tribuendus sit alius ab eo, quem intellexit et intelligit Ecclesia: A. S. (DS 3043)*

40. Strauß.

41. Translates as *Doctrine of Food—for the People*. Today it would be *Manual of Dietetics—for Everybody*.

42. Feuerbach, p. 1082.

43. After a short time as lecturer at the University of Tübingen, he established himself as a general practitioner in Darmstadt. *Kraft und Stoff*, 1855. *Natur und Geist*, 1857. *Physiologische Bilder*, 2 volumes, 1861 and 1875. *Die Darwinsche Theorie von der Entstehung un Umwandlung der Lebewelt*, 1868; *Der Gottesbegriff und dessen Bedeutung für die Gegenwart*, 1874; *Am Sterbelager des Jahrhunderts*, 1898; *Im Dienste der Wahrheit*, 1899.

44. Büchner, p. 95.

45. Ibid., p. 254.

46. “Monistenbund,” which asserted the essential unity of inorganic and organic

nature. Haeckel's propagandism was a chief factor in the success of evolutionary doctrine in Germany.

47. Newman. Doc. A.18.21, Birmingham Oratorium. Quoted from Wildiers, p. 275, n. 75.

48. Newman, *Sundries*, p. 83. Quoted from Wildiers, p. 275, n. 75.

49. This position is much closer to that of modern chaos researchers. Cf. Kauffman.

50. The second volume of Dorlodot's work was never published. Dorlodot influenced the thinking of Teilhard de Chardin.

51. Cf. Cuénot.

52. Bautz.

53. Dostoevsky, ch. 2.

54. Cf. Bégouin.

55. The attempt by Prof. Charles Moeller, of the University of Louvain, to interpret the encyclical openmindedly landed on the *Index*, still existing at that time. See Catholic Church, p. 25.

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