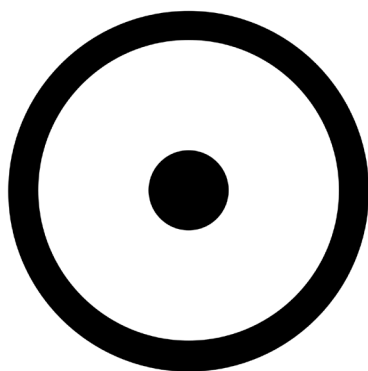


GOTHIC

ALL IS LIGHT
INTELLIGENT DESIGN



ALESSANDRO MICHELUCCI



EOTI



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Publication: EOTI
Composition and typesetting: EOTI
Published in Berlin - Germany
ISBN 978-3-00-061245-9

EOTI - European Organization of Translators and Interpreters®
Internet presence: www.eoti.eu
email: eoti@eoti.eu

EOTI - Heidenfeldstraße 8
10249 - Berlin

Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliographische Daten sind im Internet über <http://dnb.d-nb.de> abrufbar.

The German National Library lists this publication in the German National Bibliography. Detailed bibliographic data are available online at <http://dnb.d-nb.de>

“The reasons for using the Garamond typefaces rather than Gothic typefaces do not lie in the Antiqua-Fraktur dispute, but rather in the desire to recall the French Renaissance form.”



“Sigillum burgensium de berlin sum”
(Ich bin das Siegel der Bürger von Berlin)
(I am the seal of the citizens of Berlin)

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Written by

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*Following a partnership with Italy on the occasion of
the 26th session of the Conference of the Parties (COP 26)
to the UNFCCC expected to take place from 9 to 19
November 2020, in Glasgow, UK.*

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In the name of
“One humanity, one unity”

PREFACE

This book was written in order to lay the foundation of all principles of a new era and of a new vision of a changing world. To reach such a goal I have chosen as central point the term “Gothic” to explain how such a concept, if we deepen the concept of light, would not be at all an outdated concept but rather the right interpretation of the religion, politics and future of the Human Being. According to my theory, based on the concept of light, all is light.

The same light who inspired the Abbot Suger “*Libellus Alter de Consecratione Ecclesiae Sancti Dionysii*”, under the influence of the theology of Pseudo-Dionysius the Aeropagite, in the 12th century (about 1137) to rebuild portions of the Basilica of Saint Denis, considered to be the physical residence of God on Earth, in the nascent Gothic Style.

When renovated, the Basilica of Saint Denis included Suger’s own words carved in the nave:

“As the new apse is joined to the narthex the church shines brightly illuminating the central nave, for bright is that which is brightly coupled with the bright, and bright is the noble edifice which is pervaded by the new light. The enlargement of this building was realized in our time, it’s me, Suger, to have led the work”.

The primary use of the Gothic style is in religious structures, naturally leading it to an association with the Church. Both stylistically and structurally, it heralded the change from Romanesque architecture to Gothic architecture.

According to Hans Sedlmayr, it was “even considered the temporal image of Paradise, of the New Jerusalem”.

But according to current knowledge, it is uncertain whether Suger read these writings and therefore the construction of the Basilica of Saint Denis underlies a special philosophical (platonic) concept. The *tópos* of the

divine light is already found e.g. in the Bible (John 8:12 et.al.).

Hence before coming to the conclusion that the sacredness of light can be considered a concept originated by the theology of Pseudo-Dionysius the Aeropagite, we should ascribe such belief to an earlier time, when the Light as a “theological symbol” was represented by the ancient Egyptian solar deities Amon and Aton and accordingly we should mention chronologically Plato, Jesus Christ, Plotinus, (his teacher Ammonius Saccas), Porphyry, Iamblichus *“De Mysteriis Aegyptiorum - On the Egyptian Mysteries”* (the title is not authentic, but originated from the humanist Marsilio Ficino), Plutarch of Athens, Syrianus, Proclus, and lastly Pseudo-Dionysius the Aeropagite.

The main purpose of this book is to trace the origins of the concept of light and to understand how it gained theologically over the millennia its sacredness and its current value, to extrapolate this concept from the religious context and to investigate scientifically its individual aspects in order to overcome the concept of creationism, that even admitting partially the Darwin’s Theory of Evolution, remaining however anchored to the “Central Dogma of Molecular Biology”¹, it admits the Big Bang theory justifying such phenomenon as “Divine Design” placing the light on the basis of its belief: *Wayy’omer ‘elohím: Yehí ‘ór. Wayyehí ‘ór*, «And God said: “Let there be light!” and there was light!» (Genesis 1,3).

In the following chapters I illustrate how the term Gothic represents a multitude of meanings, which are connected to each other and find their expression in the religion and architecture and why they should be expressed in the politics, science and Human Rights.

¹ The term was coined by Francis Harry Compton Crick, the inventor of the theory, who, together with James D. Watson and Maurice Wilkins, won the Nobel prize on the basis of the work conducted by Rosalind Franklin on the X-ray diffraction images of the DNA that led to the discovery of the DNA double helix.

I

LIGHT AS “THEOLOGICAL SYMBOL”

Before introducing any concept related to the light, I believe we should review the past and trace back to the origins of such concept and gradually come to our days to ultimately understand without distortions its actual significance. I think that Amon and Aton, two ancient Egyptian solar gods, represent an excellent starting point to understand the origins of the sacredness of light and its theological nature as understood by Western culture.

Amon and Aton are to be placed respectively at the time of the Old Kingdom between 2700 and 2192 BC and the New Kingdom, which runs from 1550 to 1069 BC (Radiocarbon dating places the exact beginning of the New Kingdom between 1570 BC and 1544 BC)², but even before Amon's existence it should be mentioned the Cult of Ra, also known as Rê, an Egyptian deity belonging to the religion of ancient Egypt, the sun god of Heliopolis.

By the Fifth Dynasty (2510 - 2350 BC.), he had become a major god in ancient Egyptian religion, identified primarily with the noon sun. Such divinity assumes in this context a fundamental role for the syncretism that occurred in the following centuries, representing the basis or model of the further syncretism that occurred over the millennia to this day.

The right interpretation can only be found if we follow chronologically the single steps which have led to the transition from one deity to another, always bearing in mind that at the base of such transition there was the

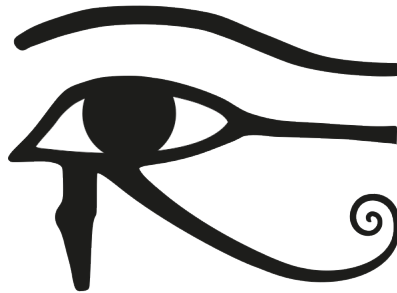
² Christopher Bronk Ramsey et al., *Radiocarbon-Based Chronology for Dynastic Egypt*, Science 18 June 2010: Vol. 328, no. 5985, pp. 1554 – 1557.

longing for a vision of the whole that the human being has always sought and that inevitably leads to the concept of light.

For the Egyptians the sun was a symbol of light, heat and prosperity. In the Egyptian pantheon the sun was considered the sovereign of the whole creation. The solar disk was seen both as the body and as the Eye of Ra, not to be confused with the Eye of Horus (which had instead a lunar valence).

Ra was often harmonised with the god Horus, an Egyptian deity among the oldest and most significant of the Egyptian pantheon, from such Syncretism came the divinity Ra-Horakhty, whose name means Ra or Horus of the Two Horizons, his cult in the Nile Valley extended chronologically from the late prehistoric era until the era of Ptolemaic reign and Roman domination of Egypt.

As a result of the syncretism between Horus and Ra in the deity of Ra-Horakhty, the Eye of Horus was associated with the Eye of Ra, becoming synonymous with it.



Horus, whose name was also Her Deshur, or “Horus the Red”, epithet of the sun god of the planet Mars, continued to survive over millennia in various forms derived from the different syncretic assimilations. Ra-Horakhty later, from the XII dynasty (1994 - 1794 BC), was associated with the Theban god Amon becoming in such way the most important deity of the Egyptian pantheon: Amon-Ra or Amon-Re, who remained for centuries the supreme god, the *King of the Gods*.

A cult that was abolished by the pharaoh Amenhotep IV / Akhenaten belonging to the XVIII dynasty, imposing the exclusive adoration of the God Aton, previously understood as a single aspect of Ra, posing an end,

even if only for the short Amarna-period, to the polytheism and replacing it with a form of monotheism or rather of henotheism.

After the death of Akhenaten, the cult of Ra was restored immediately gaining the prominence again. Amon-Ra also came to be worshipped outside Egypt, in the ancient Libya and Nubia. As Zeus Ammon he came to be identified with Zeus and worshipped by the Greeks.

But before coming to Plato and explaining his study of the concept of light in greater depth, we should introduce some elements that have made this theological concept known even to Western and Middle Eastern people. For this purpose there is no more representative figure than Moses, who, according to the Book of Exodus, despite his Israelite origin, was adopted by the Pharaoh's daughter to escape the persecution desired by the Pharaoh himself.

He was educated in all the wisdom of the Egyptians and indoctrinated in the cult of the sun god Aton, whose religion he imparted to the Jewish people, saved by himself from the Egyptian slavery.

In order to give a scientific foundation to this topic, I will refer to a study by Sigmund Freud: *“Der Mann Moses und die monotheistische Religion”*, a work completed in London and published in Amsterdam during the last year of his life in 1939.

In this study, based on the last finds of Egyptian scientists James H. Breasted, Eduard Meyer and Ernst Sellin, he takes psychoanalytically the formation of Moses, the exodus, the reasons that led him to death and the subsequent Moses-worship, demonstrating in such way the analogies with Christianity and Judaism.

The father of psychoanalysis argues that Moses was not a Jew but an Egyptian of ancient nobility, who imparted to the Jewish people the monotheistic religion of Pharaoh Akhenaten (or probably was Akhenaten himself to do so).

The adoption by Pharaoh's daughter and the apparent contradiction of ethnic belonging (Egyptian / Jewish) would be the result, according to Sigmund Freud, of a story, Exodus 2.1-10, conceived on the base of the concept of the Family Romance, in other words a complex of conscious and unconscious fantasies that sometimes develop in the pre-adolescent age and lead to create stories about our own origins, to imagine not being the children of natural parents but of noble and powerful characters.

Sigmund Freud states that Jewish people murdered Moses and after having abandoned the religion imparted to them, they forgot collectively the

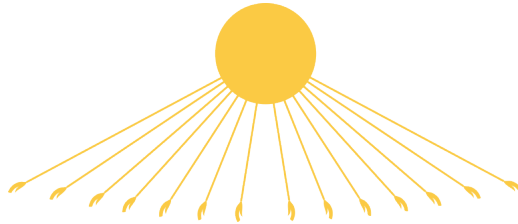
crime they perpetrated. Freud explains that the concept of Messiah came later from the sense of guilt of the rebels, who killed him, hoping for his return as the Savior of the Israelites.

Sigmund Freud also argues that the sense of guilt for the murder of Moses was passed down from generation to generation and because of this the Jews were driven to create their religion in order to expiate their faults.

It's important to stress in this context the reasons that led to the creation of new religions such as Judaism and Christianity and their analogies with ancient Egyptian practices, which always and in any case based their worship on the sun and its energy as source of life.

Sigmund Freud recalls the strong resemblance of Psalm 104 of the Bible, which sings The Glory of the Lord in Creation, with the Hymn to the Sun of Akhenaten, the Pharaoh who in the 14th century BC introduced as monolatry the cult of god Aton.

Akhenaten realized that everything came from the energy emanating from the sun through its rays and its light. In the new worship there was only the sun god Aton, represented by a solar disk, without admitting the worship of the afterlife.



The Sun God (or solar deity) is a deity, who represents the sun or just an aspect of it. The human beings have continued their worship through the millennia producing a great number of ideas and beliefs. The worship of the sun probably caused the henotheism and consequently the monotheism.

According to Sigmund Freud, the biblical story of Moses would highlight the strong influence of the monotheistic culture and religion of the god Aton of ancient Egypt on the ancient Jewish culture and its monotheism.

I find it appropriate to point out that Sigmund Freud, as well as Albert Einstein, did not want to support actively Zionism (neither morally nor

financially), since he had doubts about the creation of a Jewish state in Palestine under a British mandate. However although they did not believe in Judaism both Sigmund Freud and Albert Einstein had always considered themselves Jews.

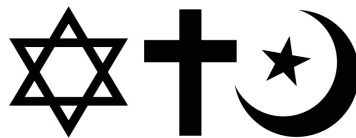
As for the similarities present in Christianity, I will deal with them in details in the next paragraphs as soon as I arrive chronologically at the time of Plotinus.

What we know of Moses’ history we learn it through the Holy Scriptures. the midrash, one of the Jewish methods of interpretation and commentary of the Jewish scripture, through the interpretation of the Bible of Philo of Alexandria “*De Vita Mosis*”, his originality lies in the philosophical platonic interpretation of the Bible, and through the texts of Titus Flavius Josephus.

Despite the dubious historical truth of the biblical reference, the figure of Moses and the exodus should be regarded as a religious tale that integrates various elements of different ages.

For this reason is crucial the concept of light, whose origin is attested by Egyptian historical reality, and if we want from the Sumerian as well, who worshiped the sun god Utu even before the three patriarchs of the Land of Canaan Abraham, Isaac, and Jacob, and also before Moses of course, from whom the concept of light was assimilated and promulgated.

I introduced in this context the figure of Abraham as a precursor of Judaism represented by Moses, because of the fundamental importance for the birth of the three Abrahamic religions: Judaism, Christianity and Islam.



They are the three most important Abrahamic religions that claim Abraham as part of their sacred history. There are also a number of minor confessions that also claim their descendant from Abraham, such as the Samaritanism of Jewish origin, or of Christian origin, we find the Mormonism, the Unification Church, the Mandaicism or Mandaeanism and the Rastafarianism, as well as Islamic origin e.g. the Yazidism, the Druzism and the Alevism (or Nusayri doctrine).

I believe it is quite significant that the Abrahamic religions represent the absolute majority of the people in the world, about 7 billion human beings.

So I think it is relevant to deepen, as far as I can, the chapter on history concerning the Sumerian civilization, Ur of the Chaldees and then coming to Abraham and the Holy Scriptures, which will allow me to introduce the concept of Creation become later creationism and pseudoscience.

The beginnings of the Sumerian civilization are dated around 4000 BC and together with Egyptian civilization is one of the first urban civilizations. Initially Sumerians had a figurative writing based on pictograms that became with the next stylization a cuneiform writing, considered the first form of codified writing, since it appeared at the end of the IV millennium BC³.

However, we do not know the authorship of the written works that reached us except the name of the poetess and priestess of the god Nanna in Ur Enheduanna, daughter of the Akkadian king Sargon, lived in the XXIV century BC.

Her fundamental work, written in Sumerian language, *Nin-me-šara* (Lady of countless cosmic powers), which is more commonly known with the modern title of “The Exaltation of Inanna”, consists of 153 lines of which we retain over 50 fragments of plates with cuneiform inscriptions⁴.

Beyond the important role she played as priestess of the god of heaven Anu in Uruk, the goddess Inanna in Uruk and of the god Nanna in Ur, she is also considered as the first author of history, whose works were received in writing. It is equally important to note that the women condition in Sumer was quite wealthy and appreciated, it seems to have been recognized as legal entity able to own and manage land ownership and undertaking their own business. There is evidence for the existence of numerous scribe women and priestesses related to the great sanctuaries of the city.

The position of En of the goddess Inanna, of great prestige and power, could only be filled by a woman of noble descent, such as the king’s daughter. In addition, princesses and rulers enjoyed the manage-

3 Cf. S. N. Kramer, *I sumeri alle radici della storia*, Roma, Newton & Compton, 1979.

4 Cf. William W. Hallo e J. J. A. Van Dijk, *The Exaltation of Inanna*, New Heaven and London Yale University Press, 1968.

ment of their palace and the relative personnel, they had an annuity and a signet, indicating their economic and legal independence.

Both Sumerian and Egyptian civilization reserved roles for women as important as those of men, just think that in ancient Egypt some women even came to fill the office of Pharaoh, Sobekneferu e.g. (XII Egyptian dynasty), or Hatshepsut (XVIII Egyptian dynasty), there were also the various queens named Cleopatra, the best known of them was certainly the last one, Cleopatra VII. Philopator (69-30 BC).

What did not happen in the ancient Athens society, where women were legally considered as “eternal minors” and therefore devoid of most civil rights.

Before coming to the concept of creationism and better expressing the meaning that encloses, I must necessarily mention the pantheon of the Sumerian deities and compare it with the Egyptian one in order to identify the source of inspiration for subsequent confessions, that place the light and the Creation on the basis of their creed.

The number of Sumerian deities listed in the lists of Fara and Abu Salabikh is about 500 and the three main deities are An, Enlil and Enki respectively gods of Heaven, Earth and the Abyss of fresh water.

Contrary to the Egyptian civilization that chooses from its origins as main deity of its pantheon the sun god RA, later become Amon-Ra or Amon-Re, “*King of the Gods*”, and substituted for the short Amarna-period with the cult of the sun god Aton, the Sumerian civilization while contemplating in its pantheon the sun god Utu chooses as main deity the god of heaven An.

Now if we consider the divinities of Sumerian civilization and those of Egyptian civilization as a source of inspiration for later civilizations, it is not difficult to understand that the concept of Creation finds its origin in the “Fertile Crescent⁵, Cradle of Civilization” thanks to a series of syn-

5 "Fertile Crescent" is an expression coined by the archaeologist and historian James Henry Breasted, University of Chicago, who initially spread this expression through his books "*Outlines of European History*" of 1914 and "*Ancient Times, A History of the Early World*" of 1916, addressing the topic of the first settled civilizations that developed in the fertile valleys of the four great rivers Nile, Jordan, Tigris and Euphrates - modern-day countries with significant territory within the Fertile Crescent are Iraq, Syria, Lebanon, Cyprus, Jordan, Israel, Palestine, Egypt, as well as the southeastern fringe of Turkey and the western fringes of Iran - an area, which as a whole without a precise territorial definition the archaeologist James Henry Breasted, by virtue of the form and its fertility,

cretic assimilations. Halfway between Egypt and Mesopotamia, the most powerful empires of the time, it extended the “Land of Canaan”. It occupied an area in which was located the Jordan Valley, in this region rose one of the first village-towns in the history of man, Jericho, and along the banks of the Jordan River was born and developed the Jewish civilization.

The history of the Jews and their religious culture are transmitted to us by the Holy Scriptures of the Bible, written between the 5th and 4th century BC. The Jews derived their name from “Habiru”, nomadic tribes that, around 2000 BC, moved between Mesopotamia, Syria and Egypt.

According to the Bible story, one of these tribes of shepherds, led by the “patriarch” Abraham, came from the Mesopotamian city of Ur and settled in the Land of Canaan.

According to the Abraham genealogy contained in Genesis 11.10-32 Ur of the Chaldees (Ur Kaśdim) was also his birthplace. However, most of the biblical scholars considered the character of Abraham as a myth, denying its substantial historical veracity.

There is nothing specific in the stories of Genesis that can be directly connected to known history concerning Canaan and surrounding areas in the first part of the second millennium BCE⁶.

As a result, it is now widely recognized that the so-called “patriarchal / ancestral period” is a subsequent literary construct, not a period in the real history of the ancient world. The same thing can not be said, for example, about Jericho and Damascus, whose existence dates back to 11,000 years ago, or about the Epipaleolithic Natufian culture, discovered by British archaeologist Dorothy Garrod, that radiometric dating (radiocarbon dating)⁷ places at the end of the Pleistocene (between 12,500 and 10,200 years ago) and which spread in the “Land of Canaan”.

From the ancient Sumerian deities and the sun god of ancient Egypt, in the Cradle of Civilization, which includes the “Land of Canaan”, was born the concept of Creation that following the subsequent interpretations became creationism and pseudoscience.

has deemed it appropriate to name "Fertile Crescent", also considered as "Cradle of Civilization".

6 Cf. Paula McNutt, *Reconstructing the Society of Ancient Israel*, Westminster John Knox Press, 1999, pp. 41-42.

7 Munro, Natalie D. (2003), *"Small game, the Younger Dryas, and the transition to agriculture in the southern Levant"* (PDF), *Mitteilungen der Gesellschaft für Urgeschichte*, 12: 47–71.

The Church today takes no official position on the theory of evolution, but it refers the matter to scientists. There are statements by Pope Saint John Paul II, who argues that the evolutionary hypothesis is “more than a theory”. But at the same time, the Church rejects the idea that evolution can be a process driven by chance alone, as claimed by Charles Darwin, and considers the universe rather the result of a project ordered for a purpose.

In this regard, I would like to quote below the words of Pope Joseph Aloisius Ratzinger - Benedict XVI:

“I find the words of this fourth-century Father surprisingly up to date when he says: Some people, “deceived by the atheism they bore within them, imagined that the universe lacked guidance and order, at the mercy as it were of chance”. How many these “some people” are today! Deceived by atheism they consider and seek to prove that it is scientific to think that all things lack guidance and order as though they were at the mercy of chance. The Lord through Sacred Scripture reawakens our reason which has fallen asleep and tells us: in the beginning was the creative Word. In the beginning the creative Word - this Word that created all things, that created this intelligent design which is the cosmos - is also love”.

(Homily of Pope Benedict XVI to the General Audience of Wednesday, 9 November 2005) © Libreria Editrice Vaticana.

“Currently, I see in Germany, but also in the United States, a somewhat fierce debate raging between the so-called “creationism” and evolutionism, presented as though they were mutually exclusive alternatives: those who believe in the Creator would not be able to conceive of evolution, and those who instead support evolution would have to exclude God. This antithesis is absurd because, on the one hand, there are so many scientific proofs in favour of evolution which appears to be a reality we can see and which enriches our knowledge of life and being as such. But on the other, the doctrine of evolution does not answer every query, especially the great philosophical question: where does everything come from? And how did everything start which ultimately led to man? I believe this is of the utmost importance”.

(Meeting of the Holy Father Benedict XVI with the clergy of the dioceses of Belluno-Feltre and Treviso, Church of St. Justin Martyr, Auronzo di Cadore Tuesday, 24 July 2007) © Libreria Editrice Vaticana.

According to Pope Francis:

“When we read the account of Creation in Genesis we risk imagining that God was a magician, complete with an all powerful magic wand. But that was not so. He created beings and he let them develop according to the internal laws with which He endowed each one, that they might develop, and reach their fullness. He gave autonomy to the beings of the universe at the same time in which He assured them of his continual presence, giving life to every reality”.

“And thus Creation has been progressing for centuries and centuries, millennia and millennia, until becoming as we know it today, precisely because God is not a demiurge or a magician, but the Creator who gives life to all beings. The beginning of the world was not a work of chaos that owes its origin to another, but derives directly from a supreme Principle, who creates out of love”.

“The Big Bang theory, which is proposed today as the origin of the world, does not contradict the intervention of a divine creator but depends on it. Evolution in nature does not conflict with the notion of Creation, because evolution presupposes the creation of beings who evolve”.

(Address of his Holiness Pope Francis to the Plenary Session of the Pontifical Academy of Sciences on the occasion of the inauguration of the bust in honour of Pope Benedict XVI, Casina of Pius IV, Monday, 27 October 2014) © Libreria Editrice Vaticana.

To the words of Pope Benedict XVI and those of Pope Francis I believe we can reply with the John Rennie’s words (former editor in chief of Scientific American):

“Science welcomes the possibility of evolution resulting from forces beyond natural selection. Yet those forces must be natural; they cannot be attributed to the actions of mysterious creative intelligences whose existence, in scientific terms, is unproved”.

(15 Answers to Creationist Nonsense - Scientific American, 1 July 2002).

John Rennie believes that who supports the theory of “Intelligent Design” is not able to provide convincing evidence on the origin of the human being or when and how intervened a designing intelligence in life’s history, by creating the first DNA, the first cell, the first human, and he

continues by asking questions like: “Was every species designed, or just a few early ones?”

He states:

“Proponents of intelligent-design theory frequently decline to be pinned down on these points. They do not even make real attempts to reconcile their disparate ideas about intelligent design. Instead they pursue argument by exclusion—that is, they belittle evolutionary explanations as far-fetched or incomplete and then imply that only design-based alternatives remain”.

John Rennie also claims that this is misleading as it leads to justify existence with religious beliefs rather than well-founded scientific theories.

“Time and again, science has shown that methodological naturalism can push back ignorance, finding increasingly detailed and informative answers to mysteries that once seemed impenetrable: the nature of light, the causes of disease, how the brain works.

Evolution is doing the same with the riddle of how the living world took shape. Creationism, by any name, adds nothing of intellectual value to the effort”.

(15 Answers to Creationist Nonsense - Scientific American, 1 July 2002).

The international scientific community’s consensus is that intelligent design, like all versions of creationism, is not falsifiable and refers to causes unknown by definition. For this reason the status of scientific theory can not be recognized.

However, I believe that a clear distinction should be made between the concept of Intelligent Design, that even if it derives from the old theses of William Paley (July 1743 – 25 May 1805) is the most recent form of creationism, whose term was first introduced by Percival William Davis’ school text *“Of Pandas and People”* in 1989 (second edition 1993), and “the teleological topic”, or topic of the Divine Design, or rather one of the arguments used to demonstrate the existence of God or a creator, starting from the perception of an order, a purpose or a “project”. The term teleological⁸ comes to us by way of New Latin from the Greek root tele-, telos,

⁸ The word teleology builds on the Greek τέλος, telos (root: τελε-, "end, purpose") and -λογία, logia, "a branch of learning", cf. Eric Partridge, *Origins: A Short Etymological*

meaning “end or purpose”. Teleology in a broader sense is the hypothesis that there is a purpose or a directional principle in the processes of nature, on the contrary, the Intelligent Design claims to justify the divine intervention rationally and scientifically.

I find it equally necessary to stress that the founding fathers and supporters of the creationist theory and the “Intelligent Design” are not to be identified in the last three Popes of the Catholic Church: Pope Saint John Paul II, Pope Joseph Aloisius Ratzinger - Benedict XVI and Pope Francis - for whom it is certain that the world is ruled by a providential design that allows a “teleological” explanation - but rather in the laypersons Phillip E. Johnson (former American academic and essayist, retired law professor, considered the father of the Intelligent Design movement and author of the book *“Darwin on Trial”*), Michael Behe (American biochemist, who developed the concept of “Irreducible Complexity”⁹ introduced in his book *Darwin’s Black Box*, rejected by the scientific community at large and considered pseudoscience, Stephen Meyer, (graduated with a B.S. degree in physics and earth science, Ph.D. in history and philosophy of science, he is a philosopher of science)¹⁰ and William Dembski (an American philosopher, theologian and mathematician).

If we really want to blame the Church, we should blame her for other reasons that are beyond the Intelligent Design and that date back to earlier times.

Having established the extraneousness of the Church to the theory of “Intelligent Design”, I would like to reiterate that the aim of this book is not to invalidate the Christian faith or any other confession, but rather to identify without distortions those theological principles that give to the current concept of light its sacredness and deepen such concept scientifically and thus overcome the concept of pure and mere “Vision”.

Dictionary of Modern English, Routledge, 1977, p. 4187. The German philosopher Christian von Wolff coined the term (in the Latin form “teleologia”) in 1728 in his work *Philosophia rationalis, sive logica*, cf. Wolff, Christian (1728). *Philosophia Rationalis Sive Logica: Methodo Scientifica Pertractata Et Ad Usum Scientiarum Atque Vitae Aptata*. Frankfurt and Leipzig (published 1732). Retrieved 2014-11-20.

⁹ “We therefore find that Professor Behe's claim for irreducible complexity has been refuted in peer-reviewed research papers and has been rejected by the scientific community at large.” Ruling, Judge John E. Jones III, *Kitzmiller v. Dover Area School District*.

¹⁰ “Biography” stephenmeyer.org

II

LIGHT AS “CONCEPT OF MERE VISION”

The theory of light begins with the divine and ancient understanding of the eye, so innate in the concept of light.

However, while modern physical optics is essentially concerned with the light, ancient optics dealt mostly with the vision; indeed in the Euclidean-Ptolemaic tradition the light was almost ignored as an object of study.

There is no better way to understand the ancient theories of vision than evaluating them in the context, in which they were generated, namely in the field of physical causality, then the relationship between the eye and visible objects and vision as a result of such relationship.

For the ancient theoreticians this mediation could be explained by three fundamental alternative hypotheses: the intromissionism, the extromissionism and a mixed form that included both.

The most ancient intromission theory seems to have been formulated by the atomists, who explained the mechanism of vision in materialistic terms and according to which the object sends something to the eye.

The most radical materialistic theory was that advanced by Epicurus (341-270) at the end of the fourth century BC.

The intromission theory was also expressed by Aristotle, who will have in common with the atomists only the material causation, as unlike the atomists, who basically explained the light in terms of particles emitted from light sources, Aristotle, *De Anima*, characterized the light as “the color of transparency”. As for extramission¹¹ theories, the older versions were

¹¹ This theory has been replaced by intromission theory, which states that visual perception comes from something representative of the object (later established to be rays

based on the idea that the eye saw spreading its light on visible objects, theory that seems to have been valid for the Pythagorean Alcmaeon of Croton (active around 500 BC) and Empedocles (5th century BC), who went even further by comparing the eye to a lantern, whose fire shines up to the surrounding objects, through transparent protective membranes (*Problemata XXXI*). The Euclidean-Ptolemaic theory of visual rays, which actually falls within the Pythagorean tradition, shows evident affinities with it.

The third and last theoretical alternative, namely the mixed form between the intromission and extramission hypothesis, was adopted by Plato and by the Stoics. As it is formulated in the *Timaeus*, in fact, Plato’s theory seems to incorporate elements of both conceptions: the atomistic - the perception of color, he explains, results from a collision between the flow of fire emanating from the eye and a current of particles emanating from colored objects - (*Timaeus*, 67 d-e), and the Pythagorean conception (*Timaeus* 45b-c), explaining the vision based on an ocular focus that flows from the eyes. Mixing with the daylight, this fiery stream forms a homogeneous body that physically and visually unifies eye and object. It is therefore through this link that the object is visually perceived. None of these theories, with the exception perhaps of atomistic theory, treats light independently or offers a coherent physical explanation. In fact, light is not even considered by ancient theoreticians as visible; in their opinion it played quite a secondary role in the process of vision.

The atomism was rejected and fought bitterly by Plato and his followers, who, considering it an impious doctrine, seem to have erased all traces, making all the originals of atomism disappear. Atomism is pure materialism and a true form of atheism. Leucippus, Democritus and Epicurus in spite of their differences do not allow in any way a diversification between transcendent and immanent. And as for the existence of the gods Epicurus, though not denying it, relegates them to distant “otherworlds” where they assume a mere symbolic value as models of abstract bliss.

The atomism as understood by Democritus follows the concept of *archè* expressed in the seventh century BC from the naturalists Milesians (Thales, Anaximander, Anaximenes) and translates it with *atomos* in the

of light reflected from it) entering the eyes. Modern physics has confirmed that light is physically transmitted by photons from a light source, such as the sun, to visible objects, and finishing with the detector, such as a human eye or camera.

plural form of *atomi*.

As a naturalist and attentive observer of the constituent elements of life, he bases his conception on “Nature”, understood as pure “Matter”, rejecting every element of transcendentality. All that exists is in “Nature”, in it there is the cause of everything in a purely mechanistic phenomenology, but what was for Leucippo the result of chance, so as it will be again for Epicurus, was for Democritus the result of necessity.

The atomistic materialism comes to Greek and then to Roman culture against the “Byzantinisms” of metaphysics.

Since he excluded from the origin of the universe a divine cause, the Democritus’ theory will be subjected to several criticisms by Plato, who never quoted Democritus in his Dialogues and by Aristotle who expressed total dissent by placing his theory in contradiction with Democritus’ theory. In order to understand the difference and radical opposition between idealism and atomism they should be diversified as follows: the idea (or spirit) as idealism, nature (or matter) as atomism.

Atomism spread in the Latin world and especially in Rome (not yet Roman Empire¹² but Roman Republic)¹³ thanks to the *De rerum natura* of

12 The date that generally identifies the beginning of the Roman Empire as a single State entity is 27 BC, the first year of the Principality of Ottaviano. Octavian's power was then unassailable and in 27 BC the Roman Senate formally granted him overarching power and the new title Augustus, effectively marking the end of the Roman Republic.

13 The Roman Republic owes its first Decemviri or Decemvirs (Latin for "ten men") to the Law of Solon. According to Livy and Dionysius, because of two hundred-year Conflict of the Orders between the patrician order (the aristocracy) and the plebeian order (the commoners), three envoys (Spurius Postumius Albus Regillensis, Aulus Manlius Vulso and Servius Sulpicius Camerinus Cornutus) were sent to Athens to study and transcribe the Law of Solon and inquire about the laws of other Greek city-states in order to pose an end to such a conflict. The first decemviri in the Roman Republic took office in 451 BC.

The Solonian Constitution, based on a system called *timokratia* or Timocracy, was created by Solon in the early 6th century BC. It consisted of a series of measures aimed to maintain the status quo of wealthiest but at the same time devoted to lift the lower classes out of the indecent conditions in which they lived, guaranteeing them, even if to a limited extent, a political representation in the Heliaia and Ecclesia.

Timocracy is a particular type of government in which the rights and duties of the citizens are established according to census classes, citizens were also divided based on their land production. Timocracy was mentioned for the first time in ancient Greece, especially by Plato and Aristotle.

In The Republic Book VIII, Plato describes five regimes, they are Aristocracy, Timo-

Lucretius¹⁴ (Titus Lucretius Carus), who in the first half of the first century BC reiterated the radical materialistic theory advanced by Epicurus about three centuries before, see *supra* p. 13.

At the end of the first century BC the Roman power was already enormous, but its cultural level was rather low, with the exception of construction technologies and some examples of good poetry. As for philosophy, science and mathematics, Rome owed its culture to the Greeks; “High” culture belonged to the Greeks so as the immigrant intellectuals, who taught for the wealthiest, but philosophy in Rome was characterized by syncretism.

Lucretius also enunciated a radical atheism never before expressed so clearly, heaped praise on the greatness of Epicurus and considered religions as the mystifiers par excellence and the main causes of ignorance and human unhappiness, provoking in such way a fierce criticism from the Church to the contents of his poetry.

cracy, Oligarchy, Democracy, and Tyranny (of which four are unjust). Timocracy is listed as the first “unjust” regime. The city-state of Sparta provided Plato with a real-world model for this form of government. A timocracy, in choosing its leaders, is “inclining rather to the more high-spirited and simple-minded type, who are better suited for war” cf. Rep. 8.547e; Cahn, Steven M., *Classics of Political and Moral Philosophy*, Oxford University Press, 2002.

Aristotle later wrote in his *Nicomachean Ethics* (Book 8, Chapter 10) “There are three forms of constitution, but also as many deviations, understood as degenerations of them. The three different Constitutions are: the Kingdom, the Aristocracy and the last form based on the Census which is appropriate to call “The Timocratic Constitution”.

Of these, the best is the kingdom, the worst is the timocracy. From timocracy we move to democracy, since these two constitutions have the same boundaries: in fact, timocracy wants to be the government of the majority, and equal are all those who have a certain census. Among corrupted Constitutions the less mean is the Democracy, since this form of constitution is not so distorting”.

14 « O miseris hominum mentes, o pectora cæca!
Qualibus in tenebris vitæ, quantisque periculis
degitur hoc ævi quodcumquest! »

O wretched minds of men! O blinded hearts!
In how great perils, in what darks of life
Are spent the human years, however brief!

Lucretius. *De Rerum Natura*. William Ellery Leonard. E. P. Dutton. 1916.

However, Epicureanism in Rome was understood like a sort of degeneration of its real meaning, many were considered epicureans only for the fact of loving good food and the pleasures of sex, while ignoring the ethics of the Epicureans, which suggested sobriety in food, moderation in physical pleasures, full dedication to philosophical reflection. Yet it will be this false interpretation of epicureanism to succeed, giving way to Christian apologists to make a use purely defamatory of it.

With the rise of Christianity, in the fourth century, the Epicurean philosophy will represent only a “counterpart” to be cited on the occasion.

Justin and Saint Jerome indicated the Epicureans as dedicated to crapa, to drunkenness, to fornication, to adultery, to homosexuality, to sodomy, to incest and to crime in general, in addition St. Ambrose and St. Augustine emphasized the Epicurean baseness. In the Middle Ages atomistic theories were subjected to an almost complete abandonment, since they were considered intolerable and demonic forms of materialism and atheism. On the contrary, both Platonism and Aristotelianism were assimilated. Platonism fed the mystical trends and the Aristotelianism the rationalistic ones, both more compatible with Christian doctrine, and in part the stoicism of Seneca, Epictetus and Marcus Aurelius will also be assimilated as “rationalizing” and “strengthening” doctrines of the terms of divine revelation witnessed by the Gospels, whose historical truth is naturally unproved.

Charles Guignebert (1867 – 1939) a French historian of Christianity, a pupil of Ernest Renan - who defends the historical existence of Christ but denies his divinity and recognizes a simple exemplary value to his teaching -, after having held a course on the history of Christianity at the Sorbonne in Paris in 1905, from 1919 he became the holder of the relative chair and expressed his thought as follows:

“The Gospels are writings of propaganda, intended to organize and authenticate, making it plausible, the legend represented in the sacred drama of the sect and to confirm it to the customs of the mythology of the time”.

As for the figure of Jesus Christ there is not much because of the lack of interest of historians, who were mainly concentrated on the turbulent

episodes concerning the empire and the revolting¹⁵ provinces, and it is therefore difficult to find contemporary texts pertaining explicitly to the figure of Jesus. Such lack of information was explained by the historian Charles Guignebert in the early 1900s as follows:

“His birth in a remote village of Galilee, among poor people and those despised and vilified Jews, his brief and insignificant career, cut off by a banal intervention of authority, a teaching that neither the form nor the content recommended to the Greeks and to the Romans, none of this had anything to do with the attention of a historian of the century, if by chance it was drawn for a moment”.

(Charles Guignebert, Le problème de Jésus, Ernest Flammarion, 1914).

With the advent of Christianity, atomism was banned as an atheist theory par excellence.

Epicureanism will be rediscovered around 1400-36, although timidly, thanks to the circulation of *De Rerum Natura* of Titus Lucretius Carus made possible by the invention of the press. But were the chemists of the eighteenth century and especially of the nineteenth century to discover the profound truth of the atomistic thesis, which found its definitive recognition after a period of time that exceeds the millennium.

At the end of 1700 the atomistic theory was scientifically confirmed thanks to the experiments of John Dalton (1766-1844), who drew up a first table of atomic weights, and those of William Prout (1785-1850), who indirectly measured the properties of the atom, confirming that all atomic weights are multiples of the atomic weight of hydrogen.

In 1869 Dmitriĭ Ivanovič Mendeleev gave a systematization of the atomic theory through the periodic table of the elements¹⁶.

15 In 7 AD, the Romans decided to reorganize Judea administratively and fiscally (passing from the tributary realm to the status of imperial province) organizing for this purpose a census in order to impose one of the most important taxes of that time: the poll tax, also known as head tax or capitation. At the head of this initiative was the Roman legate governor of Syria Publius Sulpicius Quirinius himself (c. 51 BC – AD 21) and the Herodian tetrarchs themselves. This initiative caused the famous revolt of the census, where Judas of Galilee, or Judas of Gamala found his death. He was a pretender to the Hebrew throne, claiming a descent from the Hasmonean dynasty, initiator of the Kingdom of Judea.

16 The development of the Periodic Table of the Elements began in 1817 with Johann

In 1874 the Irish physicist George Johnstone Stoney introduced the concept of “Elementary Charge Unit” and later, in 1891, he estimated its value and coined the term “electron”¹⁷ to refer to such “unit”, but in 1897 Joseph John Thomson¹⁸ immediately realized that in reality the electron was a subatomic particle of negative charge, the first to be discovered demonstrating in such way that the atom is not indivisible.

In 1905 Albert Einstein showed that the separation of electrons from one’s own atom depends exclusively on the radiation frequency from which they are affected.

Therefore the hypothesis of a quantization of energy became necessary to describe the energy exchange between light and matter.

The “quantum” was introduced as elementary constituent of these radiations by Max Planck in 1900, as an indivisible entity.

The quantum theory of light, later named “photon” in 1926, was proposed by Albert Einstein in 1905 as a result of his studies on the photoelectric effect.

These historical discoveries was followed by Ernest Rutherford discovery of proton in 1919 and by James Chadwick discovery of neutron in 1932 and in 1956 it was observed for the first time the neutrino, whose

Wolfgang Döbereiner's Triads and ended in 1869 with the still valid systematic setting of Dmitri Mendelejew and Lothar Meyer.

17 George Johnstone Stoney coined the term electron from the combination of the term "electric" and the suffix -on, which will also be used later to designate other subatomic particles, such as the proton or neutron.

He proposed the adoption of such term by writing: *"... an estimate was made of the actual amount of this most remarkable fundamental unit of electricity, for which I have since ventured to suggest the name electron"*.

Stoney, G. J. (1881). *"On the Physical Units of Nature"* Phil. Mag. [5] 11, 381.

G. J. Stoney, *Of the "Electron," or Atom of Electricity*, in *Philosophical Magazine*, 1894, Series 5, Vol.38, pp. 418–420.

The term "electron" was proposed again to identify such particle from the Irish physicist George Francis FitzGerald and since then the name was universally accepted cf. H. M. Leicester, *The Historical Background of Chemistry*, Courier Dover Publications, 1971, pp. 221-222.

18 Thomson was awarded the 1906 Nobel Prize in Physics for his work on the conduction of electricity in gases cf. "J. J. Thomson - Biographical". *The Nobel Prize in Physics 1906*. The Nobel Foundation. Retrieved 11 February 2015.

His son George Paget Thomson received the same award a few years later (1937) but for having shown that the electron is, in fact, a wave.

existence was advanced by Wolfgang Pauli in 1931.

The twentieth century physics confirms the validity of atomism as a fundamental philosophical thesis for any study of the material world.

The materialistic thought and any other similar to it is based on the atomic constitution of matter through its subatomic particles, that little by little come to light more and more.

In this regard I find it relevant to quote Plato again, who, while bitterly contesting atomism and therefore the theories related to “nature” and “matter”, dwells on such issues in the *Timaeus* (50, a-c) as follows:

“Wherefore, the mother and receptacle of all created and visible and in any way sensible things, is not to be termed earth, or air, or fire, or water, or any of their compounds or any of the elements from which these are derived, but is an invisible and formless being which receives all things and in some mysterious way partakes of the intelligible, and is most incomprehensible”.

(Translated by Benjamin Jowett).

The history of thought took a decisive turn with the end of the Roman Empire. The beginnings of the Middle Ages are to date to the 529 AD, it was the year in which the Byzantine (East Roman) emperor Justinian, traditionally known as Justinian the Great and also Saint Justinian the Great, decreed the closure of the Platonic Academy and consequently the death of Greek culture in the West. The sanctuary where the ideas of Plato and his disciples had flourished was eradicated by the advent of Christianity.

But even earlier, 391 AD, the wonderful and unique Library of Alexandria, with its five hundred thousand parchments, was destroyed by the Christians after the edict of the Roman emperor Theodosius I (hostile to the so-called Pagan Wisdom)¹⁹.

After the closing of the Academy (529 AD) the Platonists, still honoring the pagan gods, were persecuted and hunted as dangerous heretics by the Roman Church endorsed by the State. The last disciples of Plato to escape from the persecution fled to Athen and the seven great sages of the Academy took refuge, with their books, in Persia welcomed by the

¹⁹ The pagans barricaded in the great temple of Apollo were slaughtered, cf. Carlo Rovelli *"Cos'è la scienza. La rivoluzione di Anassimandro"*, Mondadori, 2011.

Emperor Khusro I²⁰. They found shelter by this great patron in his palace of Gondēshāpūr, the most illustrious Academy of the Middle East (Academy of Gondishapur)²¹, where all the arts and sciences flourished in a peaceful cosmopolitan atmosphere. According to *The Cambridge History of Iran*²², it was the most important medical center of the ancient world during the 6th and 7th centuries equipped with an extraordinary astronomical observatory, a medical school and the first hospital in human history,

“To a very large extent, the credit for the whole hospital system must be given to Persia”.²³

The Academy of Gondishapur was founded in Gondēshāpūr (a.d. 260), after the defeat of the Roman emperor Valerian, from Shapur I, also known as Shapur I the Great.

However, it was under the rule of the Sassanid Emperor Khusro I (a.d. 531-579), that the Academy became known for medicine and learning.

Its doctors and scholars were known everywhere for centuries, despite the limitations imposed by the birth of Islam, which nevertheless elected them as its core of knowledge and science.

The advent of Islam in the seventh century caused a cultural revolution of inenarrable breadth throughout the Arabian peninsula, and thanks to the establishment of the Sasanian Empire, obtained with the Holy Wars by Muhammad, the Islamic sages, helped and supported by the New Empire and the new religion, devoted themselves to the collection and translation of Greek texts. While in the West scholars were mainly devoted to religious matters, in Baghdad, Cradle of Civilization, philosophers, physicians, astronomers and mathematicians, under the aegis of the Gondishapur Academy, studied and developed the knowledge of antiquity,

20 Touraj Daryaee, *Sasanian Persia: The Rise and Fall of an Empire*, Published in 2009 by I. B. TAURIS & Co. Ltd, London - New York, in association with the Iran Heritage Foundation.

21 The Academy of Gondishapur, also known as The Jondishapur University, offered education and training in medicine, philosophy, theology and science. After the 1979 revolution Jondishapur University was renamed to Shahid Chamran University of Ahvaz in 1981 in honor of Mostafa Chamran, but recently it has been renamed again as Ahvaz Jundishapur University of Medical Sciences.

22 *The Cambridge History of Iran*, Vol 4, p. 396.

23 Elgood, Cyril. *A medical history of Persia*, Cambridge University Press, 1951, p. 173.

contributing decisively to the progress of all the wisdom.



*Stylized design of the Persian Healing Simurgh
symbol of medicine in Iran*

Abu Ali al-Hasan ibn al-Haitham, latinized Alhazen, (Basra, Iraq, 965 - 1040 a.d.), and even before, Abu Sad al-Ala ibn Sahl²⁴ (Persia 940 - 1000 a.d.), were the greatest exponents of that school of thought.

Alhazen was an Arab mathematician, astronomer, and physicist of the Islamic Golden Age, he made significant contributions to the principles of optics and visual perception. The most important of his scientific treatises was *Kitāb al-Manāzīr* “Book of Optics”. Alhazen also argued the importance of forming questions and subsequently testing them, an approach which was advocated by Galileo Galilei in 1638 with the publication of *“Discourses and Mathematical Demonstrations Relating to Two New Sciences”*²⁵.

Alhazen’s knowledge can be expressed by two fundamental aspects: the definition of a new theory of vision that replaced the Platonic one and the studies on the camera obscura.

The formulation of the intromissionist theory of Alhazen, accepted by the medieval theorists, particularly in the Latin West, replaced the classical tradition of visual rays dating back to the Euclid’s optics²⁶.

24 Ibn Sahl is the first Muslim scholar known to have studied Ptolemy's Optics, and as such an important precursor to the much more influential Book of Optics by Abu Ali al-Hasan ibn al-Haitham (Alhazen), written some thirty years later.

25 Galileo Galilei, *Discorsi e dimostrazioni matematiche intorno a due nuove scienze attenenti alla meccanica e i movimenti locali*, Leida 1638, Ludovico Elzeviro.

26 That the concept of ray is earlier than Euclid's work is evident from the use that Aristotle makes of it in Book III of Meteorological, with a study of the rays to explain the formation of the rainbow. In all respects, however, the origins of the Greek ray

The “radiation of light and color” became the new physical foundation of the science of optics replacing the concept of visual flow.

theory go back to Euclid's *Optics*, since this short work represents the first systematic approach to geometric optics.

III

ALL IS LIGHT

This new concept of vision, “radiation of light and color”, was developed in the East complementary to that of Plato as taught by Bernard of Chartres (*Bernardus Carnotensis*), French Neo-Platonist philosopher, Thierry of Chartres (*Theodoricus Chartrensis*) or Theodoric the Breton (*Theodericus Brito*), the Englishman John of Salisbury and his teacher William of Conches (student of Bernard of Chartres) in the cathedral schools of Chartres and Paris.

These men were at the forefront of the intense intellectual rethinking that culminated in what is now known as the twelfth-century renaissance, when Gothic finds its first expression. The school of Chartres was one of the largest institutes belonging to the scholastic educational system of medieval scholasticism, originated from the establishment of *scholae* and widespread throughout Europe in order to ensure a substantial uniformity of teaching.

It was the first, and perhaps the only, large-scale system of scholarship in the history of the West. It was established by Charlemagne²⁷, King of

²⁷ Charlemagne or Charles the Great (in German Karl der Große, in French Charlemagne, in Latin Carolus Magnus, 2 April 742 - Aachen, 28 January 814), was king of the Franks since 768, king of the Lombards or Longobards from 774 and 800 first emperor of the Holy Roman Empire (962 AD - 1806).

Already in a commemorating document, written by an anonymous poet during the meetings in Paderborn between the Emperor and Pope Leo III, Charlemagne is defined as *Rex Pater Europae*, the father of Europe, and in the following centuries much was discussed about the awareness, on the part of the King of the Franks, to have been the promoter of a political and economic space that can be led to the current concept of a

the Franks²⁸, by founding the Schola Palatina²⁹ in Aachen starting in such way the “Carolingian renaissance”³⁰. He encouraged the education of the people and the diffusion of knowledge in order to give unity and compactness to the Holy Roman Empire³¹.

unified European continent, cf. Alessandro Barbero, *Charlemagne - Father of a Continent*, translated by Allan Cameron, University of California Press, Berkely - Los Angeles - London 2004.

28 The Franks were one of the many Western Germanic peoples who entered the late Roman Empire as federates, they established a lasting kingdom in Gaul, to which they changed the name to France, namely, land of the Franks, and part of Germany.

29 The Schola Palatina (Greek: Σχολαί), before being adopted as term, in a singular form, by Charlemagne, was in a plural form a term used in relation to an elite cavalry unit of the army of the late Roman Empire, under the direct command of the emperor, of whom they were the guard. The Scholae Palatinae were established at the beginning of the 4th century by Diocletian or Constantine I, who dissolved the ancient imperial guard of the Praetorians. Each schola was a unit of cavalry, composed, at the time of Justinian I (6th century cf. Codex Justinianus, IV.65, XXXV.1), of 500 knights, recruited above all among the Germanic tribes: Franks, Alemanni and Goths. In the 4th century, Franks were very numerous among palace guards; Ammianus Marcellinus, *Historiae* XV.5.11.

But in the East under the impact of anti-Gothic policies (Gothic War 535–554), the Goths from the mid-5th century were largely replaced with Armenians and Isaurians.

30 The first significant renewal of learning in the West came with the Carolingian Renaissance of the Early Middle Ages. Under Charlemagne, Aachen becomes the centre of Carolingian Renaissance. Without the circle of scholars and artists that he, advised by Peter of Pisa and Alcuin of York, gathered around him at his court school, the « *Schola Palatina* », it is not possible to imagine the rise of the occidental world.

By decree in AD 787, he established schools in every abbey in his empire. Peter of Pisa (Latin: Petrus Pisanus; Italian: Pietro da Pisa; 744 – 799 AD), also known as Petrus Grammaticus wrote epistolary poems to Charlemagne, paying homage to him for building churches and acting as "Father of his People" cf. Edited by André Vauchez (2002). *Encyclopedia of the Middle Ages*. James Clarke & Co..

The Shrine of Charlemagne lies in the Aachen Cathedral where its actions are summarised by the verse:

"Thou wert the light and jewel of the Church of Christ, Charles, Thou flower of kings, Thou ornament of the world, Thou arbiter of law".

31 The Holy Roman Empire was characterized by the Carolingian Renaissance followed in later centuries by the dispute between Church and Empire, the Investiture controversy or Investiture contest, by the Crusades and the Thirty Years' War, one of the longest and most destructive conflicts in human history, as well as the deadliest European religious war in history, it resulted in eight million fatalities, cf. Peter H. Wilson, *Europe's Tragedy: A New History of the Thirty Years War* (London: Penguin, 2010), 787.

The Investiture controversy was the result of the ecclesiastical politics of Otto I, traditionally known as Otto the Great, German king from 936. He, following the example of Charlemagne's coronation as "Emperor of the Romans" in 800, was crowned Holy Roman Emperor in 962 by Pope John XII in Rome. He was Holy Roman Emperor until his death in 973. The patronage of Otto and his immediate successors facilitated a so-called "Ottonian Renaissance" of arts and architecture. Otto I transformed the Roman Catholic Church in Germany to strengthen royal authority and subjected its clergy to his personal control, provoking in such way a long term conflict, which culminated in the dispute between Henry IV and Pope Gregory VII.

The crisis began when supporters of the "Gregorian Reform" decided to rebel against simony by forcefully taking the power of investiture from the ruling secular power, the Holy Roman Emperor, and placing that power wholly within control of the church.

When Emperor Henry IV became a six-year-old German king in 1056, the reformers seized the papacy while the king was still a child. In 1059, a church council in Rome declared, with *In Nomine Domini*, a papal bull issued on 13 April 1059 written by Pope Nicholas II and a canon of the Council of Rome, the cardinal-bishops as the sole electors of the pope, with the consent of minor clergy. Having regained control of the election of the pope, Concordat of Worms (1122) and the First Council of the Lateran (1123), the church was now ready to tackle investiture and simony, a practice, which never disappeared even during the period of the papacy decline.

For example, Pope Boniface VIII was accused of being guilty of simony, as reported by Dante Alighieri in the Divine Comedy.

In his Divine Comedy (Inferno. Canto 19, lines 115–117.), written in the early 14th century, the poet Dante Alighieri regarding the Donation of Constantine (Latin: *Donatio Constantini*) wrote: "*Abi, Costantin, di quanto mal fu matre, / non la tua conversion, ma quella dote / che da te prese il primo ricco patre!*" ("*Ab, Constantine, how much evil was born, / not from your conversion, but from that donation / that the first wealthy Pope received from you!*").

The Donation of Constantine was included in the 9th century Pseudo-Isidorean Decretals collection (or False Decretals), a set of extensive influential medieval forgeries written by a scholar, or group of scholars, known as Pseudo-Isidore. In the 11th and 12th centuries, the Donation was often cited in the investiture conflicts between the papacy and the secular powers in the West.

Later, the Catholic priest Lorenzo Valla argued in his philological study of the text that the language used in manuscript could not be dated to the 4th century but rather to the 8th century. L.Valla believed the forgery to be so obvious that it could not be ignored by the Church. He further argued that papal usurpation of temporal power at the time of the Carolingian Dynasty in place of the old Merovingian royal line had corrupted the church, caused the wars of Italy, and reinforced the "overbearing, barbarous, tyrannical priestly domination".

Valla's treatise was taken up vehemently by writers of the Protestant Reformation, such as Ulrich von Hutten and Martin Luther, causing the treatise to be placed on the index of banned books (*Index Librorum Prohibitorum* - a list of publications deemed heretical, anti-clerical or lascivious, and therefore banned by the Roman Catholic Church) in

the mid-16th century. The Donation continued to be tacitly accepted as authentic until Caesar Baronius in his "*Annales Ecclesiastici*" (published 1588–1607) admitted that it was a forgery, after which it was almost universally accepted as such. The document bears the title *Constitutum domini Constantini imperatoris*, The Donation of Constantine, cf. "*Donation of Constantine*", Catholic Encyclopedia, New York 1913, Robert Appleton Company.

The Donation of Constantine paved the way for the Investiture controversy and the simony (the practice of selling "indulgences") that was strongly criticized by Martin Luther in his Ninety-five Theses posted in 1517 on the door of the All Saints' Church in Wittenberg setting the stage for the Protestant Reformation.

The Protestant Reformation lasted until the end of the Thirty Years' War with the Peace of Westphalia in 1648.

However the Investiture controversy made the papacy stronger and marshalling for public opinion engaged lay people in religious affairs increasing lay piety, setting the stage for the Crusades. In 1095, Pope Urban II called for the First Crusade in a sermon at the Council of Clermont. He encouraged military support for the Byzantine Empire and its Emperor, Alexios I, who needed reinforcements for his conflict with westward migrating Turks colonizing Anatolia. Volunteers became Crusaders by taking a public vow and receiving plenary indulgences from the Church. Some were hoping for a mass ascension into heaven at Jerusalem or God's forgiveness for all their sins. Others participated to satisfy feudal obligations, obtain glory and honour or to seek economic and political gain.

The climate of religious exaltation unleashed by the fervent preaching of the supporters of the First Crusade soon led to the unleashing of persecution against those who, much closer than the Muslims, were perceived as a threat to the faith "The Jews", infidels as much as Muslims and accused of crucifying Christ.

Godfrey of Bouillon, Lord of Bouillon and Duke of Lower Lorraine, vowed to avenge the death of Christ with Jewish blood. Even Siebert of Gembloux, monk in the Benedictine abbey of Gembloux, wrote that, before starting "a war in the name of our Lord" it was essential that the Jews convert, and those who resisted had to be "deprived of their property, massacred and expelled from the cities", cf. Norman Golb, *The Jews in Medieval Normandy: a social and intellectual history*, Cambridge, United Kingdom: Cambridge University Press 1998.

When Pope Urban II began preaching for the first campaign the word "Crusade" did not exist: instead, the terms *iter*, for journey, or *peregrinatio*, for pilgrimage, were used. Not until the word *crucesignatus*, for one who was signed with the cross, was adopted at the close of the 12th century.

As prelude of the first official crusade took place the People's Crusade, a popular crusade led primarily by Peter the Hermit of Amiens with forces of Walter Sans Avoir. It lasted roughly six months from April to October 1096. It is also known as the Peasants' Crusade, Paupers' Crusade or the Popular Crusade as it was not part of the official Catholic Church-organised expeditions that came later.

During the People's Crusade, thousands of Jews were murdered in what is now called the Rhineland massacres (also known as the German Crusade of 1096, the persecutions of 1096 or Gzerot Tatenu) giving rise to the first outbreak of antisemitism in Europe,

the first example, according to David Nirenberg, of that antisemitism whose climax will be the Holocaust.

The Count Emicho of Flonheim and another itinerant preacher, a certain Folkmar, were the main inciters and leaders of the massacre.

But before the Rhineland massacres the Jews of Speyer with the aid of bishop Huzmann had their rights and privileges confirmed and even expanded "*sub tuicionem nostram recipere et tenere*" by Henry IV. The rights and privileges which had been especially granted to the Jews of Speyer, in particular to Judah ben Kalonymus, David ben Meshulam, and Moses ben Ghutiel were extended to all the Jews of the empire. This Imperial Jews Charter was one of the first in Germany. The two charters of 1084 and 1090 marked the beginning of the "golden era" of the Jews in Speyer which, with limitations, was to last into the 13th or 14th century.

The first official crusade took place in (1096-1099) but both Philip I of France and the Holy Roman Emperor Henry IV, who was in conflict with Pope Urban II, did not take part.

Later took place other Crusades. The Second Crusade (1147–1149), was the second major crusade led by Louis VII of France and Conrad III of Germany (Hohenstaufen dynasty, he was never crowned Holy Roman Emperor) launched from Europe as a Catholic (Latin) holy war against Islam.

The Third Crusade (1189–1192), also known as The Kings' Crusade, was an attempt by European leaders to reconquer the Holy Land from Saladin, but they failed to capture Jerusalem.

The German Crusade of 1197, also known as the Crusade of Henry VI or the "Emperor's Crusade" was a crusade launched by the Hohenstaufen Emperor Henry VI (he died before his departure, already undertaken by his military forces, to the Holy Land, in Messina on 28 September 1197) in response to the aborted attempt of his father, Emperor Frederick Barbarossa (House of Staufen, or of Hohenstaufen), drowned in a river in Asia Minor on 10 June 1190 before reaching the Holy Land, during the Third Crusade.

The Fourth Crusade (1202–04) was a Western European armed expedition called by Pope Innocent III, originally intended to reconquer Muslim-controlled Jerusalem by means of an invasion through Egypt, but in reality it resulted in the sacking of Constantinople by the Crusader army, leading to the partition of the Byzantine Empire and the establishment of the Latin Empire.

The Fifth Crusade (1217–1221) was called by Pope Honorius III and led by King Andrew II of Hungary and Leopold VI, Duke of Austria, it was an attempt by Western Europeans to reacquire Jerusalem and the rest of the Holy Land by first conquering the powerful Ayyubid state in Egypt, but an attack against Jerusalem ultimately left the city in Muslim hands. Frederick II (House of Hohenstaufen), on the occasion of his coronation to *Rex romanorum*, in 1215, solemnly swore to take part to the Crusade, but since he postponed several times, provoking tensions with Pope Innocent III, when he attempted to join it, he was barred by the Pope Honorius III, successor of Innocent III.

The Sixth Crusade started in 1228 as an attempt to regain Jerusalem. It began seven years after the failure of the Fifth Crusade and involved very little actual fighting. The

first peaceful Crusade thanks to a diplomatic maneuvering of the Holy Roman Emperor, Frederick II, in the Kingdom of Jerusalem, which resulted in regaining some control over Jerusalem for much of the ensuing fifteen years (1229–39, 1241–44) as well as over other areas of the Holy Land, cf. Adrian J. Boas (2001). *Jerusalem in the Time of the Crusades: Society, Landscape and Art in the Holy City Under Frankish Rule*. London: Routledge. p. 1.

The Seventh Crusade (1248–1254) led by Louis IX of France, who was defeated and captured by the Egyptian army. Approximately 800,000 bezants were paid in ransom for his return.

The Eighth Crusade was a crusade launched by Louis IX of France against the city of Tunis in 1270. He died shortly after arriving on the shores of Tunisia and his disease-ridden army dispersed back to Europe shortly afterwards.

The Ninth Crusade (1271–1272) led by Henry III of England's son Edward is sometimes grouped with the Eighth Crusade and commonly considered to be the last major medieval Crusade to the Holy Land.

The two-century attempt to recover the Holy Land from Muslim rule ended in failure.

But the term "Crusades" is also applied to other church-sanctioned campaigns. These were fought for a variety of reasons including the suppression of paganism and heresy, the resolution of conflict among rival Roman Catholic groups, or for political and territorial advantage.

The church was going to crusade against the Holy Roman Empire under the Emperor Frederick II.

His reign was mainly characterized by a strong legislative activity and artistic and cultural innovation, aimed at unifying lands and peoples, but strongly opposed by the Church, whose Temporal Power was questioned by Frederick II. In fact, he had two excommunications from Pope Gregory IX, who considered him as antichrist.

Frederick II was a valuable writer, a convinced protector of artists and scholars, his Sicilian royal court in Palermo was a meeting place for Greek, Latin, Germanic, Arab and Hebrew cultures, it saw one of the first literary uses of a Romance language (after the Provençal dialect), the Sicilian.

Frederick II spoke six languages (Latin, Sicilian, German, French, Greek and Arabic), he played an important role in promoting the letters through the poetry of the Sicilian School. Welcomed by Dante Alighieri and his contemporaries the Sicilian School had a considerable influence on literature and on what would become the modern Italian language, cf. Gaetana Marrone, Paolo Puppa e Luca Somigli (edited by), *Encyclopedia of Italian Literary Studies (A-J)*, vol. 1, Taylor & Francis, 2007, pp. 780–82; also 563; 571; 640; 832–36.

But in the long term in Italy, the investiture controversy weakened the emperor's authority and strengthened local separatists. The long struggle between emperor and pope hurt the Holy Roman Empire's intellectual life. The dispute did not end with the Concordat of Worms in 1122; future disputes between popes and Holy Roman Emperors continued until northern Italy was lost to the empire entirely.

At the beginning of the 16th century, Niccolò Machiavelli said: "We Italians are irreligious and corrupt above others because the church and her representatives have set us



Coat of arms of the Holy Roman Empire (c. 1433–c. 1450)

The philosophers of Chartres assimilated the doctrine of Plato³² through the Neoplatonic thought of Augustine of Hippo and Anicius Manlius Severinus Boëthius, commonly called Boethius. Conventionally Neoplatonism³³ started with the activity of Plotinus of Lycopolis, who

the worst example", cf. Middlemore, S. G. C.; Burckhardt, Jacob; Murray, Peter; Burke, Peter (1990), *The Civilization of the Renaissance in Italy*, Penguin Classics. To Machiavelli, religion was merely a tool, useful for a ruler wishing to manipulate public opinion, cf. Niccolò Machiavelli, *Il Principe*, Blado, Roma 1532. Machiavelli, Niccolò (1961), *The Prince*, London: Penguin, translated by George Bull.

32 Before Plato, Parmenides of Elea also asserted such a doctrine when he reduced being and thought to Unity, and denied that being consisted of sensible realities. He said that being and thought are the same thing (Enneads, V, 1, 8).

33 Following Plotinus and his interpretation of Platonism, several schools were born, some of which competing with each other, they were located in the main teaching centers of the new doctrines, the main of which were: the school of Rome founded by Plotinus and continued by his disciples Porphyry and Amelius; the school of Alexandria, which included Olympiodorus the Elder and Hypatia's philosophy - Hypatia ((born in Alexandria, Egypt, c. 355/370 AD - died in Alexandria of Egypt, March 415 AD) was a Hellenistic Neoplatonist philosopher, astronomer, and mathematician. She was the head of the Neoplatonic school at Alexandria, because of her killing by an angry mob of Christians in turmoil, for some authors composed by monks called Parabalani or Parabolani, she became, according to the theosophist Augusto Agabiti, "The first Martyr to Freedom of Thought" cf. Augusto Agabiti, *Ipazia, la prima martire della libertà di pensiero*, Roma, Enrico Voghera 1914. In the twentieth century Hypatia became seen as an icon for women's rights and a precursor to the feminist movement.

As for the other schools are to mention the Syriac school founded by Iamblichus, also

lived in the first half of the third century AD and studied in Alexandria in Egypt, where he was a pupil of Ammonius Saccas³⁴. In Egypt Plotinus assimilated the cultural ferments of both Greek philosophy and Eastern, Egyptian and Asian mysticism. Having felt the uncertainties of his time, Plotinus found it necessary to resort to the ancient wisdom to save the soul by purifying it from passions and elevating it to intelligence. In his philosophy there are three principles: the One, the Intellect, and the Soul.

Plotinus loved to call himself simply a commentator of Plato. He is considered one of the most important philosophers of antiquity, heir to Plato and father of Neoplatonism, a systematic philosopher, whose philosophical tradition was recovered by German Idealism, except Hegel, (also known as post-Kantian idealism, post-Kantian philosophy, or simply post-Kantianism) in particular a unitary and ideal vision of being, above the subject - object dualism, the substance was understood in Spinozan sense³⁵, as the whole, the reality in its universal entirety.

Plotinus' philosophical tradition strongly influenced the theories of Pseudo-Dionysius the Aeropagite, who informed all medieval art and naturally the "Gothic", characterized by the close link between Light and Sacredness:

"Gothic architecture gave clear expression to this: in the great cathedrals light comes down from heaven by passing through windows³⁶ depicting the history of salvation. God's light comes to us through the account of his self-revelation, and thus becomes capable of illuminating our passage through time by recalling his gifts and demonstrating how he fulfils his promises".

(Pope Francis, Encyclical Letter Lumen Fidei, The faith of Israel) © Libreria Editrice Vaticana.

known as Iamblichus Chalcidensis, or Iamblichus of Apamea, a disciple of Porphyry; the school of Athens linked with the Syriac school through Priscus of Epirus, whose greatest exponents were Plutarch of Athens and Syrianus; and whose results are evidenced by the works of Proclus; and the school of Pergamon founded by Aedesius of Cappadocia and largely represented by the emperor Julian also known as Julian the Apostate.

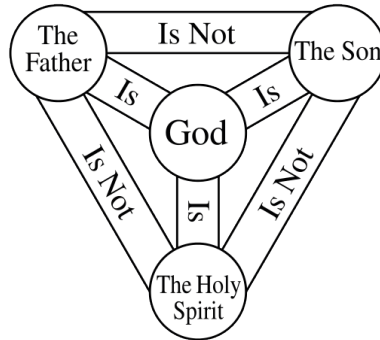
34 Cf. Stanford Encyclopedia of Philosophy *Plotinus*.

35 Baruch Spinoza was considered one of the great rationalists of 17th-century philosophy and one of the founders of the modern biblical criticism.

36 Through the Gothic stained glass rose window of Notre-Dame de Paris the colors were achieved by colloids of gold nanoparticles, "surface plasmons".

Much of the biographical information about Plotinus comes from Porphyry's preface to his edition of Plotinus' *Enneads*³⁷. The Six *Enneads* have greatly influenced Western and Near-Eastern thought.

It will be precisely the Christian thought to assimilate the Neoplatonic thought, however, interpreting Plotinus' concept of "the One" in a fully monotheistic sense. Reiterating the scheme of the three hypostasis³⁸ of Plotinus, the One, the Intellect, and the Soul, Christian and medieval theologians will thus see in "the One" the first Person of the Trinity³⁹, the ineffable being of God, the Father, who can reveal himself only through his only Son, "begotten, not made, one in Being with the Father" by the power of the Holy Spirit.



Scutum Fidei - Shield of the Trinity

³⁷ The Six *Enneads*, is the collection of writings of Plotinus, edited and compiled by his student Porphyry (c. ad 270).

³⁸ Hypostasis (from the Greek *hypostasis*, composed of *hypo*, "below", and *stasis*, "Stilstand", then "to be subsistent", "substance") in Neoplatonic philosophy and in Plotinus represents each of different dimensions of reality, hierarchically generated, belonging to the same divine substance, which produces them through a sort of emanation, otherwise called procession. The Greek term *ὑπόστασις* was used for the first time in a philosophical sense by Posidonius (Apameia, c. 135 BCE - Rhodes, c. 51 BCE).

³⁹ At the Council of Nicaea in AD 325, that debated the nature of Christ, won the Hermetic doctrine, the "Nicene Creed", which affirmed the coexistence of human and divine, on the Aryan doctrine, which separated the two realities. The Council of Nicaea was the first ecumenical council in Christendom, according to the practice of the Jerusalem Council of the Apostolic Age. The Nicene Creed was amended at the First Council of Constantinople (AD 381), and the amended form is referred to as the "Nicene or the Niceno-Constantinopolitan Creed". Both the Nicene Creed and the Niceno-Constantinopolitan Creed will be further confirmed by the Council of Chalcedon, held from October 8 to November 1, AD 451 at Chalcedon.

In particular Saint Augustine of Hippo (354 - 430) conceives God, who is "Light" (John 1:1-8)⁴⁰, as the natural goal to which reason aspires, and in which finally the dualistic discordance between subject and object, thought and being, is reconciled by Unity.

For Alchemy⁴¹ the same symbol of Unity, which contains everything and to which everything returns, is nothing but the hieroglyphic of the word Ra, namely, a circle with a point in the center, - the latter indicates the contraction, the circle instead the expansion of Creation - today's astronomical symbol of the sun, basis of the whole Egyptian monistic thought from which derives the western thought that compared to the ancient

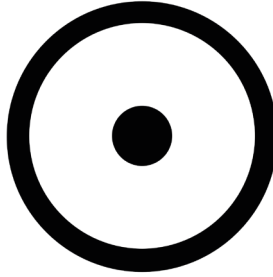
40 In the 2nd century, among all the writings ascribed to John, only the "First Letter" was recognized by all the Churches as "Holy Scripture".

41 According to Western alchemists the origin of their art dates back to the era of the ancient Egypt. The city of Alexandria was a center of alchemical knowledge, and it retained its pre-eminence until the decline of ancient Egyptian culture. Unfortunately there are no original Egyptian documents on alchemy. These writings, if they existed, were lost in the burning of the Library of Alexandria set by the Christians on the occasion of the edict of the Roman emperor Theodosius I in 391 AD see *supra* p. 20. Egyptian alchemy is mostly known through the works of ancient Greek philosophers, come to us only in Islamic translations. Legend has it that the founder of Egyptian alchemy was the god Thoth (god of speech, writing and literature, of mathematics, geometry and god of magic), called Hermes (also god of speech, writing and magic) the "thrice-greatest Hermes", "Latin: *Mercurius ter Maximus*", Hermes Trismegistus by the Greeks and Mercury by the Romans, cf. Budge, E.A. Wallis (1904). *The Gods of the Egyptians* Vol. 1. pp. 414-5.

Herodotus (The Histories 2, 50) wrote: "*In fact, the names of nearly all the gods came to Hellas from Egypt. For I am convinced by inquiry that they have come from foreign parts, and I believe that they came chiefly from Egypt.*". The legend further claims he was the true author of 42 books of every branch of knowledge, human and divine, alchemy included, cf. Jack Lindsay, *The origins of alchemy in Graeco-Roman Egypt*, Barnes & Noble (1970). The symbol of Hermes was the caduceus, a short staff entwined by two serpents, sometimes surmounted by wings, it is also a recognized symbol of alchemy. The Emerald Tablet of Hermes Trismegistus, also known as the Smaragdine Table, or Tabula Smaragdina is known only through Greek and Arabic translations, it is generally considered the basis for Western alchemical practice and philosophy and the most famous document of hermetic writings. It is a compact and cryptic piece of the Hermetica reputed to contain the secret of the prima materia and its transmutation. The Greeks took in the Egyptian hermetic doctrines, mixing them in the syncretistic environment of the Alexandrian culture, with the Pythagoreanism and the philosophy of the Ionian school and later the Gnosticism.

The thought of the Ionian school was based on the search for a unique and original principle for all natural phenomena; this philosophy, whose main exponents were the naturalists Thales and Anaximander, was later developed by Plato and Aristotle, whose works ended up becoming an integral part of alchemy.

differs slightly.



The time and the flourishing of science have gradually made the spiritual aspects vanish to privilege the construction of a material and mathematical conception of light. However, it remains a delay of a millennium and maybe more provoked by the Roman Church endorsed by the State and the advent of Christianity that requires a quick recovery to eliminate the negative effects generated.

IV

A NEW POLITICAL VISION

As already mentioned in the preface and in the previous chapters this book was written in order to lay the foundation of all principles of a new era and of a new vision of a changing world in full respect of all religions and confessions, without undermining, by going back to the true origins of her belief, the authority of the Church. I believe there is no documents more appropriate than three Encyclical Letters “*Deus Caritas est, Lumen Fidei and Laudato si*” to determine the political role of the Church and explain how to put an end to the controversy focused on embryonic stem cells, the environmental degradation and the global warming, also referred to as climate change, main cause of today’s socio-economic and world political crisis.

Deus Caritas est (English: “God is Love”), subtitled *De Christiano Amore* (Of Christian love), is a 2005 encyclical letter, the first written by Pope Benedict XVI, in large part derived from writings by his late predecessor, Pope Saint John Paul II.

In *Deus Caritas est*, for the purpose of this chapter, are to quote the paragraphs related to the role the Church plays in overcoming the social injustice and the statements according to which such a duty does not fall within the Church’s immediate responsibility but it should be a political task.

“The Church cannot and must not take upon herself the political battle to bring about the most just society possible. She cannot and must not replace the State. Yet at the same time she cannot and must not remain on the sidelines in the fight for justice.

She has to play her part through rational argument and she has to reawaken the spiritual energy without which justice, which always demands sacrifice, cannot prevail

and prosper. A just society must be the achievement of politics, not of the Church. Yet the promotion of justice through efforts to bring about openness of mind and will to the demands of the common good is something which concerns the Church deeply”.

(Encyclical Letter Deus Caritas est) © Libreria Editrice Vaticana.

By making such a statement Pope Benedict XVI puts the limits of the Church and desires such a task to the politics. The same attitude we will find in the second Encyclical Letter of Pope Francis *Laudato si’*.

As for the first Encyclical Letter of Pope Francis *Lumen Fidei* all the explanations related to the true origin of the concept of light are exhaustively reported in the previous three chapters of this book.

The Encyclical Letter *Laudato si’* has the subtitle “On care for our common home”. In it, Pope Francis critiques consumerism and irresponsible development, laments environmental degradation and global warming, and calls all people of the world to take “swift and unified global action”⁴².

Since in the Encyclical Letter *Laudato si’* the comments on climate change are consistent with the scientific consensus on climate change I find it proper to point out the importance and reliability of the scientific opinion on climate change namely the overall judgment among scientists regarding the extent to which global warming is occurring, its likely causes, and its probable consequences.

Several studies of the consensus have been undertaken⁴³. Among the most-cited is a 2013 study of nearly 12,000 abstracts of peer-reviewed papers on climate science published since 1990, of which just over 4,000 papers expressed an opinion on the cause of recent global warming. Of these, 97% agree, explicitly or implicitly, that global warming is happening and is human-caused⁴⁴.

42 *"Pope Francis, in Sweeping Encyclical, Calls for Swift Action on Climate Change"* by Jim Yardley and Laurie Goodstein, June 18, 2015, The New York Times.

43 *"Consensus on consensus: a synthesis of consensus estimates on human-caused global warming"* John Cook 1, 2, 3,16, Naomi Oreskes 4, Peter T Doran 5, William R L Anderegg 6, 7, Bart Verheggen 8, Ed W Maibach 9, J Stuart Carlton 10, Stephan Lewandowsky 11, 2, Andrew G Skuce 12, 3, Sarah A Green 13, Dana Nuccitelli 3, Peter Jacobs 9, Mark Richardson 14, Bärbel Winkler 3, Rob Painting 3 and Ken Rice 15, Published 13 April 2016 • 2016 IOP Publishing Ltd. - Environmental Research Letters, Volume 11, Number 4.

44 *"Quantifying the consensus on anthropogenic global warming in the scientific literature"* John Cook 1, 2, 3, Dana Nuccitelli 2, 4, Sarah A Green 5, Mark Richardson 6, Bärbel Winkler

National and international science academies and scientific societies have assessed current scientific opinion on global warming. These assessments are generally consistent with the conclusions of the Intergovernmental Panel on Climate Change (IPCC)⁴⁵, a scientific and intergovernmental body under the auspices of the United Nations, set up at the request of member governments, dedicated to the task of providing the world with an objective, scientific view of climate change and its political and economic impacts. It was first established in 1988 by two United Nations organizations, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP), and later endorsed by the United Nations General Assembly through Resolution A/RES/43/53⁴⁶.



The IPCC's Fifth Assessment Report (AR5)⁴⁷ was completed in 2014⁴⁸.

2, Rob Painting 2, Robert Way 7, Peter Jacobs 8 and Andrew Skuce 2, 9. Published 15 May 2013 • 2013 IOP Publishing Ltd. - Environmental Research Letters, Volume 8, Number 2. And also Marlon, J. R., Leiserowitz, A., and Feinberg, G. (2013) *Scientific and Public Perspectives on Climate Change*. Yale University. New Haven, CT: Yale Project on Climate Change Communication.

⁴⁵ The IPCC produces reports that support the United Nations Framework Convention on Climate Change (UNFCCC), which is the main international treaty on climate change. UNFCCC an international environmental treaty adopted on 9 May 1992 and opened for signature at the Earth Summit in Rio de Janeiro from 3 to 14 June 1992. It then entered into force on 21 March 1994, after a sufficient number of countries had ratified it.

⁴⁶ A/RES/43/53, 70th plenary meeting 6 December 1988 - Protection of global climate for present and future generations of mankind.

⁴⁷ IPCC, 2013: Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T. F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P. M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

⁴⁸ IPCC, 2014: Summary for policymakers. In: Climate Change 2014: Impacts, Adap-

Its conclusions are summarized below:

- “Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia”.⁴⁹
- “Atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years”.
- Human influence on the climate system is clear. It is extremely likely (95-100% probability) that human influence was the dominant cause of global warming between 1951-2010.
- “Increasing magnitudes of global warming increase the likelihood of severe, pervasive, and irreversible impacts”.
- “A first step towards adaptation to future climate change is reducing vulnerability and exposure to present climate variability”.
- “The overall risks of climate change impacts can be reduced by limiting the rate and magnitude of climate change”.
- Without new policies to mitigate climate change, projections suggest an increase in global mean temperature in 2100 of 3.7 to 4.8 °C, relative to pre-industrial levels (median values; the range is 2.5 to 7.8 °C including climate uncertainty).
- The current trajectory of global greenhouse gas emissions is not consistent with limiting global warming to below 1.5 or 2 °C, relative to pre-industrial levels. Pledges made as part of the Cancún Agreements are broadly consistent with cost-effective scenarios that give a “likely” chance (66-100% probability) of limiting global warming (in 2100) to below 3 °C, relative to pre-industrial levels.

No scientific body of national or international standing maintains a formal opinion dissenting from any of these main points.

tation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, and L. L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

⁴⁹ IPCC (11 November 2013): B. Observed Changes in the Climate System, in: Summary for Policymakers (finalized version), in: IPCC AR5 WG1 2013, p. 2.

There is now widespread agreement that the Earth is warming, due to emissions of greenhouse gases caused by human activity. It is also clear that current trends in energy use, development, and population growth will lead to continuing – and more severe – climate change⁵⁰.

The changing climate will inevitably affect the basic requirements for maintaining health: clean air and water, sufficient food and adequate shelter. Each year, about 800,000 people die from causes attributable to urban air pollution, 1.8 million from diarrhoea resulting from lack of access to clean water supply, sanitation, and poor hygiene, 3.5 million from malnutrition and approximately 60,000 in natural disasters. A warmer and more variable climate threatens to lead to higher levels of some air pollutants, increase transmission of diseases through unclean water and through contaminated food, to compromise agricultural production in some of the least developed countries, and increase the hazards of extreme weather.

One of the major continents affected by the Climate Change is the African continent experiencing in such way a serious political instability, which affects the negative effects such as irregular migration, terrorism and transnational crime as well as illicit financial flows on the European continent.

The EU Commission reiterated on the occasion of the 8th College-to-College meeting in Addis Ababa, Ethiopia, 7 April 2016, that the EU and Africa should tackle global problems jointly:

“In the face of the too many victims of terrorism on African soil and in Europe, the Colleges discussed how they could best contribute to combatting the scourge of terrorism and violent extremism, which pose a major threat to democracy, security and stability in both Africa and Europe. Within existing programmes, they agreed to pursue work jointly to enhance technical and operational capacities”.

On its part, the AU has developed a Fifty (50)-year Agenda known as “Agenda 2063” and its First Ten (10)-Year Implementation Plan adopted at the Johannesburg Summit in June 2015 as a framework to accelerate the integration of the continent.

⁵⁰ According to Gioachino Roberti, a PhD student at the University of Clermont Auvergne and Matthias Schlögl, a PhD student at the University of Natural Resources and Life Sciences in Vienna, besides having a disastrous impact on sea levels and weather, a warming climate could also trigger catastrophic volcanic eruptions across the planet.

Over the last twelve years, the European Union (EU) has grown from fifteen (15) to twenty-eight (28) Member States and has also taken steps towards greater integration through the creation of the Euro currency and the adoption of the Lisbon Treaty in order to make the EU more democratic, more efficient and better able to address global problems, such as climate change, with “one voice”.

One of the main causes of the political instability in Africa, so as in the region of South America and in the Middle East, is due to the absence of a Unity, which should find its expression in a “Union Treaty” able to establish a “Single Currency” and a “Single Market” that would give strength to their economy thus acting as an agglutinative element among all the member states of the AU (African Union), the OIC (Organization of Islamic Cooperation) and the UNASUR (international organization made up of all twelve countries in the South American region: Argentina, Bolivia, Brazil, Colombia, Chile, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela).

But before explaining how such a Treaty could come into force I would like to give you an explanatory vision of the European Union and to cite some chapter of our history.

Charlemagne or Charles the Great was king of the Franks and since 800 AD first emperor of the Holy Roman Empire (962 AD - 1806). Already in a commemorating document, written by an anonymous poet during the meetings in Paderborn between the Emperor and Pope Leo III, Charlemagne is defined as *Rex Pater Europae*, the father of Europe, and in the following centuries much was discussed about the awareness, on the part of Charles the Great, to have been the promoter of a political and economic space that can be led to the current concept of a unified European continent, see *supra* note 26.

Jean Monnet is regarded by many as a chief architect of European Unity and is regarded as one of its founding fathers together with Alcide De Gasperi and Konrad Adenauer. In 1943, Jean Monnet became a member of the National Liberation Committee, the would-be French government in exile in Algiers. During a meeting on 5 August 1943, Jean Monnet declared to the Committee:

“There will be no peace in Europe, if the states are reconstituted on the basis of national sovereignty... The countries of Europe are too small to guarantee their peoples the necessary prosperity and social development. The European states must constitute

themselves into a federation...”.

As the head of France’s General Planning Commission, Jean Monnet was the real author of what has become known as the 1950 Schuman Plan to create the European Coal and Steel Community (ECSC), forerunner of the Common Market.

Following liberation, Jean Monnet proposed a “global plan for modernization and economic development”. In 1955, Monnet founded the Action Committee for the United States of Europe in order to revive European construction following the failure of the European Defense Community (EDC). It brought political parties and European trade unions together to become a driving force behind the initiatives which laid the foundation for the European Union as it eventually emerged: first the European Economic Community (EEC) (1958) (known commonly as the “Common Market”), which was established by the Treaty of Rome of 1957.

As a result of the efforts of the past today we are enjoying the advantages of such a Union established thanks to this Treaty which in the course of time was changed amended and renamed Lisbon Treaty.

The Union Treaty while maintaining the content of the Lisbon Treaty unaltered should adopt a different numbering and adjustments related to the institutions of the AU (African Union), the OIC (Organization of Islamic Cooperation) and the UNASUR (Unión de Naciones Suramericanas - Union of South American Nations). As for the effectiveness of the adoption of a possible Union Treaty, I would like to take again a leap into the past and emphasize the importance of the transcript of a law.

The Roman Republic owes its first Decemviri or Decemvirs (Latin for “ten men”) to the Law of Solon. According to Livy and Dionysius, because of two hundred-year Conflict of the Orders between the patrician order (the aristocracy) and the plebeian order (the commoners), three envoys (Spurius Postumius Albus Regillensis, Aulus Manlius Vulso and Servius Sulpicius Camerinus Cornutus) were sent to Athens to study and transcribe the Law of Solon and inquire about the laws of other Greek city-states in order to apply them to Rome and pose an end to such a conflict. The first decemviri in the Roman Republic took office in 451 BC.

The date that generally identifies the beginning of the Roman Empire as a single State entity is 27 BC, the first year of the Principality of Octavian. Octavian’s power was then unassailable and in 27 BC the Roman Senate formally granted him overarching power and the new title Augustus,

effectively marking the end of the Roman Republic.

But at the end of the first century BC thanks to the Law of Solon the power of the Roman Republic was already enormous, see *supra* note 12.



Senatus Populusque Romanus
Emblem of the Roman Republic.

The Union Treaty, so as the Law of Solon, would represent the right provision for putting an end to the controversies, which undermine the political stability in the African continent, in the Middle East and in the South American region, making possible the process of integration of three different continents. In order to accelerate the process of integration and the creation of a single market between the above mentioned continents I suggest, as European citizen and author of this book, to urge the Vatican City State to act as catalyst by creating “*Motu Proprio*”⁵¹ a digital currency and unifying all the currencies of the AU, OIC and UNASUR by means of a “Monetary Parity” that the Vatican Bank (IOR - *Institutum pro Operibus Religionis*) would grant in the name of humanity and unity.



The coat of arms of the Vatican City State, © Libreria Editrice Vaticana.

⁵¹ In law, *motu proprio* (Latin for: “on his own impulse”) describes an official act taken without a formal request from another party. In Catholic canon law, it refers to a document issued by the pope on his own initiative and personally signed by him.

All the member states of the AU, OIC, UNASUR and UN might peg their national currency to the “Vatican Digital Currency” to keep inflation aligned with expectations and maintain a stable monetary policy regime.

The Vatican Digital Currency can also be traded and exchanged as a financial instrument similar to stocks, bonds and any other asset classes.

Vatican Digital Currency should be considered as a Digital Currency regulated by Directive on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing, according to which money laundering and terrorist financing are frequently carried out in an international context and measures adopted solely at national or even Union level, without taking account of international coordination and cooperation, would have very limited effects. With the view to reinforce the efficacy of the fight against money laundering and terrorist financing, such Directive should be aligned with the new FATF (Financial Action Task Force) Recommendations adopted and expanded in February 2012.

The FATF Recommendations are the internationally endorsed global standards against money laundering and terrorist financing: they increase transparency and enable countries to successfully take action against illicit use of their financial system.

As for the role of the Vatican Bank (IOR) and its real effectiveness I would like to answer to the words of Pope Francis expressed in the Encyclical Letter *Laudato si'*:

“Politics and the economy tend to blame each other when it comes to poverty and environmental degradation. It is to be hoped that they can acknowledge their own mistakes and find forms of interaction directed to the common good. While some are concerned only with financial gain, and others with holding on to or increasing their power, what we are left with are conflicts or spurious agreements where the last thing either party is concerned about is caring for the environment and protecting those who are most vulnerable. Here too, we see how true it is that “unity is greater than conflict””.

(Pope Francis Encyclical Letter *Laudato si'*) © Libreria Editrice Vaticana.

The Vatican City State and the Vatican Bank (IOR) as promoter *bona fide* of a “Monetary Parity” and main supporter of the Union Treaty, not

in conflict with peremptory norms (*jus cogens*)⁵², would also act as catalyst for the ratification by 35 States of the Vienna Convention on the Law of Treaties between States and International Organizations or Between International Organizations (VCLTIO) - *Pacta sunt servanda rebus sic stantibus*⁵³:

“Agreements [i.e. inter-state Treaties, in International Law] will be observed so long as the conditions under which they were made remain the same”.

Allowing in such way NGOs and Non-Profit organizations such as the Club of Rome⁵⁴ and the German association for the Club of Rome (Deutsche Gesellschaft Club of Rome)⁵⁵ to participate actively in the solution of the global crisis by promoting the Blue Economy.

“Humanity has the necessary technological, political and economic solutions at hand

52 From the Vienna Convention on the Law of Treaties (VCLT), signed at Vienna on May 23, 1969, entered into force on January 27, 1980, art. 53, and the Vienna Convention on the Law of Treaties between States and International Organizations or between International Organizations (VCLTIO), signed at Vienna on March 21, 1986, not yet entered into force, art. 53

Under Article 53 of the Vienna Convention on the Law of Treaties, any treaty that conflicts with a peremptory norm is void.

53 From the Vienna Convention on the Law of Treaties, signed at Vienna on May 23, 1969, entered into force on January 27, 1980, arts. 26, 62 and the Vienna Convention on the Law of Treaties between States and International Organizations or between International Organizations, signed at Vienna on March 21, 1986, not yet entered into force, arts. 26, 62.

54 Founded in 1968 at Accademia dei Lincei in Rome, Italy by Aurelio Peccei, an Italian industrialist, and Alexander King, a Scottish scientist. It was formed when a small international group of people from the fields of academia, civil society, diplomacy, and industry met at Villa Farnesina in Rome, hence the name. They managed to organize a conference on the future issues of humanity in the Accademia dei Lincei in Rome, which, however, did not lead to the desired success. At the end of the conference six of the participants met: Aurelio Peccei, Alexander King, Hugo Thiemann, Max Kohnstamm, Jean Saint-Geours and Erich Jantsch. The group decided to pursue such ideas giving birth to the “Club of Rome”. The Club of Rome consists of current and former heads of state, UN bureaucrats, high-level politicians and government officials, diplomats, scientists, economists, and business leaders from around the globe. It stimulated considerable public attention in 1972 with the first report to the Club of Rome, *The Limits to Growth*. Since 1 July 2008 the organization has been based in Winterthur, Switzerland.

55 The German association for the Club of Rome (Deutsche Gesellschaft Club of Rome) is inspired by the spirit of the Club of Rome, but acts independently. It was founded in 1976 as Institute for International Politics and Economics, also called Haus Rissen by Eduard Pestel, a member of the Club of Rome. It is a non-profit, independent and non-partisan training institute based in Hamburg.

to address ecosystems collapse and climate change and must seize the opportunities which the transformation to a more sustainable and low carbon society presents”.

Ernst von Weizsäcker (Co-President of the Club of Rome on the occasion of the 50th anniversary of the Club of Rome).



By means of a digital currency such as the possible Vatican Digital Currency it would be possible the creation of a new economic system based on a monetary parity able to avoid foreign exchange rate fluctuation, recession, inflation and speculation. Even the weakest currencies would enjoy a stable monetary policy regime. A political stability would be granted allowing in such way the Club of Rome and the German association for the Club of Rome (Deutsche Gesellschaft Club of Rome) to promote the Blue Economy, the Solar Foods Ltd. manufactures Solein, single cell protein (a meat substitute) and exhort every nation to create sustainable cities (highly technological circular cities provided with a cybernated system, educational facilities, computerized communications, networking systems, health and child care facilities at the core) entirely powered by renewable clean sources of energy such as wind generators, solar, heat concentrating systems, geothermal, photovoltaic and others, on the basis of “The Venus Project”⁵⁶, of Jacque Fresco, who in July 2016 received a Novus Summit award for City Design/Community.

THE VENUS PROJECT BEYOND POLITICS, POVERTY AND WAR

⁵⁶ The Venus Project proposes an alternative vision of what the future can be if we apply what we already know in order to achieve a sustainable new world civilization. The Venus Project is a 501(c)(3) not-for-profit organization. See www.thevenusproject.com

STEM CELL CONTROVERSY

Political leaders are debating how to regulate and fund research studies that involve the techniques used to remove the embryo cells. No clear consensus has emerged. Other recent discoveries may extinguish the need for embryonic stem cells but before deepening the topic concerning the stem cell controversy, I would like to mention the words of Pope Francis so as expressed in the Encyclical Letter *Laudato si'*:

“There is a tendency to justify transgressing all boundaries when experimentation is carried out on living human embryos. We forget that the inalienable worth of a human being transcends his or her degree of development. In the same way, when technology disregards the great ethical principles, it ends up considering any practice whatsoever as licit.”

(Pope Francis Encyclical Letter Laudato si') © Libreria Editrice Vaticana

Much of the criticism against the use of human embryonic stem cells has been a result of religious beliefs, and in the most high-profile case, US President George W. Bush signed an executive order banning in 2001 the use of federal funding for any cell lines other than those already in existence, stating at the time, “My position on these issues is shaped by deeply held beliefs,” and “I also believe human life is a sacred gift from our Creator”.⁵⁷

This ban was in part revoked by his successor Barack Obama, who stated “As a person of faith, I believe we are called to care for each other and work to ease human suffering. I believe we have been given the ca-

⁵⁷ Park, Alice, "George W. Bush and the Stem Cell Research Funding Ban", Aug. 20, 2012, healthland.time.

capacity and will to pursue this research and the humanity and conscience to do so responsibly”.⁵⁸ US President Barack Obama also issued a memo promising to restore “scientific integrity to government decision-making”.

That policy change was aimed more broadly than the stem cell debate, to reach into areas such as climate change as well.

The Catholic Church opposes human embryonic stem cell research calling it “an absolutely unacceptable act”. The Church supports research that involves stem cells from adult tissues and the umbilical cord, as it “involves no harm to human beings at any state of development”.

Given the importance of the controversy, I think it is necessary to clarify the differences between embryonic stem cells (ES cells or ESCs), amniotic stem cells, adult stem cells and induced pluripotent stem cells (iPSCs) in order to identify the negative effects of a stem cell therapy and those aspects that make embryonic stem cells, according to the Church, so controversial and their use ethically amoral.

Embryonic stem cells are pluripotent stem cells derived from the inner cell mass of a blastocyst, an early-stage pre-implantation embryo. Human embryos reach the blastocyst stage 4–5 days post fertilization, at which time they consist of 50–150 cells. Isolating the embryoblast, or inner cell mass (ICM) results in destruction of the blastocyst, a process which raises ethical issues, including whether or not embryos at the pre-implantation stage should have the same moral considerations as embryos in the post-implantation stage of development.

Most embryonic stem cells are derived from embryos that develop from eggs that have been fertilized *in vitro*—in an *in vitro* fertilization clinic—and then donated for research purposes with informed consent of the donors. They are not derived from eggs fertilized in a “woman’s body”.

Not all stem cell research involves the human embryos. For example, adult stem cells, amniotic stem cells, and induced pluripotent stem cells (iPSCs) do not involve creating, using, or destroying human embryos, and thus are minimally, if at all, controversial.

Stem cells are not only distinct from embryos on a molecular level, stem cells (regardless of how they are produced) cannot be embryos, because they lack required elements of totipotency that are normally provided

⁵⁸ March 9, 2009, *“Obama Ends Stem Cell Research Ban”*, CBS News.

to the embryo by the egg⁵⁹, the maternal factors (proteins, protein complexes, RNA, and microRNA). The strict definition of totipotency is the ability to both produce all cell types and to organize them into a coherent body plan, a human organism, that is, a zygote a human being. During human development, only the zygote and early cleavage-stage blastomeres (possibly up to the 4-cell stage) remain totipotent.

Embryonic stem cells are not totipotent, they are pluripotent (term introduced by Maureen L. Condic) and have the potential to grow indefinitely in a laboratory environment, they can differentiate into almost all types of bodily tissue including cells of the placenta. Totipotency is not merely a state of the cell's nucleus; it also requires a very specific type of cellular cytoplasm that is a critical component of totipotency, the only known totipotent cytoplasm is produced by an oocyte and contributed to the embryo at fertilization⁶⁰. The requirement for totipotent cytoplasm in order for a cell to actually be a zygote is precisely the reason that totipotency persists for such a short time in development.

Having the potential to grow indefinitely in a laboratory environment and differentiating into almost all types of bodily tissue make embryonic stem cells a prospect for cellular therapies to treat a wide range of diseases. On the contrary adult stem cells are generally limited to differentiating into different cell types of their tissue of origin.

However, some evidence suggests that adult stem cell plasticity may exist, increasing the number of cell types a given adult stem cell can become. Induced pluripotent stem cells (also known as iPSC cells or iPSCs) are a type of pluripotent stem cell that can be generated directly from adult cells. The iPSC technology was pioneered by Shinya Yamanaka's lab in Kyoto, Japan, who showed in 2006 that the introduction of four specific genes encoding transcription factors could convert adult cells into pluripotent stem cells. He was awarded the 2012 Nobel Prize along with Sir

59 Cf. "*Confusions About Totipotency: Stem Cells Are Not Embryos*" by Maureen L. Condic, within *Science, Public Discourse*, The Witherspoon Institute, March 6th, 2014, and in *Stem Cells and Development* - Volume 23, Number 8, 2014 Mary Ann Liebert, Inc. DOI: 10.1089/scd.2013.0364 - Maureen L. Condic, *Totipotency: What It Is and What It Is Not*.

60 The fact that oocytes produce the cytoplasmic factors that are required for an embryo to be totipotent is the reason oocytes are used for cloning, cf. Maureen L. Condic, *Totipotency: What It Is and What It Is Not*.

John Gurdon “for the discovery that mature cells can be reprogrammed to become pluripotent”. Since iPSCs can be derived directly from adult tissues, they not only bypass the need for embryos, but can be made in a patient-matched manner, which means that each individual could have their own pluripotent stem cell line. These unlimited supplies of autologous cells could be used to generate transplants without the risk of immune rejection. While the iPSC technology has not yet advanced to a stage where therapeutic transplants have been deemed safe, iPSCs are readily being used in personalized drug discovery efforts and understanding the patient-specific basis of disease.

iPSCs are typically derived by introducing products of specific sets of pluripotency-associated genes, or “reprogramming factors”, into a given cell type. Reprogramming of human cells to iPSCs was reported in November 2006 by two independent research groups: Shinya Yamanaka of Kyoto University, Japan, who pioneered the original iPSC method, and James Alexander Thomson of University of Wisconsin-Madison who was the first to derive human embryonic stem cells in 1998⁶¹. With the same principle used in mouse reprogramming, Yamanaka’s group successfully transformed human fibroblasts into iPSCs with the same four pivotal genes, Oct4, Sox2, Klf4, and cMyc, using a retroviral system, while Thomson and colleagues used a different set of factors, Oct4, Sox2, Nanog, and Lin28, using a lentiviral system.

iPSC derivation is typically a slow and inefficient process, taking 1–2 weeks for mouse cells and 3–4 weeks for human cells, with efficiencies around 0.01–0.1%. However, considerable advances have been made in improving the efficiency and the time it takes to obtain iPSCs.

Induced pluripotent stem cells (iPSCs) can be generated via the expression of OCT4, NANOG, Sox2 and Lin28⁶², using lentiviral and retroviral methods. Generating iPSCs using these methods can cause multiple chro-

61 Cf. James A. Thomson, Joseph Itskovitz-Eldor, Sander S. Shapiro, Michelle A. Waknitz, Jennifer J. Swiergiel, Vivienne S. “*Embryonic Stem Cell Lines Derived from Human Blastocysts*”, vol. 282, Issue 5391, pp. 1145-1147, Science, November 6, 1998.

62 Cf. Yu J, Vodyanik MA, Smuga-Otto K, Antosiewicz-Bourget J, Frane JL, Tian S, et al. *Induced Pluripotent Stem Cell Lines Derived from Human Somatic Cells*. Science (New York, NY). 2007;318(5858):1917–20 and Takahashi K, Yamanaka S. *Induction of pluripotent stem cells from mouse embryonic and adult fibroblast cultures by defined factors*. Cell. 2006; 126(4):663–76. Epub 2006/08/15. pmid:16904174.

mosomal integrations and possible genetic dysfunction⁶³, creating additional obstacles for clinical therapy.

Therefore, it is important to establish novel approaches for generating iPSCs free from such limitations. Delivering factors as proteins eliminates the risks associated with retroviral integration by taking advantage of a DNA vector-free protein transduction system⁶⁴. In April 2009, it was demonstrated that generation of iPS cells is possible without any genetic alteration of the adult cell: a repeated treatment of the cells with certain proteins channeled into the cells via poly-arginine anchors was sufficient to induce pluripotency. The acronym given for those iPSCs is piPSCs (protein-induced pluripotent stem cells).

In 2007, it was confirmed that the amniotic fluid contains a heterogeneous mixture of multipotent cells after it was demonstrated that they were able to differentiate into cells from all three germ layers but they could not form teratomas following implantation into immunodeficient mice. This characteristic differentiates them from embryonic stem cells but indicates similarities with adult stem cells. However, foetal stem cells attained from the amniotic fluid are more stable and more plastic than their adult counterparts making it easier for them to be reprogrammed to a pluripotent state. A variety of techniques has been developed for the isolation and culturing of amniotic stem cells. One of the more common isolation methods involves the removal of amniotic fluid by amniocentesis. The use of amniotic fluid stem cells is therefore generally considered to lack the ethical problems associated with the use of cells from embryos.

In order to understand the therapeutic value of a stem cell therapy it is advisable to list a series of advantages offered by the ESCs compared to the use of adult stem cells:

- Embryonic stem cells make up a significant proportion of a developing embryo, while adult stem cells exist as minor populations within

63 Cf. Okita K, Ichisaka T, Yamanaka S. *Generation of germline-competent induced pluripotent stem cells*. Nature. 2007;448(7151):313–7. Epub 2007/06/08. pmid:17554338 and Kim D, Kim CH, Moon JI, Chung YG, Chang MY, Han BS, et al. *Generation of human induced pluripotent stem cells by direct delivery of reprogramming proteins*. Cell stem cell. 2009;4(6):472–6. Epub 2009/06/02. pmid:19481515; PubMed Central PMCID: PMC2705327.

64 Cf. Rhee YH, Ko JY, Chang MY, Yi SH, Kim D, Kim CH, et al. *Protein-based human iPS cells efficiently generate functional dopamine neurons and can treat a rat model of Parkinson disease*. The Journal of clinical investigation. 2011;121(6):2326–35. Epub 2011/05/18. pmid:21576821; PubMed Central PMCID: PMC3104759.

a mature individual (e.g., in every 1,000 cells of the bone marrow, only one will be a usable stem cell). Thus, embryonic stem cells are likely to be easier to isolate and grow *ex vivo* than adult stem cells.

- Embryonic stem cells divide more rapidly than adult stem cells, potentially making it easier to generate large numbers of cells for therapeutic means. In contrast, adult stem cell might not divide fast enough to offer immediate treatment.
- Embryonic stem cells have greater plasticity, potentially allowing them to treat a wider range of diseases.
- Adult stem cells from the patient's own body might not be effective in treatment of genetic disorders. Allogeneic embryonic stem cell transplantation (i.e. from a healthy donor) may be more practical in these cases than gene therapy of a patient's own cell.
- DNA abnormalities found in adult stem cells that are caused by toxins and sunlight may make them poorly suited for treatment.
- Embryonic stem cells have been shown to be effective in treating heart damage in mice.
- Embryonic stem cells have the potential to cure chronic and degenerative diseases which current medicine has been unable to effectively treat.
- Adult stem cell therapies require a stem cell source of the specific lineage needed and harvesting and or culturing them up to the numbers required is a challenge.
- Adult stem cell treatments have been used for many years to treat successfully leukemia and related bone/blood cancers through bone marrow transplants.

Pro-life supporters, as well as researchers specializing in adult stem cell research, often claim that the use of adult stem cells from sources such as the umbilical cord blood has consistently produced more promising results than the use of embryonic stem cells⁶⁵. They state that adult stem cell research may be able to make greater advances if less money and resources were channeled into embryonic stem cell research. Stem cell research is highly frowned upon in many ethnic and religious groups.

Adult stem cells have provided many different therapies for illnesses such as Parkinson's disease, leukemia, multiple sclerosis, lupus, sickle-cell

⁶⁵ Cf. Prentice, David, "*Live Patients & Dead Mice*". Christianity Today. September 30, 2005.

anemia, and heart damage (to date, embryonic stem cells have also been used in treatment). Many funding and research restrictions on embryonic cell research will not impact research on iPSCs (induced pluripotent stem cells) allowing for a promising portion of the field of research to continue relatively unhindered by the ethical issues of embryonic research.

If human cells are manipulated so that they participate in the development of an existing embryo (e.g., by tetraploid complementation) or are used to generate a human embryo de novo (e.g. by fertilization or cloning), then the embryo merits substantial ethical consideration due to the fact that it is a human organism, that is, a human being. Nevertheless it is equally correct to specify that embryos are not equivalent to human life while they are still incapable of surviving outside the womb (i.e. they only have the potential for life).

According to Rabbi Levi Yitzchak Halperin of the Institute for Science and Jewish Law in Jerusalem, embryonic stem cell research is permitted so long as it has not been implanted in the womb. Not only is it permitted, but research is encouraged, rather than wasting it.

“As long as it has not been implanted in the womb and it is still a frozen fertilized egg, it does not have the status of an embryo at all and there is no prohibition to destroy it...”

The religion of Islam favors the stance that scientific research and development in terms of stem cell research is allowed as long as it benefits society while using the least amount of harm to the subjects.

“Stem cell research is one of the most controversial topics of our time period and has raised many religious and ethical questions regarding the research being done. With there being no true guidelines set forth in the Qur’an against the study of biomedical testing, Muslims have adopted any new studies as long as the studies do not contradict another teaching in the Qur’an. One of the teachings of the Qur’an states that “Whosoever saves the life of one, it shall be if he saves the life of humankind” (5:32), it is this teaching that makes stem cell research acceptable in the Muslim faith because of its promise of potential medical breakthrough”.

“Whether embryonic stem cell research or cloning is ethically acceptable in Islam depends on the benefits derived from such applications. What is most important for the

scholars is to adhere to the concepts of compassion, mercy, and benefit to everyone".⁶⁶

While maintaining controversial positions once again the three main Abrahamic religions, I believe, can converge in the thought expressed by Pope Francis in the Encyclical Letter *Laudato si'*:

"I am well aware that in the areas of politics and philosophy there are those who firmly reject the idea of a Creator, or consider it irrelevant, and consequently dismiss as irrational the rich contribution which religions can make towards an integral ecology and the full development of humanity. Others view religions simply as a subculture to be tolerated. Nonetheless, science and religion, with their distinctive approaches to understanding reality, can enter into an intense dialogue fruitful for both".

(Pope Francis, Encyclical Letter *Laudato si'*) © Libreria Editrice Vaticana.

⁶⁶ Agha, Fatima; Hayani, Al (2008). "Muslim perspectives on stem cell research and cloning". *Zygon*. 4 (43): 783–795.

V

INTELLIGENT DESIGN

After having traced the origins of the concept of light and having understood how it gained theological over the millennia its sacredness it's time to extrapolate this concept from the religious context and investigate scientifically its real value. As already said in the preface this book was written in order to lay the foundation of all principles of a new era and of a new vision of a changing world. But in order to avoid all the controversies arised from the past, most often, as we have seen, based on misconceptions, I believe we should try to change our course by not conceiving a "Divine Design" but rather an "Intelligent Design" based on the "Concept of Light" undertood as wave-particle duality deeply embedded into the foundations of quantum mechanics.

Historically, the ray-based model of light was developed first, followed by the wave model of light. Progress in electromagnetic theory in the 19th century led to the discovery that light waves were in fact electromagnetic radiation⁶⁷. Some phenomena depend on the fact that light has both wave-like and particle-like properties. Explanation of these effects requires quantum mechanics. When considering light's particle-like properties, the light is modelled as a collection of particles called "photons". Quantum optics studies the nature and effects of light as quantized photons.

⁶⁷ English physician William Gilbert initiated the careful study of magnetic phenomena in the late 16th century but scientific understanding into the nature of electricity and magnetism grew throughout the eighteenth and nineteenth centuries through the work of researchers such as Hans Christian Ørsted, André-Marie Ampère, Benjamin Franklin, Charles-Augustin de Coulomb, Siméon-Denis Poisson, Pierre-Simon, marquis de Laplace, Johann Friedrich Carl Gauss, Michael Faraday, James Clerk Maxwell and Heinrich Rudolf Hertz.

With the invention of the laser⁶⁸ in 1960 began a new field of applications, the photonics. Photonics is closely related to optics, the branch of physics that studies the behaviour and properties of light, including its interactions with matter and the construction of instruments that use or detect it. Classical optics long preceded the discovery that light is quantized, when Albert Einstein famously explained the photoelectric effect in 1905 see *supra* p. 19.

Optics began with the development of lenses by the ancient Egyptians and Mesopotamians⁶⁹, followed by the development of theories of light and vision by ancient Greek and Indian philosophers, and the development of geometrical optics in the Greco-Roman world see *supra* p. 13, chapter II, Light as “concept of mere vision”.

Based on the science of light, optics and photonics are specialized fields of physics and engineering, they are advancing today’s critical technologies that will continue to grow and enhance people’s lives. Optics and photonics are utilized in numerous medical devices that help to save lives. Imaging equipment used for Computer-Assisted Tomography or Computed Axial Tomography (CAT), Magnetic Resonance Imaging (MRI) and Positron-Emission Tomography (PET), as well as mammography, aid in the diagnosis of disease and cancer research. Fiber optics connect the world through high-speed communications, from computer screens to cell phones and all the devices, optics and photonics are at base of such technologies and further research is expected to yield even more applications designed to enhance quality of life. Photonics research at the Vrije Universiteit Brussel focuses on micro-lasers, graphene as a nonlinear optical material, optical devices for medical applications, optical fibre sensors for measuring temperature, pressure, and strain, and free-form optics – a lens technology that abandons the traditional spherical shape to avoid optical aberrations. As Hugo Thienpont, director of photonics research at Vrije Universiteit Brussel states:

“Think about the exoplanets, everything that happens with the elementary particles, all

68 A laser is a device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation. The term “laser” originated as an acronym for “light amplification by stimulated emission of radiation”. The first laser was built in 1960 by Theodore H. Maiman at Hughes Research Laboratories, based on theoretical work by Charles Hard Townes and Arthur Leonard Schawlow.

69 The earliest known lenses, made from polished crystal, often quartz, date from as early as 700 BC for Assyrian lenses such as the Layard/Nimrud lens.

*the fantastic things that optics and photonics can do in the medical world, all the breakthroughs that are bettering cancer research – it's just so disruptive, so positively engaging,”*⁷⁰

Following the words of Hugo Thienpont we can fully understand the meaning of an Intelligent Design able to elevate us to a higher cultural level and naturally to discover new worlds.

The Church admits the Big Bang theory justifying such phenomenon as “Divine Design” placing the light on the basis of her belief: *Wayy’omer ‘elohîm: Yehî ‘ôr. Wayyehî ‘ôr*, «And God said: “Let there be light!” and there was light!» (Genesis 1,3). But even if the concept of light dates back to more than three thousand years ago we all know that our planet is far older than 3000 years. In order to introduce the concept of Intelligent Design let’s try to understand the prevailing model for the evolution of the Universe, the Big Bang theory.

The universe began as a very hot, small, and dense superforce (the mix of the four fundamental forces)⁷¹, with no stars, atoms, form, or structure (called a “singularity”)⁷². Then about 13.8 billion years ago, space expanded very quickly (thus the name “Big Bang”). The Big Bang model states that the earliest state of the Universe was an extremely hot and dense one, and that the Universe subsequently expanded and cooled.

The initial hot, dense state is called the Planck epoch, a brief period extending from time zero to one Planck time unit of approximately 10^{-43} seconds. During the Planck epoch, all types of matter and all types of energy were concentrated into a dense state, and gravity - currently the weakest by far of the four known forces - is believed to have been as strong as the other fundamental forces, and all the forces may have been unified. Since the Planck epoch, space has been expanding to its present scale, with a very short but

⁷⁰ Anna Demming, *Collaborative vision takes photonics into the future*, 8th Dec 2018, Physics World.

⁷¹ There are four fundamental forces in the universe, sometimes called “interactions”. These forces are gravity, electromagnetism, the weak interaction (the weak force or weak nuclear force), and the strong interaction, strong nuclear force (also called the strong force, nuclear strong force, or colour force). They are called ‘fundamental’ because they cannot be reduced to anything simpler. Gravity and to some extent electromagnetism are experienced by people in their everyday life. A complete description of the forces requires advanced physics.

⁷² A gravitational singularity (sometimes called a spacetime singularity) is a term used to describe the center of a black hole where gravity is thought to approach infinity.

intense period of cosmic inflation believed to have occurred within the first 10^{-32} seconds. This was a kind of expansion different from those we can see around us today. Objects in space did not physically move; instead the metric that defines space itself changed.

Although objects in spacetime cannot move faster than the speed of light⁷³, this limitation does not apply to the metric governing spacetime itself. This initial period of inflation is believed to explain why space appears to be very flat, and much larger than light could travel since the start of the universe.

Within the first fraction of a second of the universe's existence, the four fundamental forces had separated. As the universe continued to cool down from its inconceivably hot state, various types of subatomic particles were able to form in short periods of time known as the quark epoch, the hadron epoch, and the lepton epoch. Together, these epochs encompassed less than 10 seconds of time following the Big Bang. These elementary particles associated stably into ever larger combinations, including stable protons and neutrons, which then formed more complex atomic nuclei through nuclear fusion. This process, known as Big Bang nucleosynthesis, only lasted for about 17 minutes and ended about 20 minutes after the Big Bang, so only the fastest and simplest reactions occurred. About 25% of the protons and all the neutrons in the universe, by mass, were converted to helium, with small amounts of deuterium (a form of hydrogen) and traces of lithium. Any other element was only formed in very tiny quantities. The other 75% of the protons remained unaffected, as hydrogen nuclei.

After nucleosynthesis ended, the universe entered a period known as the photon epoch. During this period, the Universe was still far too hot for matter to form neutral atoms, so it contained a hot, dense, foggy plasma of negatively charged electrons, neutral neutrinos and positive nuclei. After about 377,000 years, the universe had cooled enough that electrons and nuclei could form the first stable atoms. This is known as recombination for historical reasons; in fact electrons and nuclei were combining for the first time. Unlike plasma, neutral atoms are transparent to many wavelengths of light, so for the first time the universe also became transparent. The photons released (“decoupled”) when these atoms formed can still be seen today; they form

⁷³ The speed of light in vacuum, commonly denoted **c**, is a universal physical constant important in many areas of physics. Its exact value is 299,792,458 metres per second (approximately 300,000 km/s (186,000 mi/s)).

the cosmic microwave background (CMB)⁷⁴.

As the Universe expands, the energy density of electromagnetic radiation decreases more quickly than does that of matter because the energy of a photon decreases with its wavelength. At around 47,000 years, the energy density of matter became larger than that of photons and neutrinos, and began to dominate the large scale behavior of the universe. This marked the end of the radiation-dominated era and the start of the matter-dominated era.

In the earliest stages of the universe, tiny fluctuations within the universe's density led to concentrations of dark matter gradually forming. Ordinary matter, attracted to these by gravity, formed large gas clouds and eventually, stars and galaxies, where the dark matter was most dense, and voids where it was least dense. After around 100-300 million years, the first stars formed, known as Population III stars. These were probably very massive, luminous, non metallic and short-lived. They were responsible for the gradual reionization of the Universe between about 200-500 million years and 1 billion years, and also for seeding the universe with elements heavier than helium, through stellar nucleosynthesis.

The Universe also contains a mysterious energy - possibly a scalar field - called dark energy, the density of which does not change over time. After about 9.8 billion years, the Universe had expanded sufficiently so that the density of matter was less than the density of dark energy, marking the beginning of the present dark-energy-dominated era. In this era, the expansion of the Universe is accelerating due to dark energy.

The Universe appears to have much more matter than antimatter, an asymmetry possibly related to the CP violation⁷⁵. This imbalance betwe-

⁷⁴ The cosmic microwave background (CMB, CMBR) is electromagnetic radiation as a remnant from an early stage of the universe in Big Bang cosmology. In older literature, the CMB is also variously known as cosmic microwave background radiation (CMBR) or "relic radiation". The CMB is a faint cosmic background radiation filling all space that is an important source of data on the early universe because it is the oldest electromagnetic radiation in the universe, dating to the epoch of recombination.

⁷⁵ In particle physics, CP violation is a violation of CP-symmetry (or charge conjugation parity symmetry): the combination of C-symmetry (charge conjugation symmetry) and P-symmetry (parity symmetry). CP-symmetry states that the laws of physics should be the same if a particle is interchanged with its antiparticle (C symmetry) while its spatial coordinates are inverted ("mirror" or P symmetry). The discovery of CP violation in 1964 in the decays of neutral kaons resulted in the Nobel Prize in Physics in 1980 for its

en matter and antimatter is partially responsible for the existence of all matter existing today, since matter and antimatter, if equally produced at the Big Bang (about 13.8 billion years ago), would have completely annihilated each other and left only “photons” as a result of their interaction, an event that from a mere theological point of view can be summarized as follows: “*Wayy’omer ‘elohim: Yehi ‘or. Wayyehi ‘or*, «And God said: “Let there be light!” and there was light!» (Genesis 1,3)“ see *supra* p. 56.

As Intelligent Design should be understood all the principles of physics and chemistry, which interacting dynamically (fundamental interactions, also known as fundamental forces)⁷⁶ formed the Universe, our planet and the human being as a result of the Big Bang event. On the base of such principles, if deepened and investigated we can reach all the goals that until now are just confined to the world of imagination.

I refer in particular to the next generation of aerospace propulsions and advanced propulsion systems such as electromagnetic propulsion, light propulsion, nuclear-fusion propulsion, antimatter propulsion and magneto-inertial fusion (MIF), which combines aspects of “magnetic confinement fusion“ and “inertial confinement fusion“ in an attempt to lower the cost of fusion devices. The same concept of Intelligent Design can be applied to a „conceptual“ interplanetary spaceship design making possible for Human Beings to reach in their lifetime new exoplanets and enjoy the greatness of our Universe.

As former MP of Asgardia - the Space Kingdom⁷⁷, whose politics un-

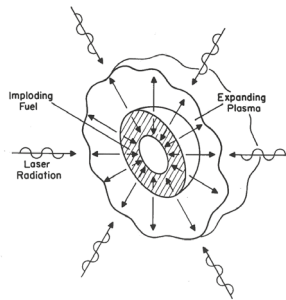
discoverers James Cronin and Val Fitch. It plays an important role both in the attempts of cosmology to explain the dominance of matter over antimatter in the present Universe, and in the study of weak interactions in particle physics.

⁷⁶ In physics, the fundamental interactions, also known as fundamental forces, are the interactions that do not appear to be reducible to more basic interactions. There are four fundamental interactions known to exist: the gravitational and electromagnetic interactions, which produce significant long-range forces whose effects can be seen directly in everyday life, and the strong and weak interactions, which produce forces at minuscule, subatomic distances and govern nuclear interactions. Some scientists speculate that a fifth force might exist, but this is neither widely accepted nor proven.

⁷⁷ Asgardia (International Non-Governmental Research Organisation on Space - Asgardia), whose legal headquarters are located in Vienna, Austria, was created with three top goals in mind: to ensure the peaceful use of space, to protect the Earth from space hazards, and to create a demilitarized and free scientific base of knowledge in space. Asgardia also has a long-term objective of setting up habitable platforms in space and building settlements on the Moon.

fortunately fails because of a speculative tax “citizenship fee“, I would like to demonstrate in this chapter how such a concept of Intelligent Design could be applied to the creation of a new spacecraft propulsion system based on the principle of Inertial Confinement Fusion, translating in such way all the principles of the Intelligent Design into reality.

In order to simplify and make the concept of Intelligent Design accessible to everyone I think it proper to highlight the fundamental elements placed on the basis of such a conceptual design i.e. the high-power pulses of laser light for nuclear fusion by inertial confinement fusion (ICF) and the Ultradense Deuterium as fuel target (an isothermal transition of Rydberg matter⁷⁸ into a high density phase by quantum mechanical exchange forces)⁷⁹. So as the Big Bang model states that the earliest state of the Universe was an extremely hot and dense one at the same way can act the ultradense deuterium, typically in the form of deuterium gas, by means of the Inertial Confinement Fusion (ICF) at the stagnation point or “bang time”, when the implosion reaches maximum density.



This process powers the Sun and has led to all life on earth. Ultradense deuterium is some 100,000 times denser than water and thought to be denser than sun’s core, imagine a material so heavy that a cube with sides of length

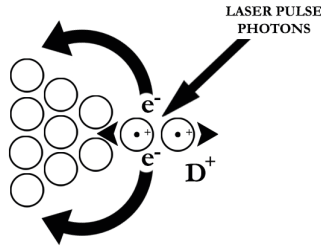
78 Rydberg atoms are not a new development – they’ve been known about since the late 1800s. What has really spurred the development of Rydberg physics has been the advent of laser trapping and cooling, for which Steven Chu, Claude Cohen-Tannoudji and William Phillips shared the Nobel Prize for Physics in 1997.

79 A theoretical description of ultra-dense deuterium D(-1) has been published by Friedwardt Winterberg, *Journal of Fusion Energy* - August 2010, Volume 29, Issue 4, pp 317–321. “It is conjectured that the transition is made possible by the formation of vortices in a Cooper pair electron fluid, separating the electrons from the deuterons, with the deuterons undergoing Bose-Einstein condensation in the core of the vortices”.

10 cm weights 130 tonnes. It is believed that ultra-dense deuterium plays a role in the formation of stars, and that it is probably present in giant planets such as Jupiter. Thanks to the work of Leif Holmlid, a professor of Atmospheric Science, Department of Chemistry and Molecular Biology, at the University of Gothenburg, we know that the distance between the atoms of the ultradense deuterium is rather close overcoming the repulsion and the Coulomb barrier or fusion barrier energy, making quite possible to easily start fusion in this material. According to Leif Holmlid the high excess kinetic energy of several hundred eV given to the deuterons by laser induced Coulomb explosions in the material increases the probability of spontaneous fusion without the need for a high plasma temperature. The temperature calculated from the normal kinetic energy of the deuterons of 630 eV from the Coulomb explosions is 7 MK, maybe a factor of 10 lower than required for ignition. The technique involves putting deuterium in a high-pressure chamber so the ultradense material forms on the surface ignited by a pulsed ultrafast laser (YAG) or particle beam of modest energy. The key is timing the pulses of the laser with the production of deuterium, it is expected that around 1 J pulse energy will be sufficient for reaching break-even⁸⁰ of D+D fusion in D(-1) ultradense deuterium⁸¹.

⁸⁰ Breakeven is an important goal in the fusion energy field, but ignition is required for a practical energy producing design. The key difference is that breakeven ignores losses to the surroundings, which do not contribute to heating the fuel, and thus are not able to make the reaction self-sustaining (Lawson criterion). To date, no man-made reactor has reached breakeven, let alone ignition.

⁸¹ The name is changed recently to D(0) instead of D(-1), since the material is not inverted (this assumption motivated the negative sign). Instead, it is a spin-based Rydberg matter with angular momentum $l = 0$ for the electrons. Due to the measured very short D-D distances of 2.3 pm, the density of D(0) is very high, in fact higher than the density of hydrogen fuel for fusion believed possible by any compression method. According to Leif Holmlid it should be possible to initiate nuclear fusion by relatively weak laser pulses in the D(0) material. It is likely that the main process initiated by the laser pulse is a transition from level $s = 2$ with D-D distance of 2.3 pm, to level $s = 1$ with theoretical distance 0.56 pm from where fusion or other nuclear reactions are spontaneous. Cf. Holmlid L., Excitation levels in ultra-dense hydrogen p(-1) and d(-1) clusters: structure of spin-based Rydberg Matter. *Int. J. Mass Spectrom* 2013;352:1-8. Cf. Badiei S, Andersson PU, Holmlid L., Laser-driven nuclear fusion D+D in ultra-dense deuterium: MeV particles formed without ignition. *Laser Part Beams* 2010;28:313-7. Cf. Holmlid L., Laser-induced fusion in ultra-dense deuterium D(-1): optimizing MeV particle ejection by carrier material selection. *Nucl Instr Meth B* 2013;296:66-71. Cf. Holmlid L., Ultra-dense hydrogen H(-1) as the cause of instabilities in laser compression-based nuclear fusion. *J. Fusion Energy*



Coulomb repulsion of deuterons in the cluster after removal of electrons by laser produced pulses.

This new fusion process can take place in relatively small laser-fired fusion reactors fuelled by heavy hydrogen (deuterium). It has already been shown to produce more energy than that needed to start it. Heavy hydrogen is found in large quantities in ordinary water and is easy to extract. The dangerous handling of radioactive heavy hydrogen (tritium) which would most likely be needed for operating large-scale fusion reactors with a magnetic enclosure in the future is therefore unnecessary. According to Leif Holmlid “we can design the deuterium fusion such that it produces only helium and hydrogen as its products, both of which are completely non-hazardous”.

Research shows that far smaller and simpler fusion reactors can be built. Holmlid’s fusion reactor and detector can be easily and relatively inexpensively built of off-the-shelf’ high vacuum parts. They could be built small enough to power neighborhoods or even single homes with clean energy or, as I believe, be used for advanced space propulsion.

I emphasize, however, that the degree to which an ICF-powered vehicle can outperform a vehicle using any other realistic technology depends on the degree to which terrestrial-based ICF research can develop the necessary energy gain from ICF targets.

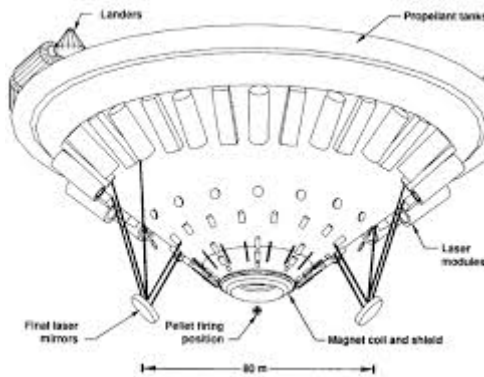
In the past the laser technology was long tested on frozen deuterium, known as “deuterium ice”, but results was poor. Such experiments compressed a hydrogen fuel pellet to high pressure and temperature for example with

2014;33:348-50. Cf. Holmlid L., Experimental studies and observations of clusters of Rydberg matter and its extreme forms. *J. Clust Sci* 2012;23:5-34. Cf. Andersson PU, Lönn B, Holmlid L., Efficient source for the production of ultra-dense deuterium $D(-1)$ for laser-induced fusion (ICF). *Rev Sci Instrum* 2011;82:013503.

the “world’s most powerful laser” at the National Ignition Facility (NIF)⁸² (September 2010 and 2012), but it was proved to be very difficult to compress the deuterium ice sufficiently for it to attain the high temperature required to ignite the fusion. After missing a goal for achieving a high-energy-yield fusion reaction by 2012 a 2016 report prepared by DOE’s National Nuclear Security Administration (NNSA) states: “The question is if the NIF will be able to reach ignition in its current configuration and not when it will occur”.

Use of laser-driven Inertial Confinement Fusion (ICF) for space propulsion has been examined in several earlier conceptual design studies. However, these designs used older ICF target technology.

In the 1980s, Lawrence Livermore National Laboratory and NASA studied an ICF-powered “Vehicle for Interplanetary Transport Applications” (VISTA).



*VISTA – A Vehicle for Interplanetary
Space Transport Application Powered by
Inertial Confinement Fusion
UCRL-TR110500, 2003*

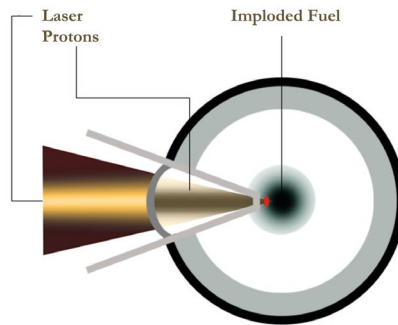
*C. D. Orth
May 16, 2003*

A new ICF target technology should be based on two different methods

⁸² The National Ignition Facility (NIF), is a large laser-based inertial confinement fusion (ICF) research device, located at the Lawrence Livermore National Laboratory in Livermore, California.

the Low-energy Nuclear Reaction (LENR) or the so called cold fusion (laser cooling) for the production of ultra-dense deuterium D(-1) i.e. separating the electrons from the deuterons, with the deuterons undergoing Bose-Einstein condensation and a subsequent laser-induced fusion (ICF) to reach the point at which the nuclear fusion reaction becomes self-sustaining, the Ignition, required for a practical energy producing design.

Deuterium forms a condensed state (ultra-dense deuterium or inverted Rydberg matter) in certain types of material defects, clusters of condensed deuterium of densities up to 10^{29} cm^{-3} in pores in solid oxide crystals were confirmed from time-of-flight mass spectrometry measurements⁸³, new techniques for preparation of targets for application in experiments of the National Ignition Facility (NIF) type are needed, but also for modified fast igniter experiments using proton or electron beams or side-on ignition of low compressed solid fusion fuel, and eventually enabling the dream of a near-term commercialization of ICF energy sources and new ICF propulsion systems.



Representation of the Proton-driven fast ignition concept, protons created by the laser converter foil interaction continue in the conical insert to hit the target fuel.

⁸³ Cf. L. Holmlid, H Hora, G Miley, X Yang, *Ultrahigh-density deuterium of Rydberg matter clusters for inertial confinement fusion targets*, Laser and Particle Beams 27 (3), 529-532.

CONCLUSION

“Day by day, man experiences many greater or lesser hopes, different in kind according to the different periods of his life. Sometimes one of these hopes may appear to be totally satisfying without any need for other hopes. Young people can have the hope of a great and fully satisfying love; the hope of a certain position in their profession, or of some success that will prove decisive for the rest of their lives.

When these hopes are fulfilled, however, it becomes clear that they were not, in reality, the whole. It becomes evident that man has need of a hope that goes further. It becomes clear that only something infinite will suffice for him, something that will always be more than he can ever attain.

In this regard our contemporary age has developed the hope of creating a perfect world that, thanks to scientific knowledge and to scientifically based politics, seemed to be achievable. Thus Biblical hope in the Kingdom of God has been displaced by hope in the kingdom of man, the hope of a better world which would be the real “Kingdom of God”. This seemed at last to be the great and realistic hope that man needs. It was capable of galvanizing — for a time — all man’s energies. The great objective seemed worthy of full commitment. In the course of time, however, it has become clear that this hope is constantly receding. Above all it has become apparent that this may be a hope for a future generation, but not for me”.

(Encyclical Letter Spe Salvi of the Supreme Pontiff Benedict XVI) © Libreria Editrice Vaticana.

Following the thought of Pope Joseph Aloisius Ratzinger - Benedict XVI I believe that the Vatican City State could play a key role in ensuring a peaceful and transparent future to all adolescents and minors, who in

the name of God at the age of discretion⁸⁴ (at about 7 years of age) allow to be investigated by some insane adult priest by revealing their privacy, which should be protected or shared only with their family and competent people such as psychologists and social workers, avoiding in such way that one of the worst plagues of our time, the pedophilia⁸⁵, continues to spread and afflict humanity in its entirety. At the same way I suggest to take into account the initiatives undertaken by the Club of Rome, the German association for the Club of Rome (Deutsche Gesellschaft Club of Rome), the Solar Foods and "The Venus Project", which, I firmly believe, could represent the right answer to our hopes and put an end to corruption, mafia and crime so increasingly ubiquitous in the homeland.

Today there are no atomists to slander or wrongly to blame, today there is only the Church, a Nation and one People influenced by a fallacious culture (*see previous chapters, in particular pp. 25 ff., 30, note 31*), in this regard I would like to quote what I believe are the most important words of Niccolò Machiavelli and Anders Wijkman, Co-President of the Club of Rome:

"We Italians are irreligious and corrupt above others because the church and her representatives have set us the worst example".

Niccolò Machiavelli (The Prince).

"Leading policymakers seem to be unfit to ensure the future of planet earth. We must find the vision, the leadership and the creativity to collaborate in developing constructive solutions to offer a decent future to present and succeeding generations. We have

84 According to the Catholic Church it is the age when a child is capable of making free acts of the will and therefore becomes morally responsible for his actions. This was St. Pius X's understanding as regards the age for receiving the sacraments of penance and Holy Communion. In general, it is about seven years of age. Cf. the Catholic Dictionary, CatholicCulture.org

85 Cf. *Sex Crimes and the Vatican* (2006) a documentary film (39 min) filmed by Colm O'Gorman. See also Mary Gail Frawley-O'Dea, *Perversion of power : sexual abuse in the Catholic Church*, Nashville, Vanderbilt University Press, 2007. Cf. Thomas Plante, *Sin against the innocents : sexual abuse by priests and the role of the Catholic Church*, Westport Conn., Praeger, 2004. Cf. L. Shengold, *Soul Murder: The Effects of Childhood Abuse and Deprivation*, Yale University Press, New Haven 1989, and Mary Gail Frawley-O'Dea, V. Goldner, *Atti impuri: la piaga dell'abuso sessuale nella Chiesa cattolica*, Milano, Raffaello Cortina Editore, 2009.

the capabilities: we must find the will”.

Anders Wijkman (Co-President of the Club of Rome on the occasion of the 50th anniversary of the Club of Rome).

“All is Light“

One day I saw two sides of a single coin,
whose value can be traced in our soul,
a duality as a single part of our life, which
can be called light and dark, or wrongly
depicted by churchmen as good and evil.

But if All is Light why should our soul be dark
or overwhelmed by evil, or even fear the Darkness?
Maybe no man is only light, maybe no man is only matter
and even less antimatter or simply this is a dilemma
that “Science cannot overtake but Human Nature feels”.

One day I observed the greatness of our Universe,
how many stars shine in the firmament and
all of them encased in the darkness as a result of an event,
which goes beyond the Human understanding,
maybe the right answer is just the Big Bang,
«And God said: “Let there be light!” and there was light!»,
but no man is only light, and no man is only matter
and even less antimatter and for sure this is a dilemma
that “Science cannot overtake but Human Brain perceives”.

One day I tried to look for the Promised Land,
the land of Canaan, that was promised to Abraham and his descendants
in the “Fertile Crescent, Cradle of Civilization”,
how many wars and how many children die in the Promised Land?
In the name of God, All is Light, but no man is only light and no
man is only matter and even less antimatter and for sure this is a war
that “Science cannot overtake but Human Being conceives”.

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PUBLICATION
EOTI - EUROPEAN ORGANIZATION OF TRANSLATORS AND INTERPRETERS
BERLIN - JANUARY 2020