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# The Catholic Church and Modern Science.

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Rev. JOHN A. ZAHM, C. S. C.





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A LECTURE,

*By the Rev. John A. Zahm, C. S. C., of the University  
of Notre Dame.*

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NOTRE DAME, INDIANA :

“ Ave Maria ” Press.

1886.

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1886.



## THE CATHOLIC CHURCH AND MODERN SCIENCE.

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AMONG the many questions that have engaged the attention of thinking minds, especially within the last few years, no one has excited a livelier or a more widespread interest than that concerning the relation between religion and science; or, more especially, the relation between modern science and the Catholic Church. Among those who let others do their thinking for them, or who are content to get their information second-hand (as it is too often, alas! doled out to them in garbled articles by an infidel press), and even among those whose intellectual acquirements should teach them better, there seems to be an impression, and, in many instances, a conviction, that there is a conflict between the teachings of the Church and the truths of science; that the doctrines of the former can no longer be reconciled with the conclusions of the latter; that, in a word, if the Church wishes to keep abreast with the advance of science she will not only have to

modify many of her dogmas, but will be forced to abandon some of them entirely, as no longer tenable. Then, again, this impression, or conviction, of these good people is confirmed by what they have heard or read about the attitude of the Church towards science in ages gone by. They have been told that the Church is the enemy of progress; that she not only does not now, but never did, encourage scientific research; and they are ever ready to point to instances which they consider as verifying such views. They adduce as facts of sober history tales of libraries burned, genius hampered and persecuted; and finish the charge with some terrible episode in the lives of the "Martyrs of Science."

It is concerning some of these points that I wish to address you a few words this evening. I will consider some of the objections brought forward by modern science against the teachings of the Church, and then define as clearly and as succinctly as possible the nature and scope of science and religion, and state what now is, what always has been, and what ever must be, the relation between human science and the Church of God.

But although I have it in purpose to speak of the Church in her relation to modern science, it is

by no means my intention to come forward as the Church's apologist.

The Church needs not apologists. Her past history is her apology. Her *raison d'être* is seen in the miraculous transformation she has effected in the moral, social and intellectual condition of mankind since her advent into this world. All the civilization and enlightenment we now enjoy; all that is great and good and noble in the world; all that is pure, grand and sublime in humanity, is owing to her. It was she that made the present condition of the world possible; it is she that we have to thank for all the advantages and blessings, in the natural as well as in the spiritual order, that we now possess; without her, progress and civilization, as we now understand them, would have been impossible; without her, we should to-day be no better than was the world when the Church entered upon her mission of refining and spiritualizing, nearly nineteen centuries ago.

Neither is it my intention in any statements I may make to minimize, even in the slightest degree, any doctrine the Church proposes for our belief, or assert anything that is inconsistent with the strictest orthodoxy, or, if you will, with the most pronounced Ultramontaniam.

The Church has no retractions to make; she

knows not what it is to make concessions in what she has once defined to be of faith. How, then, can one who pretends to be a Catholic do what the Church has never done and never can do? Conscious of her divine origin, of the Spirit of Truth being always with her, to assist her and preserve her from error, she continues her office of teacher of the nations, despite all that the world may say or do against her.

Such, then, being the spirit of the Church, there is only one course open for those who would be her children, and that is, to follow faithfully the path she has marked out for them. No liberalism, then, in matters of doctrine can be tolerated; no concessions can be allowed. What the Church teaches *must* be accepted as divine truth—all that so-called science may teach to the contrary notwithstanding.

With these few premises, I will at once proceed to examine some of the difficulties that modern science is thought to have raised against the teachings of Revelation. The objections generally brought forward, and those to which most interest attaches, are those which have been given the appearance of reality by recent studies in geology, biology, and astronomy. There are others, it is true, that have been suggested by investigations

and discoveries in other departments of science; but the arguments drawn from the sciences just mentioned are those on which the rationalist most relies in his controversies with the defenders of revealed truth.

The principal objections made by the geologists against the Bible are based on certain passages of the Book of Genesis, and notably on interpretations that have been given to the first chapter. The objections are as far-reaching as they are interesting; and, if they were well-founded, we might indeed despair of ever seeing a reconciliation between the teachings of science, on the one hand, and those of religion on the other. They embrace, among others, such questions as the age of the world, the six days of Creation, the origin and antiquity of man, the unity of species, and the nature and extent of the Noachian deluge. Now, although there is material in each of these subjects for one or even many discourses, I think it possible to give them all a satisfactory notice this evening, and that, too, without making any unreasonable demand on either your time or patience.

And, first, as to the age of the world. Astronomers and geologists tell us that millions, yea, hundreds of millions, of years must have elapsed since the creation of the world—if, indeed, the

world be not eternal,—and hence, they say, science is in direct contradiction to the generally received opinion, which places the age of the world at about six thousand years.

But here, at the outset, our learned astronomers and geologists make several serious blunders. They mistake a generally received opinion for a doctrine or definition of the Church; whereas, as a matter of fact, the Church has never defined anything regarding the age of the world, and most probably never will, as the age of the world has nothing whatever to do—at least as far as I can see—with the object of her teaching, viz.: faith and morals.

Again, we are told that the conclusions of science respecting the age of the world are at variance with Scripture, when, in reality, the Bible nowhere says anything whatever about the matter, so far as the age of the world is concerned, except what is contained in the first words of *Genesis*: *In principio creavit Deus cælum et terram*,—"In the *beginning* God created heaven and earth." But when was the beginning? No one knows. Nothing can be more indefinite. It may have been six thousand years ago, as some have thought; or it may have been, as Proctor and others contend, five hundred million years ago. Scripture says

nothing on the subject more definite than the words quoted, and the Church has never made any declaration whatever; so that scientists are given all the latitude they could desire, as far as time is concerned. True it is, there have been commentators on the Sacred Text who, thinking that the creation of the world was simultaneous with the creation of man,—and it must be pleaded in their behalf that, when they wrote, there was no special reason for believing that the case was otherwise,—have maintained that the age of the world is about six thousand years; but, then, the opinions of commentators, however learned, are by no means to be confounded with official teachings of the Church. As well might we say that the theories and hypotheses of individual scientists are always to be accepted as demonstrated truths, as facts that cannot be gainsaid. If this distinction between opinion and doctrine, between theory and demonstration, were always borne in mind, we should hear less of the so-called conflict between science and religion. What the contest should be called—what, in fact, it has always been—is a conflict between individuals: commentators and theologians, if you will, on one side, and scientists and philosophers on the other.

The second objection urged regards the days of

creation. It was long considered—and indeed there was no particular reason for holding a different opinion until lately, when the study of geology began to open new avenues of thought—that the six days spoken of in Genesis were the ordinary days of twenty-four hours each. But geology and astronomy come forward and tell us that their records speak of untold ages that must have elapsed during those six days, and consequently that the Scriptures are again at fault. The Sacred Text is once more examined, and it is found that the days spoken of do not necessarily mean periods of twenty-four hours each, but that they may be interpreted as meaning indefinite periods of time. Nay, more: there is strong presumptive evidence for believing even from Scripture that the days referred to were not true solar days, but that, on the contrary, they were periods of time, just such as geologists and astronomers demand. According to Scripture the sun was not created until the fourth day; consequently, there was no alteration of day and night as we now know it, and no way of dividing time into days of twenty-four hours each, like that which existed after the sun appeared on the fourth day.

But this interpretation is not a new one, or one that has been provoked by the advance of modern



science. True, recent scientific investigations have caused this interpretation to be the one now generally accepted; but as far back as the time of St. Augustine, and even further, the difficulty of considering the days of Genesis as ordinary solar days was apparent. Indeed the saint himself, in his masterly work on Genesis, inclines to the opinion, as being the more reasonable, that the days spoken of were indefinite periods of time. In this opinion he is followed by the greatest theologians and commentators of the Middle Ages—among others, Albertus Magnus, and the Angel of the Schools, St. Thomas Aquinas.

The Angelic Doctor says that the opinion according to which the days of Genesis are solar days is plainer and the one more conformable to the letter of the text: but, as if foreseeing the discussions the text would eventually give rise to, declares the opinion which makes the days periods of time to be the more reasonable, and the better adapted to defend the Sacred Scriptures from the ridicule of unbelievers, and adds that it is the one that pleases him most. And this opinion—it can never, I think, be considered as more than an opinion, not originated by modern science, although given new weight and rendered more probable by recent discoveries,—this opinion, maintained by St. Augustine and the great doctors

of the Church during the Middle Ages, is the one now almost universally accepted. As in the case of the age of the world, the Church has never pronounced upon the subject, and most likely never will. It is an opinion that does not in the slightest degree militate against any of her teachings, and, far from being contrary to any of the declarations of Scripture, is the only one which, even aside from the light thrown on the subject by science, seems tenable. It is consequently an opinion that any one is free to choose and defend. As a Catholic, then, one is at perfect liberty to consider the days of Genesis as true solar days or as indefinite periods of time.

But you may say that there are more serious objections to be answered before science and Scripture can be harmonized. What about the difficulties concerning the origin and antiquity of man, and about the unity of the human species, put forward by a class of scientists who call themselves evolutionists? What, in a word, about evolution?

It is scarcely necessary to state that it would be simply impossible, in a brief lecture, to give anything like a detailed answer to this question, or even to give a *resumé* of what evolutionists actually teach. The subject of evolution, although but little discussed until about twenty-five years ago (about

the time of the appearance of Darwin's work on the "Origin of Species"), is now one that excites more interest than any other one subject whatever. It already has a literature of its own, and the number of works pertaining to the question is daily increasing. It is treated of in magazines and newspapers, is discussed from the rostrum and the pulpit, and is a frequent topic of conversation in the railway-car and in the drawing-room. Everybody talks about evolution, and often too without knowing any more about the matter than the fact that some one who is an evolutionist says that man is descended from a monkey. Still, although we cannot give even a *resumé* of the teachings of evolutionists, we can state a few facts and principles sufficient, however, to answer our present purpose.

One of the fundamental teachings of evolution, and the one about which we are just now most particularly concerned, is that which declares that all the higher forms of life, animal and vegetable, have been derived, by the interaction of natural causes, from the lower forms, and that the lowest and first forms of organic life were produced by the action of the forces of nature on inorganic matter. On this one point all evolutionists agree, although there is a great variety of opinions as

to the causes that have operated, and the processes that have obtained, in the gradual development of the organic world from its first beginnings to what it is now. For what I will have to say on the subject, however, this difference of opinion is of no moment.

Now, at the outset, I must tell you that evolution is, at its best, only a theory—only an hypothesis. It is simply an assumption, and an assumption too that rests on other assumptions. No one who has studied the question with even moderate care, and who understands the distinction between theory and doctrine, between hypothesis and demonstrated fact, will pretend to say it is anything more. It assumes in the first place the truth of Laplace's mechanical explanation of the formation of the universe, as put forth in his celebrated nebular hypothesis — an hypothesis which maintained that the earth and all the heavenly bodies once existed in a state of incandescent vapor; were once immense clouds of fire-mist, which, after the lapse of countless ages, were condensed into the solid orbs we now behold. From the very nature of the case this is an hypothesis whose truth can never be demonstrated. It may be shown by astronomers, physicists and geologists to be more or less plausible, but it can never get above the rank of

a theory. It is, if you will, the best mechanical explanation of the formation of the universe that has yet been given; but it is nothing more than an attempt to account for what can never be known with any certainty, without a special divine revelation,—a revelation which one can safely say will never be made.

Again, evolution assumes that organic was derived from inorganic matter, by the simple interaction of the forces of nature.

In the words of Prof. Huxley—“If the hypothesis of evolution be true, living matter must have arisen from non-living matter; for by the hypothesis the condition of the globe was at one time such that living matter could not have existed on it, life being entirely incompatible with the gaseous state.” It assumes the truth of the theory of spontaneous generation, and that, too, in the face of unanswerable, I might say, conclusive scientific evidence against it. Any one who has followed the investigations on the subject by the eminent French *savant* M. Pasteur, or watched the delicate and ingenious experiments devised by Prof. Tyndall, will, I think, be forced to admit, whatever may have been his preconceived notions, the force of their arguments, and to acknowledge the justness of their conclusions against the possibility of spontaneous

generation. Since the researches of these eminent experimentalists were made known, no one laying any claim to scientific knowledge has thought of regarding spontaneous generation as anything more than an old and exploded theory. Even Darwin himself considered spontaneous generation as "a result absolutely inconceivable." Dr. Carpenter, one of the most eminent biologists of the age, regarded it as an "astounding hypothesis;" whilst the celebrated Dr. Virchow, at the Conference of the German Naturalists and Physicians at Munich, in 1877, did not hesitate to declare that it is a "theory not supported by any evidence," and as one "utterly discredited."

Then, again, as a third postulate, evolution assumes as a fact the transmutation of species, the change suddenly or gradually of one species, of either animal or plant, into another. But this is an assumption for which there is not the slightest evidence whatever. Not a single fact in the whole range of natural science can be adduced favoring the truth of the transmutation of species; not a single instance can be cited of a single species, whether of plant or animal, that has ever, either through the agency of natural causes, or by the artifice of man, been changed into another species. The bird-fancier and the florist can produce

varieties, but species never. There have been produced by cultivation different varieties of roses, different varieties of pigeons, but there is not on record a solitary example of the change of one species of pigeon or of one species of rose into another species.

And yet if there were any truth in the theory of the transmutation of species, some conclusive evidence in support of it should certainly have been discovered before this. For hundreds of years there have been thousands of observers of thousands of species and of millions of individuals of animals and plants, in all parts of the world, and yet not a single instance has been brought to light to justify a theory that is absolutely essential to the hypothesis of evolution. According to the calculation of probabilities, the present chances against the transmutation of species, and consequently against evolution, are as infinity to nothing. Even Prof. Huxley, with all his evolutionary tendencies, is forced to admit, in speaking of the Darwinian hypothesis, that "it is our clear conviction that, as the evidence stands, it is not absolutely proven that a group of animals, having all the characters exhibited by species in nature, has ever been originated by selection, whether artificial or natural."

If then there is no evidence for the transmutation of one species into another in the lower forms of life, there is still less when it comes to consider the change of one of the higher animal forms into man. Between the brute creation and man there is an impassable chasm. Between the most perfectly developed ape and man, with all his wonderful gifts of mind and soul, there is an infinite distance that no "missing link," and no series of missing links, can bridge over. From the highest exhibition of brute instinct to the lowest manifestation of human reason there is a void as great as that which separates earth from heaven.

Such are a few of the assumptions of the evolutionist, every one of them absolutely necessary to establish the truth of his hypothesis, and yet none of them with any demonstrated foundation in fact. What, then, is our conclusion as regards evolution and faith? Evidently, to say the least, that evolution has proven nothing against the teachings of faith, from the simple fact that evolution, so far, is, at best, a conjecture, a theory, not only unproven, but a theory that, as it is now taught, would seem to be unprovable.

But supposing the nebular hypothesis and spontaneous generation and the transmutation of species, and all the other postulates necessary to establish



the fact of evolution, be granted; supposing that, as new facts are discovered, and as nature is more carefully scrutinized, it be shown that there has obtained that development from lower to higher forms of life that the evolutionist speaks of, what then? I might reply that it would be time enough to answer the question when the evidence is forthcoming; but as it seems to bear somewhat closely on the subject I have chosen to treat, and as, even aside from this, its answer, if not altogether new, may have a certain interest for some of my hearers—at least, as illustrative of the liberty of thought that the Catholic enjoys regarding this and similar questions—I think it best to give it a passing notice.

Before going further, however, it will be necessary to state more precisely the meaning of a few terms. I have given a general definition of evolution, yet one that will answer our purpose sufficiently well. But as all who hold the doctrine are not at one as to the causes and processes that have obtained, it will be well to define the beliefs of the principal classes of evolutionists. First, then, we have the atheistic evolutionist, or the evolutionist who denies the existence of a divine Creator. To this class belong Hæckel, Vogt, and Büchner, and many of their disciples in Europe

and in this country. The second class comprises the school of agnostic evolutionists, those, viz., who, while not admitting the existence of a divine Creator, still do not explicitly deny His existence. They simply relegate God to the Unknowable; because, they say, we can know nothing about Him. Among the more prominent representatives of this school are Herbert Spencer, Tyndall, Huxley, and Bain. Evolutionists of the third class are theists, or those who profess and maintain a belief in the existence of a personal God. To this last class belong the ablest scientists and philosophers of the age. Among those best known we may mention the names of Owen, Sir John Herschel, Sir William Thompson, Prof. Gray, Mr. Wallace, and M. Naudin.

It is quite evident that a Catholic could not hold the theory of evolution in the sense in which it is maintained by atheists and agnostics. To do so would be in direct opposition to the first article of his Creed. But could he, consistently with his faith, hold it as taught by theists? Before answering this question, we must properly understand another term of paramount importance in the discussion of the subject. That term is creation. Creation, in its primary and strictest sense, is the origination by God of something without pre-ex-

isting material. But, besides this primary or absolute creation, there is also a secondary or derivative creation, which obtains, for instance, when God, after having created matter directly, gives it the power of evolving under certain conditions all the various forms it may subsequently assume. In the first instance, God creates matter absolutely; and then by giving it certain powers and properties,—in other words, by imposing on it what we call natural laws,—creates potentially all the forms that may afterwards be evolved from matter thus under the action of the forces and properties given it.

Now the question comes again: Is there anything in the theistic idea of evolution contrary to the declaration of Scripture or to the teachings of Catholic faith? I trust you will not consider me as proclaiming a novelty, or as giving expression to a heterodox opinion, when I state it as my belief that there is not. According to the words of Genesis, God did not create animals and plants in the primary sense of the word, but caused them to be produced from pre-existing material. “Let the earth bring forth,” “Let the waters bring forth,” He says; showing clearly that creation, in these instances, was only secondary or derivative.

So far, then, the way seems clear. But was this

creation instantaneous, or was it something effected only after the lapse of time, through the operation of natural forces; were the animals and plants called immediately into existence from crude inorganic material by the *fiat* of Omnipotence, or were they slowly and gradually evolved from this same inorganic material, and developed from lower to higher forms, in accordance with laws that God Himself had established in the beginning?

It is popularly supposed that the creations spoken of were instantaneous; but the evolutionist contends that they were gradual, and the result of the interaction, according to divinely pre-ordained laws, of natural forces on matter. In either case, the creative act of God is maintained; and in the second case, it seems to me, as much as in the first. The evolutionist simply maintains that God did potentially, what the ordinary Scriptural interpreter believes He did by a distinct exercise of infinite power.

Thus understood, then, it seems clear that there is nothing in evolution contrary to Scripture. But may there not be some dogmatic definition of the Church against it, or may it not be contrary, at least in its spirit, to the teachings of the Fathers and Doctors of the Church?

As to the Church, she has never pronounced on

the matter, and there is not—I speak under correction—a single definition that declares, even by implication, that evolution is opposed to faith. But we must go still further. We are not satisfied by steering clear of opinions that are manifestly heretical; we wish also to avoid, much less advocate, opinions that a *concensus* of theological authority would consider as rash or dangerous. What, then, do the Doctors and Fathers of the Church say in relation to the subject? It need not be observed that they could not have said anything about evolution as we now understand it, for the simple reason that the subject, as taught to-day, was quite unknown. But, still, they may have laid down principles that will meet all our difficulties. And that they did so, is a fact, I think, no one who weighs what they have written can deny.

In his great work on Genesis, St. Augustine, when speaking of the creation of animals and plants, repeats time and again his belief that they were brought into existence by the operation of natural causes. He tells us explicitly that they were created potentially, and that they were afterwards developed into the manifold forms we now behold. “As,” he teaches, “the seed contains invisibly within itself all that is found in the full-grown tree, so also the world, after its creation by

God, contained all the germs of the various forms of life that were afterwards produced.”

St. Thomas follows St. Augustine’s teaching regarding derivative creation, as does also the great Jesuit theologian Saurez, and many others of acknowledged authority. I will not take up your time in reading quotations or making references, as I do not purpose giving you a treatise on the subject, but only to point out a few well-authenticated facts. Those who have the leisure or the inclination can make a detailed examination of the question for themselves.

Thus, then, we see that that system of evolution which acknowledges God as direct Creator of matter and force, and as at least the indirect Creator—a Creator through secondary causes—of all the manifold forms of organic nature that we know of, is not inconsistent with either the declarations of Scripture, the definitions of the Church, or the teachings of the Doctors and Fathers. Consequently, as matters now stand, evolution is not contrary to Catholic faith; and any one is at liberty to hold the theory, if he is satisfied with the evidence adduced in its support.

But, you may ask, can this system of evolution be made, consistently with Catholic doctrine, to embrace also man? In answer to this question, I

will simply say that, as to the soul of man, the reply must be a decided negative. Each individual soul, according to Catholic teaching, is created directly and absolutely by God Himself. But as to whether theistic evolution may embrace man's body, considered as separate from, and independent of, the soul, I will only observe that the theory has been defended by no less an authority than the eminent Catholic naturalist and philosopher, St. George Mivart: and I am not aware that his position has been proven by theologians to be untenable. The hypothesis may be rash, and even dangerous, but I do not think that, considering it simply in its bearing on dogma, any one could pronounce it as certainly and positively false. But—and this is important to bear in mind—it is at most a matter of mere speculation, and such it will probably always remain.

So also is the evolution of the lower forms of animal and plant life only a theory—"a fascinating theory," as the great Agassiz called it,—but nothing more. Organic forms *may* have been evolved according to the laws of theistic evolution, but *were* they? We are now dealing with a question of fact, not of fancy. To this I think we can reply, with the eminent German physiologist, Du Bois-Reymond, when facing a similar question,

*“Ignoramus et ignorabimus—*we do not know, and we never shall know.” We know that God has created all things that exist. How He has created them is a mystery that does not concern us. We know that all that is grand and sublime and beautiful in nature is the work of His hands, although we may never know anything more than we do now of the wonderful methods and processes employed. Probably we should show more wisdom by humbly acknowledging that we are dealing with one of those mysteries of the natural order of which a solution will never be vouchsafed us in this world. At any rate, whatever advances science may make, we can rest secure in the thought that there is nothing in evolution, outside of the atheistic and agnostic systems of it, that contravenes the teachings of Holy Church. For us this is sufficient.

Having thus disposed of that insurmountable barrier, as unbelievers are pleased to call it, which evolution is ordinarily considered to oppose to a consistent acceptance of revealed truth, I will proceed to those other subjects that are at the present time regarded as offering special difficulties to the theologian. I refer to the much vexed questions of the unity of species, the antiquity of man, and the Noachian Deluge.



The question of the unity of the human species is one that has, more or less, engaged the attention of philosophers for centuries. But the impetus given to the study of biological science, particularly within the last twenty-five years, has created for the subject an interest it never possessed before. It has been taken up not only by speculative scientists and sentimental philanthropists, but also, and especially, by practical, learned, truth-loving naturalists, philologists, ethnologists and archæologists the world over. All the races and tribes of the earth have been visited in the interests of science; their anatomical and physiological characteristics have been noted and compared; their manners and customs have been studied with scrupulous care; their languages and literatures have been consulted by scholars of every shade of opinion; their monuments and records have been ransacked to satisfy the demands of *savants* and learned societies; their traditions and religious beliefs have been examined even in their minutest details. The hieroglyphical writings of the ancient Egyptians and Aztecs have been deciphered; the cuneiform inscriptions of Western Asia interpreted; the remains of prehistoric man in the Old and New Worlds questioned; and all this with what result? One in perfect harmony with the

teaching of the Church, which maintains, and ever has maintained, the oneness of the human species.

The bearing of her doctrine of the unity of species—*i. e.*, that all mankind is derived from common parents—on some of the fundamental teachings of faith, is so evident as to need no comment. But precise as the doctrine of the Church is on this point, its truth has not been in the least impaired by the investigations and discoveries of modern science. On the contrary, all demonstrated conclusions in every department of knowledge have, as every Catholic knew would be the case, only tended to corroborate what the Church has always taught, and to strengthen more than ever her position in the eyes of the intellectual world. I know that there have been men, with theories to support—specialists who wished to obtain notoriety,—who have maintained the unprovable hypothesis of the multiplicity of species. I am aware also that there have been those who have divided mankind into species according to geographical distribution, or color, or language, but no one has ever regarded their theories as anything more than vague and unfounded conjectures.

Another and more interesting question is that

regarding the antiquity of man. Scientific men now maintain that man has been on earth much longer than is popularly supposed, and much longer, too, than is consistent with the declarations of the Sacred Text. Instead of the six thousand years that are generally assigned as the time that has elapsed since man appeared on earth, scientists assure us that his advent dates back much farther. Some will tell you that man has inhabited this earth for at least 40,000 or 50,000 years; whilst others, like Sir John Lubbock and Sir Charles Lyell, will claim for him an antiquity of 200,000 years, and still others more than a million. They tell us that the present remains of prehistoric man, the instruments of defense, etc., found in Europe and America, teach us that all our ideas about his antiquity have to be entirely modified.

Now, at the first blush, the great disagreement among the scientists themselves about the question at issue should put us on our guard. No two of them view the question in the same light. No two of them, in any given instance, ever arrive at the same conclusion as the result of their investigations. Geologists particularly are fond of giving a great antiquity to man, and to the period during which animal and vegetable life has existed upon this earth. According to Lyell, the life period of

the earth must be somewhere about 300,000,000 years. Yet, in the face of this statement, the great mathematicians and physicists, Sir Wm. Thompson and Prof. Tait, come forward, with conclusions based on well known laws of physics, and assert, as a certainty, that it would have been simply impossible for life, as we now know it, to have existed on the earth for more than 10,000,000 or 15,000,000 years at most,—only the one-thirtieth or the one-twentieth of the time claimed by Lyell and his followers. Allow me to quote you Prof. Tait's own words, as found in his admirable work, "Recent Advances in Physical Science": "We can at once say to geologists that, granting this premise, that physical laws have remained as they are now, and that we know of all the physical laws which have been operating during that time, we cannot give more time for their speculation than about ten, or, say at most, fifteen million years. But I dare say many of you are acquainted with the speculations of Lyell, and others,—especially of Darwin, who tells us that even for a comparatively brief portion of geological history three hundred millions of years will not suffice. We say—so much the worse for geology as at present understood by its chief authorities, for, as you will presently see, physical considerations, from various

independent points of view, render it utterly impossible that more than ten million years can be granted.”

Now, looking at Lyell's proportion of man's age to that of the life period of the earth, viz., 200,000 to 300,000,000—*i.e.*, 1 to 1500—in the light of Thompson's conclusions, we find that the age of man must, according to Lyell's own figures, be brought down to a period somewhere between 6600 and 10,000 years. The mean result, which, however, is only approximate, would be about 8000 years. Still it is equally decisive as against the unwarranted assumptions of geologists.

But what about the antiquity of man according to the Bible? It is a mistaken idea to suppose that the Scriptures give any date as to the creation of man, or any definite data that would aid one in calculating how long he has been upon the earth. The dates usually put at the head of chapters or parts of the Bible are not a part of the inspired writings, but only the determinations of individual commentators, from such data as the Sacred Text afforded them. These data, often vague and uncertain, are mostly the genealogies of the patriarchs, reigns of kings, periods of servitude, etc.: and, owing to various causes, which it is unnecessary to explain at present, it is found that even the

oldest versions of the Bible we now possess—viz., the Septuagint, the Hebrew, and the Samaritan—seriously differ from each other in their chronologies.

No orthodox writer, according to Riccioli, an eminent Jesuit astronomer, places the era of creation of man higher than 7000 B. C., or lower than 3700. Of two hundred different values collected by the chronologer Dessignoles, for the time elapsed from the creation of man until the coming of Christ, the least was 3483 and the greatest 6984 years, giving a difference of 3501 years. Adding to these results the time that has elapsed since the coming of Christ (1883 years) we have as a minimum of man's antiquity 5366 years, and as a maximum 8867 years. The mean of these two sums would be a little over 7000 years,—a result that chronologists hold to be better founded than the popularly received figure that places the age of our race at about 6000 years. In conclusion I would add that it is now considered by those who have made Biblical chronology a study, that, from the data given in the Bible, it would scarcely be safe to maintain that the time which has elapsed since the creation of our first parents has been more than 8000 years. It may be a little more;

but, judging from the data calculated from, it is a little less.

Here, then, we have, on the one hand, the latest conclusions—the results are only approximate—of science, which put the antiquity of man at about 8000 years; and, on the other hand, the computations of Biblical chronologists, which, giving a latitude of fully thirty-five centuries between the lowest and the highest values, afford certainly all the time that the geologist or astronomer can prove necessary to reconcile the facts of his science with the known data of Holy Scripture.

As far as the Church is concerned, the antiquity of man is an open question. She has never pronounced on the subject, but, as in many similar instances, has left it to be decided by learned men according to the data afforded by chronological investigations.

In the calculations to which I have just alluded I have taken the results of geologists whose views on the subject are extreme. But there are not wanting eminent scholars in every branch of modern scientific inquiry who maintain that the antiquity of man is far less than some of our “advanced thinkers” would make it; and that there is yet no valid reason for considering it greater than it has been popularly supposed to be,

viz., 6000 years. At all events — barring all fanciful computations, like those based on Indian or Chinese chronologies; or idle conjectures, like those found on the relics discovered in Scandinavian graves, in French peat or gravel beds, or in Swiss lake-dwellings—there is certainly no conflict between science—I do not mean *theory*—and religion on the subject of the age of our race. More than this: as fully convinced as I am that there is no conflict now, so fully am I convinced that there never will be any; but that, on the contrary, every new scientific discovery, when properly understood, will, as in every other case, only tend to confirm the teachings of the Inspired Record.

One more difficulty, and I have done with the objections I proposed to answer. We are told that there is a conflict between the teachings of science and the account of the flood, as contained in the Bible. I might admit that there is a conflict between the teachings of certain scientists and the Bible; but this would prove nothing against the Bible. That there is even the slightest conflict between the Mosaic narrative of the deluge and the demonstrated conclusions of science, I emphatically deny.

It is the popular belief—a belief, too, that the words of the Bible seem to favor—that the flood



was universal; but science steps forward and tells us that, for many reasons I need not mention, the deluge could not have been universal. Admitting, as we may, that there was nothing more miraculous about the deluge than the employment by God, at a fixed time, of physical agents, as we now know them, for the accomplishment of His purpose—the destruction of the human race in punishment of their crimes,—I do not see that we are obliged, even by the words Scripture, to believe that the deluge was universal as to the surface of the earth, but universal only as to that part inhabited by man. The end for which the flood was sent—the washing away of the wicked from the face of the earth—would have been attained as well by a local as by a general deluge. The frequent use of universal for particular terms in every part of the Sacred Text is well known. But there is no reason whatever why the terms employed in the narrative of the flood should be used in a general rather than a particular sense; and the Church, as in the other cases I have spoken of, has not given any decision on the question. Hence, in the present state of the discussion, we are at perfect liberty to believe that the waters covered the whole earth, or extended over only that portion—a very limited

territory it was—of Western Asia then occupied by the human family.

But the objections of scientists are at fault on other grounds. Geology, it is generally conceded, can tell us nothing at all about the catastrophe of which all peoples have their traditions; and more than this, there is no certain geological evidence even of the existence of such a flood, at the time spoken of, as Moses describes.

Again, as much as the question has been discussed, it has not yet been proved that a universal flood was impossible. There are still able scientists, eminent geologists and physicists, on the affirmative as well as on the negative side of the question. Like many other questions of no practical importance, it is most likely one that will ever remain in dispute.

So much, then, for the serious (?) objections offered by our "advanced thinkers" against the teachings of the Church. When examined they prove to be objections founded on mere assumptions, or series of assumptions,—or, more truly, they are no objections at all.

What, then, about the much vaunted conflict between Science and Religion? Is there, then, no conflict? And is Science, then, in reality, the

handmaid of Religion, as the defenders of Revelation claim she is?

I have already answered these questions incidentally; but I deem it best to emphasize now what I have said, and to state more clearly what we are to understand by Science, on the one hand, and the teachings of the Church on the other. As we have just seen in the difficulties we have been considering, all the objections were based on misunderstandings or misinterpretations. At most, the conflict has been one between individuals—between scientists and interpreters. This has arisen from mistaking—a common error nowadays—the theories, guesses and vagaries of scientists for true science — for positive knowledge — for demonstrated certainties,—which they are not; and from regarding the opinions, hypotheses, provisional expositions of individual theologians and commentators as authoritative teachings of the Church.

Modern science, as it is generally spoken of,—I do not refer to facts and phenomena,—is, at best, nothing more than conjecture. There is nothing positive about it. In the language of mathematicians, it is a variable quantity, and as we have seen, a very variable quantity it is. The theories, the explanations, the science, therefore, of to-day is abandoned for that offered to-morrow. It has

been well said that modern science, as ordinarily understood, is but the opinions of the scientists of the day. How much it is a matter of conjecture, is seen from the questions we have already considered. But these are not special or isolated instances. We find the same uncertainty, the same difference of opinion, in every department of science. At one time it was thought that the manifold revolutions, of which geology speaks as having taken place in the earth's crust, were brought about by the action of fire. At another time it was held that water was the all-powerful agent in the changes observed. Again, it was supposed that the effects of upheaval and subsidence, of mountain and continent making, were brought about suddenly and violently, like our present volcanoes and earthquakes, only that the action was on a much more stupendous scale, and of much greater extent. Now it is thought that these same effects may be accounted for by the slow operation of known causes which are still in action.

So it is with the various forces and elements with which the physicist and chemist have to deal. Light and heat were not long ago considered as very attenuated kinds of matter, and from the fact that they have no appreciable weight, were named imponderables. Even now, there are not wanting

those—and this, too, among our “advanced thinkers” —who still hold to the corpuscular theory of light and heat. But there are others again, and for the nonce they are in the majority, who look upon light and heat—sound, magnetism and electricity also—as only modes of motion, as merely different manifestations of one and the same force, – a force, however, about whose real nature they are obliged to confess that they know absolutely nothing.

Again, the ordinary text-books on chemistry enumerate some sixty-five or seventy forms of matter that are called elementary,—forms of matter that are incapable of decomposition, and from which all compound bodies are formed. But there are to-day—and their number is increasing—some of the ablest experimenters and most profound thinkers in chemical, physical and astronomical science, who, for reasons that seem almost conclusive, maintain that all the so-called elements are only modifications, allotropic conditions, of one and the same primal substance.

Yet more: just now the greatest diversity of opinion, giving rise to the most ingenious hypotheses and the most most profound problems, obtain regarding the nature of matter itself.

What is matter? Are we to look upon it, as do most of the chemists of the day, as something

made up of atoms of which we know nothing? Shall we, with Boscovitch and Faraday and others, regard it as nothing more than centers of force, doing away thereby with the idea of matter altogether and reserving only that of force? Or shall we accept the latest explanation of the mystery—the vortex atom theory of Sir William Thompson and Helmholtz, who consider matter as simply rotating portions of a perfect fluid that fills all space? These are questions which not only *have not* been answered, but also questions which *cannot* be answered. Everywhere, even in apparently the simplest things, we are confronted with mysteries. And it is the speculations about these mysteries, the attempted answers of philosophers to questions proposed regarding the simplest phenomena, that we call science! Truly, there is a grave misapprehension somewhere. What is palmed off on a credulous public as science is not science, unless we choose to designate by this term the constantly changing hypotheses that are in turn offered in explanation of the facts and phenomena daily observable in the world around us.

From what I have said, however, I would not have you infer that I am opposed to theories in science. Far from it. They often serve a useful purpose, and, as a matter of fact, if we wish to go

beyond the limits of simple observation we cannot do without them. But in the name of exact science, in the name of true philosophy, I do protest against the disposition, the custom, I should say, that now prevails with some of our would-be scientists, of foisting the crudest hypotheses, particularly when there is question concerning the relation between science and religion, into a place that should be reserved only for positive knowledge, for incontestable truth.

So far, I have spoken of theories only in relation to science and dogma, but I have said nothing about their bearing on politics and morals. The various theories of matter and force would, at first sight, seem to have little or no connection with morals or politics; and yet, as interpreted and developed by a materialistic and an atheistic philosophy, they are as intimately related as cause and effect.

Granting, with Hæckel, Straus, Vogt, and Büchner, who have no belief in a personal God, that there is nothing outside of matter and force, we can see at once what must be the logical consequences of such a premise. We could then hold, with Prof. Woleshott, that "the will is the necessary expression of a state of the brain produced by external influences. There is no such thing as free-will. A crime is the logical result, direct and inevitable,

of the passion which animates us. Without phosphorus, no thought." . . . . . "Thought is a movement of matter; conscience is also a movement of matter." We could then maintain, with the German pantheist, Prof. E. Von Hartmann, ("Philosophy of the Unknown,") "that it is important to make the beast-life better known to youth as being the truest source of pure nature, wherein they may learn to understand their true being, in its simplest form, and in it rest and refresh themselves after the artificiality and deformity of our social condition. . . . Let us only think how *agreeably* an *ox* or a *hog* lives, almost as if he had learned to do so from Aristotle."

In speaking of Darwinism, the blasphemous Hæckel observes: "Darwinism is doubtless insufficient, but that which, in spite of this, should contribute to its being admitted, is that it excludes the intervention of God. This is its inappreciable merit." Again, in speaking of his theory of morphology (as summarized in *The London Times*), he says: "In this way the Creator is disposed of, not only as superfluous, but as a Being who, if He existed, instead of being all-wise, would every now and then have committed the indiscretion of attempting to create eyes and wings which His power did not suffice to perfect." And in another



place he observes: "With this simple argument the mystery of the universe is explained, Divinity is annulled, and a new era of infinite knowledge ushered in."

No wonder that Dr. Virchow—certainly no great friend of the Church—thought it time to call a halt. "Gentlemen," he says in his Address to the Congress of German Naturalists at Munich in 1877, "I will only hope that the evolution theory may not bring upon us all the alarm that similar theories have actually aroused in the neighboring country. At all events, this theory, if consistently carried out, has a very serious aspect, and I trust that it has not escaped your notice that Socialism has already established a sympathetic relation with it. We must not conceal these facts from ourselves." In the same address he solemnly declares: "Every attempt to transform our problems into doctrines, to introduce our hypotheses as the bases of introduction—especially the attempt simply to dispossess the Church and to supplant its dogmas forthwith by a religion of evolution,—be assured, gentlemen, every such attempt will make shipwreck, and its wreck will also bring with it the greatest perils for the whole position of science."

To the question why such pernicious doctrines as those I have just quoted for you should be sus-

tained in the name of sober science, I will let that close observer and acute thinker, St. George Mivart, give the answer: “. . . . A passionate hatred of religion (‘Lessons from Nature,’ chapter xiii), however discreetly or astutely veiled, lies at the bottom of much of the popular metaphysical teachings now in vogue.

“A belief in the necessary inconsistency of science with religion is persistently propagated among the public by writings and lectures, in which more is implied than asserted. In such lectures attempts have again and again been made to strike theology through physical science, or to blacken religion with coal-dust, or to pelt it with chalk, or to smother it with sub-Atlantic mud, or to drown it with a sea of protoplasm.

“*Delenda est Carthago.* No system is to be tolerated which will lead men to accept a personal God, moral responsibility, and a future state of rewards and punishments. Let these unwelcome truths be once eliminated, and no system is deemed undeserving of a candid, if not a sympathetic, consideration; and, *cæteris paribus*, that system which excludes the most efficaciously, becomes the most acceptable.”

If the doctrines which the Church proposes for our belief were as variable, and had no better

foundation than the conjectures we are asked to accept as science; if the logical tendencies of her teachings were as disastrous in their consequences as those of popular materialistic science, then, indeed, we should have a difficult case to plead in maintaining her position against the various so-called systems of science and philosophy that are constantly attacking her in the name of freedom of thought and intellectual advancement. Fortunately for us, such is not the case. The Church of Christ is ever the same. She teaches the same truths now as she did nineteen centuries ago, and with a certainty—because resting on Truth itself—that precludes the possibility of error. Not once in her whole history has she ever contradicted herself, or promulgated a proposition for the belief of her children that scientific investigation has proved false. In every age she has been called upon to pronounce on questions in every department of human knowledge, and her answers have been consistent, both with her previous decisions and the demonstrated conclusions of science. Certainly, no one could desire a stronger proof of her divine origin, or more convincing evidence of the constant presence of the Spirit of Truth watching over her and preserving her from error. Not so with other systems of belief. The religions of Brahma and Buddha and Sweden-

borg are intimately mixed up with false systems of astronomy, geography, anatomy, and physiology. The latter being disproved on simple scientific grounds, the former are shown to be false. But the Catholic Church never committed herself to any theory, even when, humanly speaking, such a committal, at least in a few instances, seemed unavoidable.

“When the Copernican system,” observes the learned Cardinal Newman, in his ‘Lectures on University Subjects,’ “first made progress, what religious man would not have been tempted to uneasiness, or at least fear of scandal, from the seeming contradiction which it involved to some authoritative tradition of the Church and the declaration of Scripture? It was generally received as if the Apostles had expressly delivered it, both orally and in writing, that the earth was stationary, and that the sun was fixed in a solid firmament which whirled around the earth. After a little time, however, and on full consideration, it was found that the Church had decided next to nothing on questions such as these, and that physical science might range in this sphere of thought almost at will, without fear of encountering the decisions of ecclesiastical authority. Now, besides the relief it afforded to Catholics to find that they were to be spared

this addition, on the side of Cosmology, to their many controversies already existing, there is something of an argument in this circumstance in behalf of the divinity of their religion. For it surely is a very remarkable fact, considering how widely and how long one certain interpretation of those physical statements in Scripture had been received by Catholics, that the Church should not have formally acknowledged it. Looking at the matter in a human point of view, it was inevitable that she should have made that opinion her own. But now we find, on ascertaining where we stand, in the face of the new sciences of these latter times, that, in spite of the bountiful comments, which from the first she has ever been making on the sacred text, as it is her duty and her right to do, nevertheless, she has never been led formally to explain the texts in question, or to give them an authoritative sense which modern science may question."

And, yet, with all this the Church has ever permitted, notwithstanding what her adversaries say to the contrary, her children the greatest liberty of thought. The latitude she allows regarding current scientific theories—I refer not to atheistic and materialistic assumptions—is a proof of my assertion. More than this: not only has the Church permitted the greatest liberty of thought

in doubtful matters of science and philosophy, or, more truly, in all matters not opposed to revealed truth, but she has also been the first to foster and stimulate, in every age, the growth of every science, and to encourage and remunerate those who distinguished themselves by their researches and discoveries.

That there is nothing in the teachings of the Church incompatible with the highest exercise of reason, that there is not a single conclusion of true science inconsistent with any article of faith, are propositions that every Catholic regards as self-evident.

The illustrious Dr. Brownson, one of the greatest philosophers our age, or any age, has produced, says in his "Convert," in reference to this subject: "I never in a single instance found a single article, dogma, proposition or definition of faith which embarrassed me as a logician, or which I would, so far as my own reason was concerned, have changed, or modified, or in any respect altered from what I found it, even if I had been free to do so. I have never found my reason struggling against the teachings of the Church, or felt it restrained, or myself reduced to a state of mental slavery. I have, as a Catholic, felt and

enjoyed a mental freedom which I never conceived possible while I was a non-Catholic.”

To the words of the profound Brownson—who, according to the opinion of an eminent Protestant writer, had critically examined and mastered more systems of philosophy than many persons claiming to be professors of philosophy had ever heard the names of—allow me to add the testimony of one who, for the depth, extent and variety of his attainments, and for his accurate and profound knowledge in every branch of knowledge, sacred and profane, and who, for his original researches as well as for the astonishing number of works on all subjects his prolific pen has given to the world, deserves to be called the Albertus Magnus of the nineteenth century. I refer to the illustrious Abbé Moigno, of Paris, who, according to M. Dumas, Secretary of the French Academy of Sciences, “has, for the last fifty years, marched at the head of the scientific movement,” and who is, without question, the first scholar of the age. In his brief autobiography prefixed to the fourth volume of his last great work, *Les Splendeurs de la Foi*, he says: “I am seventy-three years old [he is now seventy-nine]; I have read everything, I have understood everything, and I have never been troubled with the slightest doubt or temptation

against faith. I have always believed, and I believe more than ever, all the truths of the Catholic, Apostolic, Roman Church, with a calm, serene, lively, strong faith, without, I repeat it, any cloud being interposed between dogma and my mind. I have sounded, as far as I have been able, all the mysteries of religion and science, and my faith has never been shaken; my voice, then, is that of an enlightened, convinced, and faithful witness."

And not less eloquent are the words of the immortal Cauchy, one of the most eminent mathematicians and physicists of modern times, and at the same time one of the most devoted and saintly sons of Mother Church. His was the honor of continuing the work of Laplace, of solving some of the most difficult problems in modern transcendental analysis, and of founding (to the glory of France) a new school of mathematical science. In his "Religious Orders," he declares: "I am a Christian; that is, I believe in the Divinity of Jesus Christ, with Tycho Brahe, Copernicus, Decartes, Newton, Fermat, Leibnitz, Pascal, Grimaldi, Euler, Boscovich, and Gerdil, together with the great astronomers, physicists, and geometers of past ages. And, with the greater part of them, I am also a Catholic, and should any one ask me the reason I



should give it with pleasure. He would see that my convictions are not the fruit of preoccupations proceeding from birth, but the result of a most profound investigation. He would see how there have been engraved, and forever, in my mind and heart, truths that are to me more incontestible than the squaring of the hypotheneuse, or the theorem of Maclaurin. I am a sincere Catholic, as were Corneille, Racine, La Bruyère, Bossuet, Bourdaloue, and Fenelon; as have been, and are, many of the most distinguished men of our day, who have done honor to science, philosophy, and literature, and added luster to our academies more than all others besides. I share the profound convictions manifested in the works, discourses, and lives of so many *savants* of the first order: of the Ruffinis, the Haüys, the Laënnecs, the Ampères, the Pelletiers, the Freycinets, the Cariolis. And if I name not those who still live, fearing lest I should offend their modesty, I can at least say, that it has always been most grateful to me to meet all the nobility and all the generosity of Christian faith in my illustrious friends: in the founder of crystallography, in the inventor of chemistry, and of the stethoscope, and in the immortal author of dynamical electricity."

But this is sufficient. Allow me to make a brief

summary of what I have said, and I will conclude. We have seen, then, that all real scientific discoveries only go to corroborate the doctrines that the Church proposes for our acceptance. We have learned that the so-called conflict between Science and Religion is a conflict between private individuals,—scientists and philosophers with their hypotheses, on the one hand, commentators and theologians with their provisional interpretations, on the other. We have found, too, that the most prominent scientific theories of the day, aside from the consequences falsely deduced from them, are perfectly reconcilable with Catholic dogma; that the Catholic student enjoys the greatest possible liberty of thought in matters of science and speculation; and that the Church, far from impeding his progress, true to her divine mission, and true to her past history, is the first to encourage and assist him.

The Church has nothing to fear from scientific progress, but much to gain. Every new conquest of science is a new argument in the natural order confirmatory of the verities that God has been pleased to reveal. No one can have greater reason to rejoice at the advance of science than the Church, for she is conscious that every acquisition of science will be an addition to her sacred treasure of heav-

only, divine truth. Science is the handmaid of Religion. Between true science and true religion, between modern science—in so far as it is science—and the Catholic Church, a conflict not only does not exist, but it is not even possible. Both point in the same direction; both should lead us to the Author of all good—God, our Father.





















