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ON HAVING THE LAST WORD: EPISTEMOLOGICAL AND NORMATIVE CONSIDERATIONS

di Gereon Wolters

Abstract: Claims by extra-scientific, religious institutions or fundamentalist believers to having the last word in matters scientific (humanities included) have been connected in the history of science less with defending truth than rather with exerting power and authority. The condemnation of Galileo is the model case. Other examples are the Papal infallibility dogma of 1871, the case of evolutionary theory in present day Vatican statements, and, finally, in present-day fundamentalist Christian and Islamic circles. My normative plea is based on a great achievement of enlightened rational thinking: there are no last words, neither in science nor in other cognitive fields. Enlightened rejection of the last word does not, however, support "postmodern" Western relativism: there are very well second last words, based on universalizable arguments and evidence.

Keywords: Galileo, infallibility, evolutionary theory, relativism, Christian church, Pope, islamic science.

1. *Introduction*

Most of us have observed or recall from their own childhood the following "dialogue" among children: «You're stupid! – No, you're stupid!! – No, you!!! – No, you are really stupid!!!! – No, you are!!!!!!», and so on, and so on. Such a fight might go on for a while and usually ends with one of the fighters giving up, be it from exhaustion or be it for prudence. The winner has literally retained the last word. We may learn from this familiar example that having the last word appears as something desirable, something worth to fight for. Already among small children, having the last word might be connected with the feeling of exerting power over others. How about the last word in cognitive contexts, particularly in religion and science, humanities and social sciences included? Is not defending truth here the motive for the last word? My thesis is that also here rather power than truth, or better, authority connected with power is the central issue. I will exemplify this by a few historical examples: the case of Galileo (section II); the infallibility case (section III); the case of evolutionary theory in Catholicism (section IV), and in fundamentalist Christian and Islamic circles (section V). Section

VI is a normative plea not to jeopardize a great achievement of enlightened rational thinking: “there is no last word”, neither in science nor in other cognitive fields. One should fight – this is the normative part of the paper – both the ongoing claims of religious fundamentalists to the last word in cognitive matters, and of “postmodern” Western relativism. Postmodern relativism not only correctly joins philosophy of science in rejecting the last word, but also denies that there are objective “second last” words, based on universalizable arguments and evidence.

2. *The Last Word in Case of Galileo*¹

For our purposes, the Galileo affair can be condensed to what happened on two days: 26 February 1616 and 22 June 1633. On 26 February 1616, Galileo was summoned to receive an injunction to the “Holy Office”, alias “Supreme Sacred Congregation of the Roman and Universal Inquisition”, now (since 1965) the “Congregation of the Doctrine of the Faith”. One of the Cardinal Inquisitors, Robert Bellarmine (1542-1621), who in 1600 had succeeded in having Giordano Bruno burned at the stake, issued the injunction. This took place a week before, on 5 March 1616, Copernicus’ *De revolutionibus orbium caelestium* as well as several heliocentric writings of others were officially put on the *Index of Prohibited Books*. Bellarmine

in the name of His Holiness the Pope and the whole Congregation of the Holy Office, ordered and enjoined the said Galileo, who was himself still present, to abandon completely the above-mentioned opinion that the sun stands still at the centre of the world and the earth moves, and henceforth not to hold, teach, or defend it in any way whatever, either orally or in writing; otherwise the Holy Office would start proceedings against him. The same Galileo acquiesced in this injunction and promised to obey².

¹ In this section, I follow partly G. Wolters, *The Silence of the Wolves, or, Why it Took the Holy Inquisition Seventy-Three Years to Ban Copernicanism*, in W. Neuber, T. Rahn and C. Zittel (eds.), *The Making of Copernicus. Early Modern Transformations of the Scientist and his Science*, Brill, Leiden-Boston 2015 (= *Intersections. Interdisciplinary Studies in Early Modern Culture*, vol. 36), 42-63, where I rely on the excellent presentation in R. Blackwell, *Galileo, Bellarmine, and the Bible: Including a Translation of Foscarini’s Letter on the Motion of the Earth*, University of Notre Dame Press, Notre Dame-London 1991.

² The complete translation of Bellarmine’s special injunction against Galileo is in M.A. Finocchiaro (ed.), *The Galileo Affair: a Documentary History*, University of California Press, Berkeley-Los Angeles-London 1989, 147 f.: «ordinavit [proprio nome] Sanctissimi Domini Nostri Papae et totius Congregationis [Galileum], ut supradictam opinionem quod Sol sit centrum mundi, et immobilis, et Terra moveatur omnino relinquat, nec eam de Caetero quovis modo teneat, doceat, aut defendat, verbo, aut scriptis, alias contra ipsum procedetur in Sancto officio. Cui praecepto Idem Galileus acquievit, et parere promisit»; cf. S. Pagano (ed.), *I Documenti Vaticani del Processo di Galileo Galilei (1611-1741)*, nuova ed. accresciuta, rivista e annotata, Archivio Segreto Vaticano, Città del Vaticano 2009 (= *Collectanea Archivi Vaticani*,

Both putting Copernican writings on the *Index* and Bellarmine's yellow card to Galileo was based on a report of no less than eleven so-called consultants who had to assess the following two "propositions"³:

(1) «The sun is the centre of the world and completely devoid of local motion»;

(2) «The earth is not at the centre of the world, or motionless, but it moves as a whole and also with diurnal motion».

Here is the consultants' "assessment" of (1):

All [consultants, G.W.] said that this proposition is foolish and absurd in philosophy, and formally heretical since it explicitly contradicts in many places the sense of the Holy Scripture, according to the literal meaning of the words and according to the common interpretation and understanding of the Holy Fathers and the doctors of theology.

(2) is not as bad as (1), since it is not "formally heretical"⁴:

All said that this proposition receives the same judgment in philosophy and that with regard to theological truth it is at least erroneous in faith.

The assessment of the consultants is on the one hand "scientific", insofar as it judges heliocentrism as «foolish and absurd in philosophy»⁵, on the other hand, it is "theological" because it identifies a formal heresy and errors in faith, respectively.

The assessment of heliocentrism as «foolish and absurd in philosophy» could change in the course of time. It would be the job of scientists to justify such a change. However, things are much trickier, for such a change in

69 – Pontificiae Academiae Scientiarum Scripta Varia, 112), 45 f.

³ Quotes from M.A. Finocchiaro, *The Galileo Affair*, cit., 146 f.: «*Propositiones Censurandae. [...] Prima: Sol est centrum mundi et omnino immobilis motu locali. [...] 2^a. Terra non est centrum mundi, nec immobilis, sed secundum se Totam, movetur, etiam motu diurno.*» – *Censura [1^{ae} propositionis]: Omnes dixerunt dictam propositionem esse stultam et absurdam in Philosophia, et formaliter haeticam, quatenus contraicit expresse sententiis sacrae scripturae in multis locis, secundum proprietatem verborum, et secundum commune expositionem, et sensum, Sanctorum Patrum et Theologorum doctorum. [...] Censura [2^{ae} propositionis]: Omnes dixerunt, hanc propositionem recipere eandem censuram in Philosophia; et spectando veritatem Theologicam, adminus esse in fide erroneam*» (S. Pagano, *I Documenti Vaticani*, cit., 42 f.).

⁴ "Formally heretical" is an opinion of which the person who utters it knows that it is heretical. Such a person, thus, explicitly (*formaliter*) refuses to acknowledge the "truth".

⁵ Note that the "assessment" does, in fact, relate to contemporary cosmology, since well into the 19th century "philosophy" often means causal scientific knowledge, as opposed to "history", which gives only descriptive accounts. A last remainder of this usage one finds in "natural history". Cf. the overview of the conceptual development in F. Kambartel, *Erfahrung und Struktur: Bausteine zu einer Kritik des Empirismus und Formalismus*, Suhrkamp, Frankfurt 1968, ch. 1.

cosmology would necessarily lead to a change of the traditional reading of the Bible, as Bellarmine was well aware of. The question is: who has the “authority” over the last word about changes in issues, in which cosmology and theology are undissolvably welded together? Happily enough for Bellarmine, already the Council of Trent had given at its fourth session on April 8, 1546 the legal basis for solving such a conflict and for the assessment of the consultants:

Furthermore, to control petulant spirits, the Council decrees that, in matters of faith and morals pertaining to the edification of Christian doctrine, no one, relying on his own judgment and distorting the Sacred Scriptures according to his own conceptions, shall dare to interpret them contrary to the sense which Holy Mother Church, to whom it belongs to judge of their true sense and meaning, has held or does hold, or even contrary to the unanimous agreement of the Fathers, even though such interpretations should never at any time be published. Those who do otherwise shall be identified by the ordinaries and punished in accordance with the penalties prescribed by the law⁶.

Bellarmino had given this declaration a decisive twist in a letter (1615) to the Carmelite Father Paolo Antonio Foscarini (ca. 1565-1616), who had just published a “Letter” in defense of Copernicanism that was to end on the *Index* a year later, together with Copernicus’ *De revolutionibus*:

Nor can one reply that this [i.e., Copernicanism] is not a matter of faith, because even if it is not a matter of faith because of the subject matter, it is still a matter of faith because of the speaker [i.e. the Holy Spirit through the authors of Scripture]. Thus anyone who would say that Abraham did not have two sons and Jacob twelve would be just as much of a heretic as someone who would say that Christ was not born of a virgin, for the Holy Spirit has said both these things through the mouth of the Prophets and the Apostles⁷.

The message is clear; Galileo and his fellow Copernicans do not have the authority to introduce a new reading of the Bible by proposing a new cosmological theory. The content of Bellarmine’s injunction against Galileo is precisely the prohibition of proposing a new cosmological theory. The last word about this is with the Church, since a new cosmological theory has

⁶ R. Blackwell, *Galileo, Bellarmine, and the Bible*, cit., 353. Latin original in H. Denzinger and P. Hünermann (eds.), *Enchiridion Symbolorum definitionum et declarationum de rebus fidei et morum – Kompendium der Glaubensbekenntnisse und kirchlichen Lehrentscheidungen*, 40th edition, Herder, Freiburg 2005, no. 1507.

⁷ R. Blackwell, *Galileo, Bellarmine, and the Bible*, cit., 105. Foscarini’s “Letter”: *ivi*, 217-251; Bellarmine’s letter to Foscarini: *ivi*, 265-267; see also M.A. Finocchiaro, *The Galileo Affair*, cit., 68.

theological consequences. I would like to call such conflicts between science and religion as a compliment to Galileo “Galilean conflicts”⁸. As is well documented, Galileo pledged obedience to the injunction of 26 February 1616.

The condemnation of Galileo on 22 June 1633 at the end of his trial is nothing more than just a punishment for disobedience⁹. There do not enter new content related points of view compared to the warning of 1616. With the defense of heliocentrism in his *Dialogue on the Two Chief World Systems* (1632) Galileo had violated Bellarmine’s injunction «not to hold, teach, or defend it in any way whatever, either orally or in writing». Consequently, the sentence of the Inquisition mentions the original question of the conflict between heliocentrism and the Bible, but it does not discuss it further. Galileo is condemned first for «having held and believed a doctrine which is false and contrary to the Divine and Holy Scripture». This is exactly what the injunction of 1616 was about. Second, he is condemned for saying «that one may hold and defend as probable an opinion [in science] after it has been declared and defined contrary to Holy Scripture»¹⁰. As we know, the last word with respect to the interpretation of Scripture is with Church authorities. Since cosmology and the literal reading of the Bible, which had become standard in the 17th century, are inextricably intertwined, Church authorities have also the last word in cosmological matters.

In Galilean conflicts, thus, two completely different authorities clash: the authorities of science and religion. In the case of “religion”, it is the «logic of centralized authority» that is characteristic for the Catholic Church, to a certain degree up to the present day. It is «monolithic, centralized, esoteric, resistant to change, self-protective». It is the authority of the last word. The authority that guides “science” is quite different: «pluralistic, democratic, public, fallibilistic, and self-corrective»¹¹. It is – as we shall see later – an authority, which explicitly excludes a last word.

3. Infallibility

Catholic centralized authority has a special term for the last word: *dogma*. This authority found a first high point with respect to Galilean conflicts at the First Vatican Council. The more explicative Dogmatic Constitution “*Dei Filius*” (24 April 1870) closes with so-called canons that in short words

⁸ Cf. G. Wolters, *The Epistemological Roots of Ecclesiastical Claims to Knowledge*, «*Axiomathes*», 19 (2009), 488. Galilean conflicts between religion and science should be distinguished from “Freudian conflicts”, where a scientific discipline tries to explain away religion as an “illusion” (Freud) or as just a byproduct of evolution (many sociobiologists).

⁹ M.A. Finocchiaro, *The Galileo Affair*, cit., 256 ff. gives the English texts of the comprehensive “later Inquisition proceedings (1633)”. The sentence against Galileo on 287 ff.

¹⁰ *Ivi*, 291.

¹¹ R. Blackwell, *Galileo, Bellarmine, and the Bible*, cit., 351; 359; 358.

issue anathemas on those who contradict its teachings. In Canon IV.2-3 of the constitution we read, what more than 250 years earlier, Bellarmine could not have said better:

2. If anyone shall say that human sciences are to be so freely treated, that their assertions, although opposed to revealed doctrine, are to be held as true, and cannot be condemned by the Church; let him be anathema.

3. If anyone shall assert it to be possible that sometimes, according to the progress of science, a sense is to be given to doctrines propounded by the Church different from that which the Church has understood and understands; let him be anathema¹².

In the time of Galileo, such anathemas had brought offenders to the stake or to jail. Thanks to the intellectual corrosive effects of the Enlightenment, by 1870 most formerly Catholic countries had achieved the separation of church and state, even if in most cases only partially¹³. This epochal change defused the violence connected in Christian States with enforcing the last word. It then led only to the exclusion of offenders from the ecclesiastical community.

The ecclesiastical authoritarianism of the last word reached its climax, when it was personalized. On 18 July 1871, the Council – under rather dubious procedural circumstances¹⁴ – decided by way of dogma that one person, the Pope, had the competence of stating dogmas, i.e. having the last word in certain matters¹⁵:

¹² Quoted from: <http://www.catholicplanet.org/councils/20-Dei-Filius.htm> (verified September 2015). Latin text: «2. *Si quis dixerit, disciplinas humanas ea cum libertate tractandas esse, ut earum assertiones, etsi doctrinae relevatae adversentur, tamquam verae retineri necque ab Ecclesia proscribe possint: anathema sit.* 3. *Si quis dixerit, fieri posse, ut dogmatibus ab Ecclesia propositis aliquando secundum progressum scientiae sensus tribuendus sit alius ab eo, quem intellexit et intellegit Ecclesia: anathema sit*» (H. Denzinger and P. Hünermann, *Enchiridion*, cit., 823).

¹³ Similar things hold for Protestant countries. I would just like to remind you that in 1553 in Geneva the humanistic scholar, physician and theologian Michel Servet was burnt at the stake – particularly at the instigation of the great reformer Jean Calvin – for his alleged anti-trinitarian heresies.

¹⁴ Critical analyses one can find in H. Küng, *Unfehlbar? Eine unerledigte Anfrage*, 2nd enlarged edition, Piper, München 1989 (1st ed. *Unfehlbar? Eine Anfrage*, Benzinger, Zürich 1970; English ed. *Infallible? An Inquiry*, Collins, London; new expanded ed. Continuum, New York 1994; Italian ed. *Infallibile? Una domanda*, Queriniana, Brescia 1970; new expanded ed. *L'infallibilità*, Mondadori, Milano 1977) and A.B. Hasler, *Wie der Papst unfehlbar wurde. Macht und Ohnmacht eines Dogmas*, 2nd edition, Piper, München 1980. Because of his book (first edition 1970), Hans Küng, in 1980, lost his chair at the Tübingen Faculty of Catholic theology due to the very special status of theological faculties (both Protestant and Catholic) at German universities. He remained, however, a university professor and received as a compensation a large new institute, the “Institute for Ecumenical Research”.

¹⁵ Up to that point, the dogmatic competence of the last word had been exclusively with “Ecumenical Councils”. Pope Pius IX, to whom the Church owes the infallibility dogma,

we teach and define as a divinely revealed dogma that when the Roman Pontiff speaks EX CATHEDRA, that is, when, in the exercise of his office as shepherd and teacher of all Christians, in virtue of his supreme apostolic authority, he defines a doctrine concerning faith or morals to be held by the whole Church, he possesses, by the divine assistance promised to him in blessed Peter, that infallibility which the divine Redeemer willed his Church to enjoy in defining doctrine concerning faith or morals. Therefore, such definitions of the Roman Pontiff are of themselves, and not by the consent of the Church, irreformable¹⁶.

Cardinal Bellarmine, beatified in 1923, would have wholeheartedly approved, if he had lived to see this dogmatic apotheosis of the last word. It is, however, interesting to note that in the almost 150 years of infallibility only one Pope made use of the last word. In 1950, Pope Pius XII added to the Immaculate Conception of Mary her so-called Assumption, i.e. her bodily taking up into heaven at the end of her earthly life.

One can hardly say that the Church on a “theoretical” level had learned anything from Her defeat in the original Galilean conflict. In Her “practice” of condemning, however, She had become rather cautious by the end of the 19th century. The reason for this is not a deeper insight but rather the result of Her defeat in the confrontation with the barrage of enlightened criticism for almost two centuries. We will see this when we talk about the last word in evolutionary theory.

4. *Evolutionary Theory in Pontifical Perspective, or, the Last “Last Word” in Matters Scientific*

When at the First Vatican Council the last word-position of the Catholic Church in the case of Galileo was solemnly confirmed and tightened in 1870 and 1871, Charles Darwin’s *Origin of Species* (1859) had been on the market for more than eleven years and had been translated into the major European languages. Evolutionary theory represented a much greater challenge to the teachings of the Church than heliocentrism. Evolution gives a completely

had already in 1854 – contrary to the Council rule – pronounced the dogma of the Immaculate Conception of Mary by virtue of his personal ambitions to infallibility.

¹⁶ For the complete text see ch. 4. 9 of the dogmatic constitution *Pastor aeternus*, available at: <http://www.ewtn.com/library/COUNCILS/V1.htm#6> (verified September 2015). The Latin original is: «*docemus et divinitus relevatum dogma esse definimus; Romanum Pontificem, cum ex cathedra loquitur, id est, cum omnium Christianorum pastoris et doctoris munere fungens pro suprema sua Apostolica auctoritate doctrinam de fide vel moribus ab universa Ecclesia tenendam definit, per assistentiam divinam ipsi in beato Petro promissam, ea infallibilitate pollere, qua divinus redemptor Ecclesiam suam in definienda doctrina de fide vel moribus instructam esse voluit; ideoque eiusmodi Romani Pontificis definitiones ex sese, non autem ex consensu Ecclesiae, irreformabiles esse*» (H. Denzinger and P. Hünermann, *Enchiridion*, cit., 833).

different story about the origin of man than does the Bible, if understood literally. According to evolutionary anthropology man is the completely natural result of evolutionary processes in the order of primates. There is no indication and no need at all for a divine creation of man – a cornerstone of Christian religion – in order to understand why humans exist. It is, therefore, the more surprising that Darwin's works were never put on the *Index of Prohibited Books*¹⁷. In fact, the Holy Congregation of the *Index*, which was then exclusively in charge of condemning books hardly ever took the initiative as far as evolution is concerned. It reacted only, when somebody denounced an author. «There was, in a sense, no policy at all» with the Vatican authorities. They “reacted” «to particular circumstances, not to a carefully designed plan»¹⁸. During my research in the Vatican Archives I saw a great number of documents (up to 1929), regarding evolution. From those documents and from checking the official statements of the Holy See I conclude that there was not even one such statement with respect to evolutionary theory. As the Vatican documents show, only a few Catholic authors, most of them priests, ended on the *Index*. All of them tried to reconcile evolution and Catholic faith. Because the Congregation of the Index did not give any reason, why a book was put on the Index, sometimes even the authors themselves did not know, why their books were forbidden, or they made wrong guesses¹⁹.

I take it as a sign of the already mentioned enlightenment induced corrosion of the Vatican last word-authority that not even one non-Catholic “evolutionist” author was ever discussed on the meetings of the Congregation of the *Index*. Quite a few, for example the antichristian and particularly anticatholic works of the German evolutionary biologist Ernst Haeckel (1834-1919), would have well qualified for the Index. However, in a sense, the Vatican had also found a justification for such negligence towards authors that menaced its authority. First, Pope Leo XIII was convinced that books written by Catholic authors and published in Catholic countries would disturb the life of the Church with greater probability²⁰. A further reason for this apparent clemency towards non-Catholics was the fact that

¹⁷ Darwin would have been there in very good company, though: Descartes, Spinoza, Kant, Hume, Francis Bacon, Locke, and son on. The last philosopher to receive this special Roman promotion was Jean-Paul Sartre. Cf. the excellently informed and at the same time entertaining H. Wolf, *Index. Der Vatikan und die verbotenen Bücher*, Beck, München 2006; italian edition *Storia dell'Indice: il Vaticano e i Libri proibiti*, Donzelli, Roma 2006.

¹⁸ M. Artigas, T.F. Glick and R.A. Martínez, *Negotiating Darwin: The Vatican confronts Evolution 1877-1902*, Johns Hopkins University Press, Baltimore (MD) 2006, 4. For the following, cf. G. Wolters, *Ambivalenz und Konflikt. Katholische Kirche und Evolutionstheorie*, UVK Universitätsverlag, Konstanz 2009.

¹⁹ This is documented in M. Artigas, T.F. Glick and R.A. Martínez, *Negotiating Darwin*, cit.

²⁰ Cf. *ivi*, 14.

Pope Leo in his *Constitutio de Prohibitione Censura Librorum* (1896) had officially declared what possibly had been practiced already for a while. In the first Chapter (*On the Prohibition of Books of Apostates, Heretics, Schismatics and Other Writers*) he declares:

3. Books of non-Catholic authors that professionally (*ex professo*) deal with religion are forbidden as long as it is not certain that they not contain anything against the Catholic faith.
4. Books of such authors that do not deal professionally with religion but only in passing touch religious truths should not be taken as prohibited by Church until they are not forbidden by a special decree²¹.

In short, “in theory” the Pope still claims the last word. He has only given up declaring this publicly in the case of *acatholici* and similar miscreants. “In practice”, however, the Vatican has surrendered to not being able to enforce its last word *in partibus infidelium*. Even among believers the means of enforcing religious faith in Galilean conflicts go towards zero. One can observe more than 100 years of – sometimes discontinuous – decline of the Roman “logic of centralized authority”. Here a few important stages:²²

- 1917: the Holy Congregation of the *Index*, founded in 1571, was merged with the Holy Office after almost 350 years of activity.
- 1950: Pope Pius XII promulgates the Encyclical *Humanae Genes*, the first official document of the Church after almost 100 years of evolutionary theory. Without going into detail, one can state that this Encyclical is a relapse to the old authoritarian habits. The Pope claims among other things to have the last word on the direct creation of the human soul and he firmly rejects “polygenism”, i.e. the teaching that «after Adam there existed on this earth true men who did not take their origin through natural generation from him as from the first parent of all, or that Adam represents a certain number of first parents»²³. Current anthropology

²¹ *Index Librorum Prohibitorum: Leonis XIII Sum. Pont. Auctoritate Recognitus* – SS. D. N. Benedicti P. XV Iussu editus. *Praemittuntur Constitutiones Apostolicae de Examine et Prohibitione Librorum*, Typis Poliglottis Vaticanis, Romae 1917, 7 (my translation): «3. *Item prohibentur acatholicorum libri, qui ex professo de religione tractant, nisi constet nihil in eis contra fidem catholicam contineri.* – 4. *Libri eorundem auctororum, qui ex professo de religione non tractant, sed obiter tantum fidei veritates attingunt, iure ecclesiastico prohibiti non habentur, donec speciali decreto proscripti haud fuerint.*»

²² H. Wolf, *Index*, cit., and G. Wolters, *The Epistemological Roots of Ecclesiastical Claims to Knowledge*, cit.

²³ Full text available at: http://w2.vatican.va/content/pius-xii/en/encyclicals/documents/hf_p-xii_enc_12081950_humani-generis.html (verified September 2015). «*Non enim christifideles eam sententiam amplecti possunt, quam qui retinent asservant vel post Adam hisce in terris veros homines exstitisse, qui non ab eodem prouti omnium protoparente,*»

overwhelmingly shares the rejection of polygenism, understood as multiple origins of humankind. It does not share, however, the special Vatican “monogenism” of Adam and Eve. Pontifical monogenism contradicts both the gradual character of species formation²⁴, which excludes a first couple and the presently widely accepted hypothesis that all current humans have the same mitochondria. It stems from a woman who probably lived in Africa about most recently between 99.000 and 148.000 years ago (“Mitochondrial Eve”). All living males seem to have inherited their Y chromosomes from a guy who lived most recently, probably again in Africa, between 120.000 and 156.000 years ago (“Y-chromosomal Adam”)²⁵. Furthermore, the Pope claims that evolutionary “hypotheses”, as distinguished from «really proven facts» (*facta reapse demonstrata*), have to be submitted to the judgment of the Church.

- 1965/66: On 7 December 1965, Pope Paul VI in the context of the second Vatican Council issued the Apostolic Letter given *Motu Proprio* [i.e. on his own initiative] *Integrae servandae* that re-constituted the Holy Office as the “Sacred Congregation for the Doctrine of the Faith”²⁶. The Index, however, was missing among the obligations of the “Sacred Congregation of the Doctrine of the Faith”. Its “prefect”, Cardinal Alfredo Ottaviani, answered the question, whether it still existed, in the negative in 1966. Thus ended a notorious institution of having the last word in scientific as well as in cognitive matters in general.
- 1996: Pope John Paul II states in a famous letter to the Pontifical Academy that evolutionary theory has to be regarded as an adequately confirmed scientific theory. He insists, however, as did Pius in 1950, on the “monogenetic” origin in the sense of a first human couple, and on the special creation of the soul. It is interesting to note that hardly any scientist, in fact, cared about the Galilean type assaults on Science by Pope Pius XII and Pope John Paul II.
- 2005: Cardinal Christoph Schönborn of Vienna, a former student of the

naturali generatione originem duxerint, vel Adam significare multitudinem quamdam proto-parentum» (H. Denzinger and P. Hünermann, *Enchiridion*, cit., 1098).

²⁴ J.A. Coyne and H.A. Orr, *Speciation*, Sinauer, Sunderland (Mass.) 2004.

²⁵ «Unlike her biblical namesake, she [i.e. Mitochondrial Eve] was not the only living human female at her time. However, her female contemporaries, excluding her mother, failed to produce a direct unbroken female line to any living person in the present day» (quoted from Wiki, “Mitochondrial Eve”, verified September 2015). The figures about the age of our most recent common male and female ancestors are taken from G.D. Poznik *et al.*, *Sequencing Y Chromosomes Resolves Discrepancy in Time to Common Ancestor of Males Versus Females*, «Science», 341/2 (August 2013), 562-565.

²⁶ Available at: http://w2.vatican.va/content/paul-vi/en/motu_proprio/documents/hf_p-vi_motu-proprio_19651207_integrae-servandae.pdf (seen September 2015).

now Pope Emeritus Benedict XVI, in an Editorial of the *New York Times* joins forces with American creationists. In the meantime, Schönborn has changed his mind²⁷. Chapeau, Eminency!

Apart from the “monogenetic” origin issue, the Catholic Church has given up to engage in Galilean conflicts, let alone claiming to have the last word there. Evolutionary theory seems to be the last stage in the enlightened deconstruction of ecclesiastical claims for a say in scientific matters²⁸.

5. *Evolutionary Theory with Christian and Muslim Fundamentalists, or, the Last Word is With Texts*

With Christian and Muslim fundamentalists, “the logic of centralized authority” that characterized the Catholic desire for having the last word, is replaced by what one might call “the authority of literally understood holy texts”.

As far as Christianity is concerned, American fundamentalists, also called “evangelicals”, are the most influential group. They have succeeded in nourishing a popular distrust of the theory of evolution among almost half of the population²⁹:

Many Americans share a populist distrust of evolution and the scientific and educational elites who favor evolution. At this grassroots level, a literally read Bible confronts evolution, caricaturized as the notion that complex objects can be assembled by pure chance. [...] Conservative Protestants in the United States generate an extensive pseudoscientific literature and support organizations such as the Institute for Creation Research. [...] Recently opposition to evolution has been coalescing around the intelligent design (ID) movement, which attempts to present a more intellectually respectable rejection of Darwinian evolution. [...] Though ID looks like a complete failure as a scientific claim³⁰, it has become poli-

²⁷ C. Schönborn, *Schöpfung und Evolution – Zwei Paradigmen und ihr gegenseitiges Verhältnis*, Picus, Wien 2009.

²⁸ The strong interest of the Church in the Adam-and-Eve “monogenism” is, by the way, quite understandable: the whole story of Christianity begins with the “fall of man” in paradise that was transmitted as “original sin” by Adam and Eve to all of their descendants. The original sin, in turn, made necessary the salvation by God in the person of Christ becoming human and dying for us. Making the beginning of the salvation story acceptable in view of the results of evolutionary anthropology clearly needs considerable “demythologizing” (Rudolf Bultmann) hermeneutic efforts.

²⁹ The figures are available at: <http://www.gallup.com/poll/170822/believe-creationist-view-human-origins.aspx> (verified September 2015).

³⁰ M. Young and T. Edis (eds.), *Why Intelligent Design Fails: A Scientific Critique of the New Creationism*, Rutgers University Press, New Brunswick (NJ) 2004.

tically influential in the United States, continually trying to make inroads into scientific education³¹.

ID is the latest of the various mutations American creationism has undergone, in order to safeguard children against the exclusive teaching of evolution in public schools. Its predecessor was “scientific creationism”, for which evangelicals requested “equal time” alongside evolutionary theory in public schools. After years of litigation in various American states, the Supreme Court of the United States in 1987 declared unconstitutional Louisiana’s “Creationism Act” that forbade «the teaching of the theory of evolution in public elementary and secondary schools unless accompanied by instruction in the theory of “creation science”»³². The unconstitutionality of the equal time law in the state of Louisiana consisted in violating the so-called “Establishment Clause” of the First Amendment to the Constitution of the United States. It includes that neither a State nor the Federal Government

can pass laws, which aid one religion, aid all religions, or prefer one religion over another. Neither can [a State or the Federal Government] force or influence a person to go to or to remain away from church against his will or force him to profess a belief or disbelief in any religion³³.

Despite these clear words about the separation of religion and state, one can be sure that the fight of American Christian fundamentalists for including creationism in one form or other in the curriculum of public schools will continue. For them, God’s authority, as literally revealed in the book of *Genesis* of the Old Testament, is the last word also about biological issues. It must not be tainted with enlightened hermeneutical principles of dealing with a text written more than two and a half millennia ago³⁴.

In Islam, things are slightly different. To be sure, both Christian Evangelicals and their fundamentalist Islamic counterparts receive the last word on evolution from their respective Holy Scriptures. One remarkable difference is, however, that many Muslim thinkers claim not only the “last” word for the Quran “but also the first”: modern science is already contained in the Quran. Taner Edis, American physicist with a Turkish family back-

³¹ T. Edis, *An Illusion of Harmony: Science and Religion in Islam*, Prometheus Books, Amherst (N.Y.) 2007, 118 f.

³² The complete ruling of the court at: <http://caselaw.findlaw.com/us-supreme-court/482/578.html> (verified September 2015).

³³ The Establishment Clause was formulated already in a landmark decision of the court in 1947: <http://caselaw.findlaw.com/us-supreme-court/330/1.html> (verified September 2015).

³⁴ An excellent presentation of the current state of knowledge is J.C. Gertz (ed.), *Grundinformation Altes Testament. Eine Einführung in Literatur, Religion und Geschichte des Alten Testaments*, 4th rev. ed., Vandenhoeck & Ruprecht, Göttingen 2010, 193 ff.

ground, is a critic of Muslim and also of Christian and Jewish fundamentalist assaults on science. He speaks of «science-in-scripture apologetics» that is more popular in Islam than in other religions. Such apologetics claim that the Quran «anticipates science or that modern science can be interpreted to support medieval theology»³⁵.

Claiming for the Quran the first as well as the last word in science becomes more understandable when one compares the hyperbolic self-assessment that pervades the Muslim world and its clearly marginal role in modern science and technology³⁶. Many Muslims perceive this situation as a collective humiliation by “the West”³⁷. The hyperbolic self-assessment of Islam is based on the conviction that it is in the possession of the only true religion, and connected to this, on the narrative of a medieval Golden Age, promoted by the wisdom and the knowledge of the Quran³⁸. Most current Islamic thinkers view medieval Islamic scholarship as superior to its European counterpart. This narrative – historically accurate as it may be – is embedded in a larger narrative of a general cultural and moral superiority of Islam that has found a remarkable expression in the “Cairo Declaration of Human Rights in Islam” that was adopted in 1990 by the member states of “Islamic Conference of Foreign Ministers”. Here a short quote from the preamble.

The Member States of the Organization of the Islamic Conference, reaffirming the civilizing and historical role of the Islamic Ummah which God

³⁵ T. Edis, *An Illusion of Harmony*, cit., 107. The last quotation relates to science-in-scripture apologetics in general and not only to the “science-in-the-Quran” variety. Chapter 3 (“Finding Science in the Quran”) of Edis’ book is important for our topic. For the “Islamization” of science, i.e. the appropriation of “western” science in a Quranic context, L. Stenberg (*The Islamization of Science: Four Muslim Positions Developing an Islamic Modernity*, «Lund Studies in the History of Religion», vol. 6, Lund 1996) is still an enlightening reading.

³⁶ Scientists born as Muslims have so far received exactly two of the many Nobel prizes in physics (up to now 199 Laureates), chemistry (169 Laureates) or medicine (207 Laureates): the Pakistani Mohammad Abdus Salam in physics (1979), and the Egyptian-American Ahmed Hassan Zewail in chemistry (1999) and the Turkish-American Aziz Sancar (2015). The numbers of laureates are from the website of the Nobel Institute: http://www.nobel-prize.org/nobel_prizes/ (verified September 2015). One has to note, however, two points: first, that the scientific work for the two chemistry prizes was done at American universities, and second, that Abdus Salam was a devout Muslim of the Ahmadiyya variety of Islam. Ahmadiyya, however, was declared in 1974 “non-Muslim” by the Pakistani parliament by way of an amendment to the Constitution. «In protest, Salam left Pakistan for London» (cf. the informative Wiki entry “Mohammad Abdus Salam”, verified September 2015).

³⁷ Similar forms of collective humiliation feelings, combined with hyperbolic self-assessment one finds before and during World War I with the German elites, above all university professors, who felt particularly humiliated by their British “cousins”; or with Russian elites today, feeling humiliated again by “the West”. Unfortunately, collective humiliation of the sort described has a strong tendency to erupt into violence, as the examples mentioned show.

³⁸ Cf. T. Edis, *An Illusion of Harmony*, cit., chapter 2 (“A Usable Past”).

made the best nation that has given mankind a universal and well-balanced civilization in which harmony is established between this life and the here-after and knowledge is combined with faith; and the role that this Ummah should play to guide a humanity confused by competing trends and ideologies and to provide solutions to the chronic problems of this materialistic civilization³⁹.

Looking at the political, social and intellectual reality in predominantly Islamic countries, from Pakistan to Somalia, from Afghanistan to Saudi Arabia, from Qatar to Syria, from Iraq to Libya, from Yemen to *Boko Haram* in Northern Nigeria, Chad, Niger and northern Cameroon, to name a few, may raise doubts, whether the *Ummah* is the right model to solve the «chronic problems of this materialistic civilization»⁴⁰.

Getting back from the first to the last word, I have learned much from *Islam and the Quest for Modern Science* by the Italian scholar Stefano Bigliardi⁴¹. In six interviews with Muslim authors who care about the interaction between science and religion, Bigliardi presents in a descriptive, non-evaluative way a vivid spectrum of diverging views that oscillate between rejecting evolutionary theory and accepting it. Only one of his interlocutors, the Algerian astronomer Nidhal Guessoum, accepts evolutionary theory as it stands. For him, science has its own methods of establishing and correcting, and «is in no need of any “conceptual infusion” whatsoever»⁴². Other interlocutors reject evolution right away as contradicting the Quran, while again others accept evolution as a fact in the history of the earth. They reject, however, the standard Darwinian explanation that rests on mutation/variation and natu-

³⁹ The full text is available at: <http://www.oic-oci.org/english/article/human.htm> (verified September 2015).

⁴⁰ In part, “the West” is among the causal factors of the desolate state of much of the Islamic world, particularly the British colonial rule and American criminal interventionism (Afghanistan and Iraq). The main reasons ought to be sought in my view, however, in those countries and in the Islamic world itself. Surprisingly, hardly ever religion is mentioned among the causes for the disaster. The fact that Islam has protected itself on a large scale against enlightenment inspired critical thinking might well be one of the causes of the actual situation in the Muslim world. Cf. S.J. Al-Azm, *Unbehagen in der Moderne. Aufklärung im Islam*, ed. by Kai-Henning Gerlach, Fischer, Frankfurt 1993; S.J. Al-Azm and E. Herms (eds.), *Islam und säkularer Humanismus*, Mohr Siebeck, Tübingen 2005.

⁴¹ S. Bigliardi, *Islam and the Quest for Modern Science: Conversations with Adnan Oktar, Mehdi Golshani, Mohammed Basis Altaie, Zaghoul El-Naggar, Bruno Guideroni and Nidhal Guessoum*, Swedish Research Institute, Istanbul 2014. Very useful is also L. Stenberg, *The Islamization of Science*, cit.

⁴² S. Bigliardi, *Islam and the Quest for Modern Science*, cit., 151. Guessoum seems to endorse a relation of incommensurability between science and religion, as was outlined by L. Wittgenstein (*Vorlesungen und Gespräche über Ästhetik, Psychologie und Religion*, ed. by C. Barrat, German edition E. Bubser, Vandenhoeck, Göttingen 1971²): religion and science talk about different things, or about the same things in a completely different way.

ral selection⁴³. The Darwinian methodological device is in their view – quite similar to American ID – not in a position to explain the complexity of living nature nor its purposiveness that the Quran teaches⁴⁴. Above all, they try to infuse from the Quran a teleological metaphysics into biological science.

I think that Guessoum hits the point: «Typically in the Muslim world today, even my students say that evolution is not a fact: “it is not confirmed, it is just an ideology, so you do not have to worry about it...”»⁴⁵. Guessoum’s assessment⁴⁶ is fully shared by Edis⁴⁷:

The Muslim world continues to lag in science. To correct that situation, many Muslims look to the past, thinking that they need to revive a golden age when Islamic science was strong and vigorous. [...] Today devout Muslims tend to embrace technology but keep science at arm’s length. Culturally, a scientific outlook has been hard to absorb, therefore many Muslims wrap science in protective layers of pseudoscience. Large numbers of Muslims are convinced that the Quran contains miraculous hints of modern discoveries. Muslims, even well-educated Muslims, overwhelmingly reject Darwinian evolution. After all, theories such as evolution do not sit comfortably with the common Muslim perception that our world is obviously designed by a higher intelligence.

There seems to be a variety of causes for this situation in the Muslim world. I would like to point here to only a cognitive one: it seems that many Muslim scholars understand as a “metaphysical” position the “methodological” materialism or naturalism of modern science that excludes from science the action of non-material forces⁴⁸. Taken as a metaphysical position, materialism contradicts, indeed, the Quran – literally the word of God – that states teleology and purposiveness of the natural world. For the believer, the Quran “is”, in fact, the last word.

⁴³ This seems to be, by the way, the majority position among believing Muslim scholars.

⁴⁴ So e.g. the Iraqi physicist M.B. Altaie prefers the Quran story about the origin of man, although he does not want to generally exclude Darwinian mechanisms; cf. S. Bigliardi *Islam and the Quest for Modern Science*, cit., 79.

⁴⁵ *Ivi*, 153.

⁴⁶ Guessoum remarks about Edis: «I have met him at least once and I had a nice conversation with him. Edis is an atheist and says so explicitly. He rejects religion and spirituality» (*ivi*, 163).

⁴⁷ T. Edis, *An Illusion of Harmony*, cit., 239 f.

⁴⁸ There are, of course, quite a few people who represent such metaphysical materialism, e.g. Edward O. Wilson, Richard Dawkins or Daniel Dennett. They represent, however, not a scientific but a (rather disputable) philosophical position that does not follow from methodological materialism; cf. G. Wolters, *Ambivalenz und Konflikt*, cit., 34 ff.

6. *A second Last Word About the Last Word in Science: Popper and Modern Philosophy of Science*

The “holy text”, as it were, about the possibility of only “second last” words in science and elsewhere dates back to 1935: *Logic of Scientific Discovery*⁴⁹, originally published in German as *Logik der Forschung*. The “prophet” is Karl R. Popper. Clearly, somewhat different from Popper’s self-interpretation, killing the last word in science has been a collective enterprise, that started in antiquity with the invention of rationality (*logos*) with the pre-Socratics, it reached an important stage in the Enlightenment, and found its present form in the philosophical revolution in the scientific philosophy (“Logical Empiricism”) of the Vienna and Berlin Circles⁵⁰. Almost all of its members had to escape from being victims of a negative last word about their lives by the Nazis. Most of them went to the United States and contributed to what is present day philosophy of science that itself does not know of a last word and regards itself as a never ending task, as science itself⁵¹. Popper excels in this matter for two reasons. He was the first to show with great clarity that general scientific statements for logical reasons cannot be “verified” by empirical evidence. The best we can attain is that an attempt at falsification fails. Failed falsification, in turn, we might understand as confirmation or “corroboration”, as Popper prefers to call it. In general, according to Coniglione, the history of rationality since its Greek beginnings is characterized by a last word-excluding strategy:

Escluso che ciò possa avvenire in virtù di un potere esterno (è migliore il discorso del più forte, cioè di colui che sia in grado di esercitare un maggiore coercizione fisica rispetto all’avversario).

E messa da parte la pretesa assolutistica dei discorsi religiosi o mitici, la cui autorevolezza dipende tutto dalla fonte di chi li profferisce (il sacerdote, il profeta, l’iniziato o il mistico) o da chi si presume che essi provengano in ultima istanza (la divinità, mediante ispirazione, invasamento o dettatura di un libro, per ciò stesso ritenuto sacro)⁵².

⁴⁹ K.R. Popper, *The Logic of Scientific Discovery*, Routledge, London-New York 2002 (first English edition 1959).

⁵⁰ On logical empiricism see P. Parrini, *L’empirismo logico. Aspetti storici e prospettive teoriche*, Carocci, Roma 2002. The Italian reader is here in the same lucky situation that I indicate in the next footnote.

⁵¹ For the history of rationality, the Italian reader for once needs not take recourse to the holy language of modern philosophy, i.e. English. F. Coniglione (*Popper addio. Dalla crisi dell’epistemologia alla fine del logos occidentale*, Bonanno, Acireale-Roma 2008, chapter 1), gives a splendid overview of the development of scientific rationality, on which I base my considerations.

⁵² F. Coniglione, *Popper addio*, cit., 22: «It is excluded everything that might happen by virtue of an external power (the best discourse is that of the most powerful, i.e. of the

Popper, furthermore, applied his methodologically motivated exclusion of the last word to politics and society, giving an influential plea for an “open society” and the liberal state.

In short, the last word, wherever it might come from, has been replaced in modern western thinking by critical discourse, based on rational (i.e. universalizable) arguments. This is the most fundamental precondition for the enormous success of Western science and technology. It includes that there can be at most *only second last words*, even with our best confirmed theories. This fact has led a series of philosophers to contest even *the possibility of second last words*. According to these “relativistic” or “postmodern” positions, everything scientific is “construction”, “local”, “culture dependent”, “gender-dependent”, and so on. There is no space here to deal with these “relativistic” attacks on scientific objectivity and universality⁵³.

The history of rationality started with the Greeks and reached its maturity in the Enlightenment of the 17th and 18th centuries and the ensuing developments up to the present day. I would like mention several normative pillars that have made modern science and technology possible. They all deny the idea of the last word:

- «Have the courage to use your own understanding!». This is from Kant’s normative definition of “enlightenment”.
«Enlightenment is man’s emergence from his self-imposed nonage. Nonage is the inability to use one’s own understanding without another’s guidance. This nonage is self-imposed if its cause lies not in lack of understanding but in indecision and lack of courage to use one’s own mind without another’s guidance. Dare to know! (*Sapere aude*). “Have the courage to use your own understanding” is therefore the motto of the enlightenment»⁵⁴. In short, “why should I believe this or that?” is

person that is in a position to exert greater physical coercion than his/her adversary»; «It is discarded the absolutist pretention of religious or mythological discourses, whose authority completely depends on the source that enunciates them (the priest, the prophet, the initiated, or the mystic) or from an entity, with which one presumes it as originating in final analysis» (my translation).

⁵³ I refer again to F. Coniglione, *Popper addio*, cit., who in chapter 2 describes and critically deals with most of these approaches. An Italian variant of postmodernism has chosen for itself the appropriate label *pensiero debole* (weak thinking).

⁵⁴ The English text of Kant’s *Beantwortung der Frage: was ist Aufklärung?* is easily available at: <http://www.columbia.edu/acis/ets/CCREAD/etscc/kant.html>: «Aufklärung ist der Ausgang des Menschen aus seiner selbst verschuldeten Unmündigkeit. Unmündigkeit ist das Unvermögen, sich seines Verstandes ohne Leitung eines anderen zu bedienen. Selbstverschuldet ist diese Unmündigkeit, wenn die Ursache derselben nicht am Mangel des Verstandes, sondern der Entschließung und des Mutes liegt, sich seiner ohne Leitung eines anderen zu bedienen. *Sapere aude!* Habe Mut dich deines eigenen Verstandes zu bedienen! ist also der Wahlspruch der Aufklärung» (I. Kant, *Beantwortung der Frage: Was ist Aufklärung?* [1784], in Id., *Werke in zehn Bänden*, ed. by W. Weischedel, vol. 9, Wissen-

the question that better than any other deconstructs incompetent authorities, at least as long one excludes physical violence and absolutist pretensions (see above) from the discourse.

- «Keep separate state and religion!». This is one of the most precious fruits of the Enlightenment, and a precondition for the development of the humanities and of social science, but also for the natural sciences. In most European states, it is only in partially realized⁵⁵. It is well discussable, whether a strict separation of religion and state (as in the French model of *laïcité* or as in the US, where strict separation of religion and state coexists with a highly religion-laden public sphere) is desirable in Europe. In any case, religious attempts to restrict the freedom of non-believers have to be combated.
- «Spend more money on education!». However, not only on STEM, i.e. to the academic disciplines of Science, Technology, Engineering, and Mathematics! The promotion of the humanities, above all of the philosophical analysis of science and culture in knowledge-based societies is of utmost importance⁵⁶. Philosophy courses should be obligatory in the STEM disciplines.
- «Fight the cretinism of large layers of our consumer societies!».

Particularly, this last imperative seems of great importance. I wholeheartedly share Coniglione's concerns about the end of the glorious history of enlightened Western thinking: «Sembra proprio che l'Occidente si sia stancato di se stesso, di pensarsi come un luogo privilegiato in cui, nel modo migliore, si era realizzata l'avventura della razionalità»⁵⁷. Coniglione is also concerned about the relativistic, "post-modern" tendencies in parts of contemporary philosophy of science, and particularly about the rising tide of religion. Although he mentions only Heidegger («only a God can save us») and the idea of the Pope emeritus Benedict XVI to strictly tie rationality to Christian revelation, he seems to be even more concerned about fundamentalist Islam. In a pessimistic outlook, he writes about rationality:

E allora quella verità, che abbiamo perso nei meandri e nelle infinite sotti-

schaftliche Buchgesellschaft, Darmstadt 1968, 53).

⁵⁵ Cf. G. Wolters, *Aufklärung und Religion – Damals und heute*, in P. Buser, C. Debru and P. Meyer (eds.), *Les Lumières: hier, aujourd'hui, demain*, Sciences e société, Hermann Éditeurs, Paris 2013, 232 ff.

⁵⁶ Cf. F. Coniglione (ed.), *Through the Mirrors of Science: New Challenges for Knowledge-based Societies*, Ontos, Heusenstamm 2010.

⁵⁷ F. Coniglione, *Popper addio*, cit., 236 f.: «It really seems that the West is tired of itself, is tired of seeing itself as a privileged place, where the adventure of rationality was realized» (my translation).

gliezze dell'epistemologia e della filosofia della scienza contemporanea, non sarà più accessibile all'umana ragione, ma solo allo sguardo di chi sarà legittimato a sollevare il burqa che ne copre il volto⁵⁸.

We should do everything we can to prevent that the truth about what has made us what we despite of all shortcomings (still) are: enlightened societies, formed by critical thinking; where religion is a private affair; where freedom, democracy, an impartial secular legal system exist; where we enjoy a science-based society and an economy that has generated mass welfare to a degree that has never existed before.

In short, we should choose as our goddess Pallas Athena with her open face, but also wearing lance and shield, in order to fight obscurantisms and cretinisms of all sorts.

⁵⁸ *Ivi*, 237: «And then this truth that we have lost in the meanders and the infinite subtleties of contemporary epistemology and philosophy of science, will not anymore be accessible to human reason, but only to the look of those who are legitimated to lift the burka that covers its face» (my translation).

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