

Juli Peretó

Intelligent design and the assault on science¹

Without evolutionary theory, contemporary biology would totally collapse. What is a coherent and fascinating vision of nature in which cruelty and crudeness are transformed into a marvel of countless forms and behaviours, a glorious view of life connected with the cosmos, Earth and all the rest of the natural phenomena, would lose all its sense and elegance without the evolutionary framework.

The only new theory that present-day science could admit would be one that encompasses and perfects the Darwinian view of the natural world, as a step forward that would illuminate the many details of the origins of life that still remain to be discovered or that resist our ability to understand the world. There is no way that substituting scientific scrutiny with obscurantism because of lack of data and observations, abandoning confidence in reason and recognising the failure of intelligence, can ever advance knowledge. Why should we accept that there is an impenetrable barrier to reason in the most intimate interstices of cellular structures and the most basic biochemical processes? Creationism and its most recent form, the so-called “theory of intelligent design” is inadmissible as an alternative explanation to the theory of evolution because it involves the surrender of reason. If we dare to think in evolutionary terms, we advance in our understanding of nature. We have the tools for understanding the marvels of

■ ¹ I should like to express my thanks to Jesús Català, historian of science at the Cardenal Herrera University-CEU, for his constant support and valuable comments.

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biodiversity or for bringing reason to bear on the threats of pathogens. Moreover, if we allow that an inscrutable wall shuts away natural phenomena from scientific explanation, we abandon forever the realm of reason and fall into the embrace of blind faith and fanaticism. The mind is annihilated with the tyranny of intimate truths over universal truths. Anything positive achieved by intellectual history would be lost.

TEACH THE CONTROVERSY

President George W. Bush says that school children have the right to learn about all opinions, all the versions that purport to explain the world. Hence it is legitimate to teach creationism in biology classes. One does not have to be very smart to divine the manipulation and fallacy that lie behind this assertion. First, we have the erroneous use of words like “theory” that can have other meanings in other linguistic registers. It is evident that we do not have a theory of universal gravitation along the same lines and of the same import as a theory we might have as to who assassinated President Kennedy. Everybody can have a different conspiratorial version. Talking about universal truths and private truths as if they were equal is cheating.

Again, the public is being given the false idea that evolutionary theory is monolithic and dogmatic. There is nothing further from the truth. Evolutionary theory is richly nuanced, overflowing with controversies, with abundant explanatory power but it also has its encouraging lacunae, problems that stimulate the intellects of thousands of people all around the world. There is no doubt whatsoever about the educative value of familiarising students with the controversies, reflecting on the arguments, taking up positions in debates and of becoming aware of the intrinsic provisionality and vulnerability of universal scientific truths and, finally, of reaching conclusions and readily accepting that a particular standpoint is mistaken if this is demonstrated by appropriate proofs.

In brief, this is not about two opposing sides, despite the efforts of the Discovery Institute, bastion of intelligent design, to present it as a scientific alternative to neo-Darwinism². What does exist is a political strategy, represented by the slogan “Teach the Controversy” that is causing a furore in the United States. On closer consideration, there is no controversy to be taught because the two sides of the dispute are not on the same plane. There is not, and neither can there ever be, because of epistemological impossibility, any debate between evolutionism and creationism. It is totally false that they can be put into opposition on equal terms because they represent intellectual positions that move on parallel planes with no chance of intersection. An experimental science like biology is based on the universality of its truths, which are contrastable and verifiable by anyone anywhere, independently of their religious or ideological affiliations so long as the investigation is carried out rigorously and honestly. Creationist truths, however, are not universal. They are heavily dependent on culture and education. Not all religions are

■ ² For further information in this regard, see E. C. Scott and G. Branch (2003) “Evolution: What’s Wrong with ‘Teaching the Controversy’”, *Trends Ecol. Evol.* 18:499-502; T. A. Langen (2004) “What is Right with ‘Teaching the Controversy’?”. *Trends Ecol. Evol.* 19:114-115; S. C.

Meyer (2004) “Teaching about Scientific Dissent from Neo-Darwinism”. *Trends Ecol. Evol.* 19:115-116; E. C. Scott and G. Branch (2003) “Teaching the Controversy: Response to Langen and to Meyer”. *Trends Ecol. Evol.* 19:116-117.

creationist in the same way, or inspired by the same principles, or governed by the same dogmatic obligations. Not all religions call for belief in a single, personal divinity. They do not all offer the same account of how it all began and neither do they have the same concept of the origins of everything that exists. There are even beliefs that are totally lacking in creation myths or that have a cyclical notion of time, which has no beginning and no end. Faith in any supernatural force and miracles is excluded by definition from the realm of science. Moreover, the provisionality and vulnerability that are part and parcel of scientific knowledge are not inherent to theology.

Disagreement over “teaching the controversy” is a hot issue in the United States today and it has generated a considerable number of public discussions and institutional and academic declarations³. The outcome of the Dover Area School Board case is highly relevant as the sentence of the Federal Judge, John E. Jones III, was an impeccable and exemplary summary of the issues⁴. There are 139 pages of testimonies and reasoning that radically unmask the so-called “theory of intelligent design”, denying its supposed scientific character and revealing the real intentions of its proponents: to sneak religious teaching into public schools, which violates the constitutional principle of separation of church and state. For Judge Jones, it was perfectly demonstrated that intelligent design is a fallacy, and nothing other than the same old creationism now dressed up as scientific theory. It is therefore unconstitutional to teach it in public schools.

At the end of 2004, the Dover School board decided that the biology teachers at the school should read a warning to the students before starting to teach the subject of evolution. The note⁵ stated what is as well known as it is false, that evolution is “only” a theory, while playing with a concept of “theory”, which it actually abhors. Students were warned that evolutionary theory is full of gaps and difficulties and that it has not been demonstrated. So that they could learn about “other scientific theories” (in other words, the famous and handy slogan of “teach the controversy”) students would be provided with the book *Of Pandas and People* (with which the board generously stocked the school library). This is a classic of creationist gobbledygook, and it turned out to be a determining factor in the trial, as we shall see below. When the teaching staff refused to read the note, the school’s administrative staff was obliged to do so.

■ ³ The dispute has gone to all levels, from the National Academy of Science to the Federation of American Societies for Experimental Biology (FASEB), which have made solemn declarations against intelligent design. Many scientific journals have devoted space to the issue (see the reports in *Nature* “Who has Designs on your Students’ Minds?” [28 April 2005], and *Science*, “Darwin’s Place on Campus is Secure —but not Supreme” [10 February 2006]). One may also find extensive documentation in R. T. Pennock (2003) “Creationism and Intelligent Design”, *Annu. Rev. Genomics Hum. Genet.* 4:143-163.

⁴ See www.pamd.uscourts.gov/kitzmiller/kitzmiller_342.pdf.

⁵ The statement read, “The Pennsylvania Academic Standards require students to learn about Darwin’s theory of evolution and eventually to take a

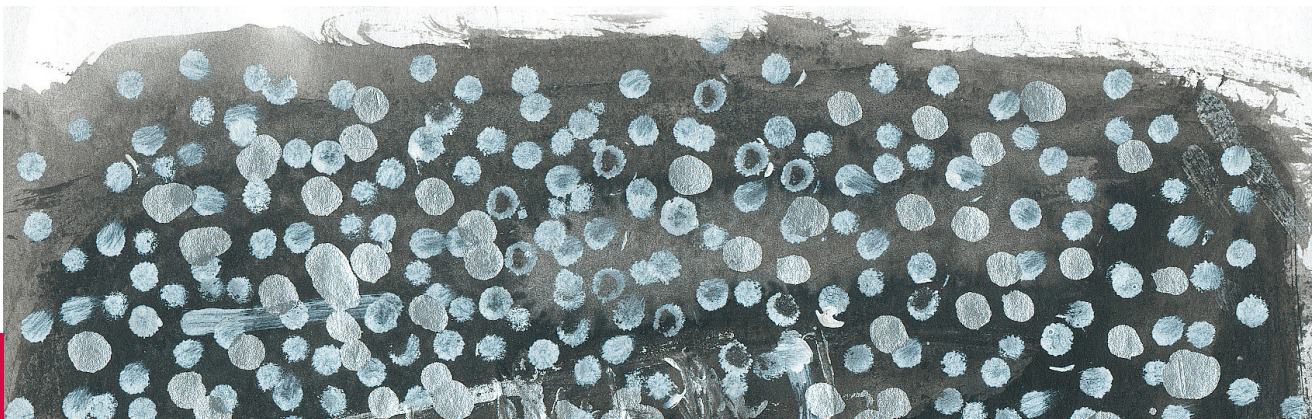
standardized test of which evolution is a part. Because Darwin’s Theory is a theory, it is still being tested as new evidence is discovered. The Theory is not a fact. Gaps in the Theory exist for which there is no evidence. A theory is defined as a well-tested explanation that unifies a broad range of observations. Intelligent design is an explanation of the origin of life that differs from Darwin’s view. The reference book, *Of Pandas and People*, is available for students to see if they would like to explore this view in an effort to gain an understanding of what intelligent design actually involves. As is true with any theory, students are encouraged to keep an open mind. The school leaves the discussion of the origins of life to individual students and their families. As a standards-driven district, class instruction focuses upon preparing students to achieve proficiency on standards-based assessments.”

In one sub-heading of his findings, the judge ironically concluded that even creationism evolves: “An Objective Observer Would Know that ID and Teaching About ‘Gaps’ and ‘Problems’ in Evolutionary Theory are Creationist, Religious Strategies that Evolved from Earlier Forms of Creationism” (page 18, 2.1.1.). The decisive evidence was provided by the historian of science, Barbara Forrest who demonstrated that “creationism” had been systematically replaced by “intelligent design” some 150 times in versions of the aforementioned book following the Decision of the Constitutional Tribunal in 1987 that declared it illegal to teach creationism in public schools.

Jones hopes to have unmasked the fraud of intelligent design and thus to avoid further loss of time and money, although the citizens of Dover were a jump ahead: in the elections of November 2005, not one of the school board members was returned. However, defenders of neocreationism continue to hatch new tactics. Not only do they subscribe to the ideas upheld by some scientists, for example the anthropic principle—the silly idea that some physicists have that basic constants must be fine-tuned in order for life to appear in the universe—to acquire a certain respectable gloss, but now they are also aiming to infiltrate philosophy classes, as they attempted to do some months ago in a California high school. Their influence has extended to some government circles (for example Australia where the Minister of Education would love to introduce teaching of intelligent design) that make ridiculous decisions in scientific policy (as in the recent case of the Canadian researcher whose research project on the penetration of creationist ideas into his country was turned down because he had not sufficiently demonstrated that the alternative, evolution, was the correct version!). The recent tour of the United Kingdom by a prominent advocate of intelligent design and the fact that some British private schools are already teaching it has prompted a solemn declaration by the Royal Society in defence of evolution (the text of this document is appended as an Annex)⁶. It is undeniable that this is a remarkable and unwonted occurrence in the country where Darwin was born, though it gives an idea of the extent of the problem and raises our guard against complacency.

■ ⁶ The National Centre for Science Education website (<http://www.natcensci.ed.org/>) offers an excellent way to keep up to date with all the news on the diffusion of the creationist phenomenon. There are numerous links to papers, essays, book reviews and educational

resources. The main aim of the NCSE is to foster the teaching of evolution in public schools. Its executive director, Eugenie C. Scott, is the author of one of the best books about creationism, *Evolution vs. Creationism* (California University Press, Berkeley, 2004).



IRREDUCIBLE COMPLEXITY

Darwin's Black Box: the Biochemical Challenge to Evolution (1996)⁷, written by the biochemist Michael J. Behe, is, without exaggerating, the book that has had the greatest influence in recent debates on creationism, a veritable founding treatise of neocreationism that has created an uproar of tremendous proportions in all the arguments for and against⁸. Better said, it has been an injection of vitality into a moribund movement like the biblical creationism of the beginning of the 1990s. Behe is Associate Professor of Biochemistry at Lehigh University (Bethlehem, Pennsylvania) although his department has officially distanced itself from his ideas⁹.

The central argument of Behe's book is that Darwin failed on the molecular scale. Behe occupies himself with the interior of the cells where, according to him, there is a myriad of structures of extraordinary complexity, based on the interaction of smaller pieces that fit together perfectly and make no sense in isolation. Neither would a system that lacked any of its pieces make any functional sense. This is what Behe calls *irreducible complexity*¹⁰: the validation of highly improbable molecular structures whose functions we cannot conceive of in incomplete systems. Behe's favourite examples are the bacterial flagellum the means of bacterial locomotion the process of blood coagulation and the immune system. Detailed examination of these and other molecular systems and comparative analysis with similar systems in many organisms from the whole phylogenetic scale clearly demonstrate that the irreducible complexity of the bacterial flagellum, for example, is not real but only apparent. There are examples of bacteria that contain only parts of this mechanism. The problem with the theory is that parts of the system can function differently from the whole, may or may not represent ancestral states and, furthermore, our capacity for observation and imagination is limited. Natural systems do not follow our logical schemes. It is we ourselves who must deduce, on the basis of molecular documentation that is as fragmentary as it is cryptic, by what paths, and by what processes such complex organisations have been structured over evolutionary history¹¹.

■ ⁷ Published by the Free Press (New York). There is a Spanish version of the book (Andrés Bello, April, 2000). It should be remarked that the factual information on biochemistry offered by the book is essentially correct and painstakingly presented.

⁸ If one types in "Michael Behe" on Google 435,000 pages appear (last accessed 30 July 2006)! If we use the Scholar version (<http://scholar.google.com/>) on the same search engine, there are 1,250 (last accessed 30 July 2006) references. If we look for scientific articles published by Behe in peer-reviewed journals (<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=PubMed>), there are 36 references, all publications by Behe on different aspects of biochemistry and molecular biology, but none of them directly related with the question of "irreducible complexity" or intelligent design. Behe has published some texts specifically dealing with intelligent design. It is worth reading his response to critics of his book (Behe, Michael, 2001 "Reply to my Critics: a Response to Reviews of *Darwin's Black Box: the Biochemical Challenge to Evolution*" *Biol. Phil.* 16:685-709).

⁹ See <http://www.lehigh.edu/~inbios/news/evolution.htm>: "Department Position on Evolution and "Intelligent Design".

The faculty in the Department of Biological Sciences is committed to the highest standards of scientific integrity and academic function. This commitment carries with it unwavering support for academic freedom and the free exchange of ideas. It also demands the utmost respect for the scientific method, integrity in the conduct of research, and recognition that the validity of any scientific model comes only as a result of rational hypothesis testing, sound experimentation, and findings that can be replicated by others.

The department faculty, then, are unequivocal in their support of evolutionary theory, which has its roots in the seminal work of Charles Darwin and has been supported by findings accumulated over 140 years. The sole dissenter from this position, Prof. Michael Behe, is a well-known proponent of «intelligent design.» While we respect Prof. Behe's right to express his views, they are his alone and are in no way endorsed by the

Paradoxically, Behe raises a problem that was resolved a century and a half ago by Darwin himself when he analysed the difficulties of evolutionary theory in his work on the origin of the species¹². And it was very well resolved. One evident case for Darwin was the existence of organs of extreme complexity and perfection, such as animal eyes, and how to explain their origins by natural selection. Given the impossibility of analysing each and every one of all the intermediate stages in the evolutionary formation of an eye because these stages are extinct, imagination and comparative method come to our aid. There is no doubt that some closely related species might have retained simpler structures, representing previous stages, which are useful for them in their habitat and lifestyle, and we need to be capable of recognising them. Because a half-completed eye could be better and more useful than not having any and living in total darkness, we find species that only have light-detecting systems, others than cannot generate well-defined images, right through to others with sight organs that manifest states of sheer perfection, like the eye of vertebrates, which is able to focus and correct optical aberrations. On the molecular scale, and this is where Behe resorts to trickery, we can also employ the comparative method and seek simpler molecular structures —like an eye that is unable to form sharp images but that can function usefully for the survival of the organism that possesses it. This form of functionality, as the crude and unpredictable process of evolution prescribes, will not be exactly the same in the final product¹³.

Behe also introduces epistemological sleight of hand into his argument. He seeks an example of complex molecular structure. He wonders if scientists have inquired into each and every intermediate step in its evolutionary history. If the answer is negative, this supposedly demonstrates that it has been designed by a supernatural power. In other words, his only criterion for recognising an irreducibly complex structure is that we

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department. It is our collective position that intelligent design has no basis in science, has not been tested experimentally and should not be regarded as scientific.”

¹⁰ The literal definition in the book is, “By irreducibly complex I mean a single system which is composed of several well-matched, interacting parts that contribute to the basic function, and where the removal of any one of the parts causes the system to effectively cease functioning” (Behe 1996:39). The example used to explain the idea is that of a mousetrap. The author, recognising its ambiguity on several occasions, has changed and nuanced his definition of irreducible complexity, for example by adding the word “necessarily” so that it reads “...a single system which is *necessarily* composed of several well-matched ...” (See Behe, 2001, p. 694).

¹¹ Extensive discussions of each of the systems favoured by Behe may be found along with explanations why, contrary to what Behe states, they are perfectly “reducible”. See in particular Niall Shanks (2004) *God, the Devil, and Darwin* (OUP, Oxford); Matt Young and

Taner Edis, eds. (2005) *Why Intelligent Design Fails. A Scientific Critique of the New Creationism* (Rutgers University Press, New Brunswick).

¹² Charles Darwin (1859) *On the Origin of Species* (John Murray, London), published in Catalan by Edicions 62, Clàssics del pensament modern 1, Barcelona, 1982. Chapter 6 is devoted to the “difficulties of the theory” with a section specifically concerned with analysing the natural origins of animal eyes (1982, 179 ff.).

Richard Dawkins offers a magnificent exposition of the evolution of eyes by natural selection in his *Climbing Mount Improbable*, Penguin, London (the Spanish version was published by Tusquets, Barcelona, in 1998).

¹³ François Jacob introduced the felicitous notion of evolutionary bricolage to refer precisely to the non-designed character of evolution. See, for example, his *Le jeu des possibles*, Fayard, Paris, 1982. The Spanish version was published by Grijalbo, Barcelona, 1997, while the English version is entitled *The Possible and the Actual* (Pantheon Books, 1982).

cannot postulate any evolutionary explanation. If next week, or next month, or next year, or some century, somebody finds it, what then? In the cases where we are able to propose logical evolutionary schemes, Behe accepts evolution. For the rest, he confines himself to partial quotes out of context. In other words, his conclusions are frequently based on elimination of context and the partial information he supplies in his book. The theory of intelligent design is shameless acceptance of ignorance and shameful abdication of the possibility of abandoning it.

We also find quite an interesting parallel between Behe's intellectual position and that adopted a century ago by Catholic neovitalists with regard to the enigmas of the origins of life. The impossibility of spontaneous generation was elegantly established with experimental persuasiveness by Louis Pasteur and John Tyndall in the latter half of the nineteenth century. From the strictly scientific point of view, coherent acceptance of Darwin's theory required imagining that the original primordial beings came about through natural phenomena. Only those who wished to defend continuity between inanimate and living matter, like the German naturalist Ernst Haeckel, were able to suggest an origin of life without miracles. Again, Pasteur's experiments were at the basis of arguments by different Catholic scientists, who, although they accepted that species were transformed by natural mechanisms, saw an insurmountable barrier between chemistry and the most primitive forms of life. For them, only a miracle could explain the origins of life. The German evolutionary entomologist and Jesuit, Erich Wasmann declared that, "we see acceptance of a personal Creator as a true 'scientific postulate'"¹⁴. The Catholic biochemist Behe asserts that there is no a priori reason for imagining that these basic developments (the origin of the universe and the development of life) should be explained in the same fashion as other physical occurrences¹⁵. In brief, the champions of intelligent design are asking science to incorporate *other non-physical explanations* of the world.

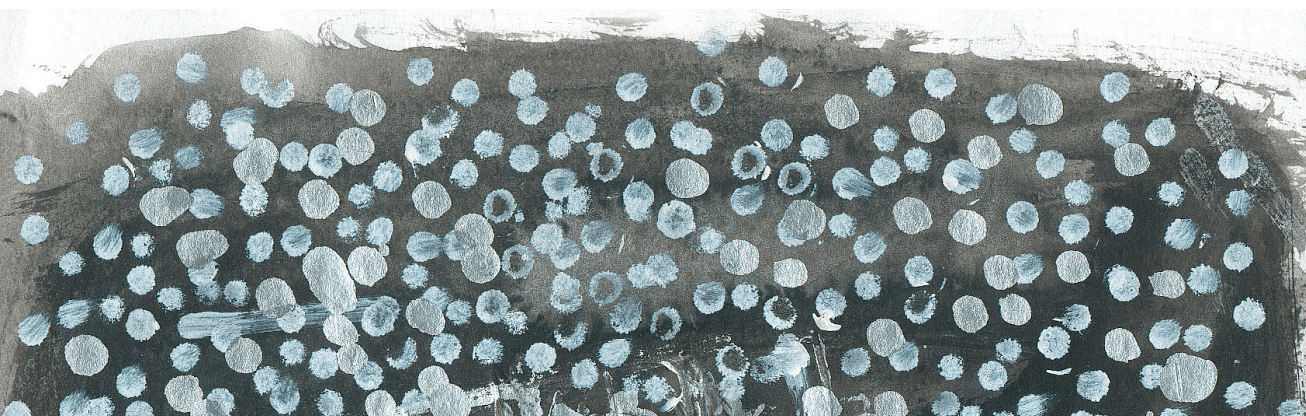
■ ¹⁴ E. Wasmann, S. J. (1910), *Modern Biology and the Theory of Evolution*, Kegan Paul, Trench, Trübner & Co., London (translation of the third German edition by A. M. Buchanan, p.206). Wasmann had scientist members of religious orders among his followers, for example Agostino Gemelli, Jean Maumus and Jaume Pujiula. In all cases their criticism of the materialism of the evolutionists (especially Haeckel) was implacable and their option was theist, creationist evolution, in the context of neovitalism.

¹⁵ Behe (1999), op. cit., p.300.

¹⁶ D. J. Futuyma, 1997, "Miracles and Molecules", *Boston Review* (February-March).

¹⁷ Kevin Phillips, a well-known ideologue and former Republican politician, has just published *American Theocracy: the Peril and Politics of Radical Religion, Oil and Borrowed Money in the 21st Century* (Viking, New York, 2006), where he offers quite a complete analysis of the influence of Christian fundamentalism (especially in the Protestant churches in the South of the USA) in recent American history. For Phillips, the religious excesses and anti-scientific censorship of the present Bush government (for example, with regard to health and the environment), vast oil-based ambitions and public and private debt have set the United States on the road to disaster.

¹⁸ See <http://www.alternet.org/story/30335/>.



THE GOSPEL OF DEMOLISHED INTELLIGENCE

From the standpoint of the theory of intelligent design there is, moreover, an asymmetry in its explicative requirement vis-à-vis evolutionary theory that has no precedent in other scientific disciplines. Nobody wants to know, centimetre by centimetre, how the Alps were formed over the last 200 million years. Nobody questions the theory of plaque tectonics because we do not have —we cannot have!— such detailed narrative. However, Behe denies the validity of evolutionary theory because we do not have a step-by-step explanation of the origins of complex structures contained within the cell. In conclusion, implicitly admitting the defeat of reason, he wants to force us to take an a-scientific path: we cannot explain it because everything is the result of the whim of an inscrutable mind. As Douglas Futuyma has remarked¹⁶, instead of advancing and honing scientific knowledge, Behe advises us to abandon all hope of understanding! The theory of intelligent design cannot be rated as scientific by any of the usual criteria of classification. Judge Jones provided a meticulous analysis of this in his Dover case sentence. However, to put it briefly, we might say that the theory of intelligent design, by definition, is not vulnerable, or provisional or universal. It is a case of general evolutionary incredulity. The level of detail required in its explanations is absurd. It is based on an absence of explanation and is thus at best the product of scientific impatience, when not of ignorance. Perhaps it is the proposal of idle scientists who wish to introduce supernatural, untenable and unnecessary explanations into the description of nature, which is to say it is an assault on science by religious fundamentalism. In this regard, the disturbing fervour with which this idea of intelligent design has spread to different countries and creeds from the United States, where it receives considerable government support, is illustrative¹⁷.

Although the United States is the stronghold of creationism, antievolutionism is exporting its propaganda everywhere. The evangelists are using creationist texts in different languages, apart from English, for example Afrikaans, Albanian, Chinese, French German, Italian, Japanese, Portuguese and Spanish. In Russia, evangelist texts tend to be used for teaching English. Again, the labours of a Turkish “Foundation for Scientific Research” to push creationist texts are remarkable. The display of methods on its website is fabulous with free on-line books and videos translated into many languages and with quite a lot of references from the Koran. Texts by Harun Yahya (pseudonym of the most popular Islamic creationist, Adnan Oktar) are rehashes of texts on intelligent design from the American Discovery Institute. There are some small disparities that betray the lack of universality of these explanations: references to the Flood are eliminated because this “geological phenomenon” is not part of the Koranic tradition! Again, last January, Moshe Tendler, an orthodox rabbi and biology lecturer at the Yeshiva University proclaimed before a large audience of Jewish scientists and intellectuals at an international congress on “Torah and Science”¹⁸ that, «It is our task to inform the world [about intelligent design]... Or the child growing up will grow up with unintelligent design[.] Unintelligent

“...we might say that the theory of intelligent design, by definition, is not vulnerable, or provisional or universal”

design is our ignorance, our stupidity». I think that the problem is not so much these differences but exactly the reverse. Religious fundamentalists can reach agreement at least in their radical opposition to scientific explanations of nature.

THE SCHÖNBORN AFFAIR

Texts that are critical of creationism and intelligent design generally highlight and offer in contrast the stance of the Catholic Church when confronting the radicalism of certain protestant groups, followers of biblical literalism. The key quote is the speech of Pope John Paul II on 22 October 1996 to the Pontifical Academy of Sciences in which he recognised that evolution is “more than a hypothesis” and noted its scientific nature. However, the Dominican cardinal, Christoph Schönborn, Archbishop of Vienna, then published a brief but significant text in response that has had unexpected reverberation. What is worst about his “Finding Design in Nature” (*The New York Times*, 7 July, 2005¹⁹) is not that its prominent author, an eminent theologian and editor of the Universal Catechism, should side with intelligent design because this is legitimate as pure personal opinion. In this article, he describes the speech of John Paul II as “rather vague and unimportant”, explicitly attempting to discredit all those who refer to it in order to illustrate the compatibility of Church teachings with the scientific theory of evolution. He does this Wasmann-style, with the appropriate exceptions because the Pope’s declaration also touched on what Emila Pardo Bazán once called the “rock of the Darwinist scandal”, the question of the origin of man as being reserved for divine intervention. It is about the ontological leap from matter to spirit, the discontinuity that is so cherished by the bearers of doctrine and still upheld in the last vitalist redoubt that has holed up in the neurosciences. In any case, there is nothing to make one think that the Archbishop of Vienna is a sharpshooter. The hullabaloo that followed the article in *The New York Times*, which surprised the author himself, might make one wonder about a change of strategy by the Catholic hierarchy.

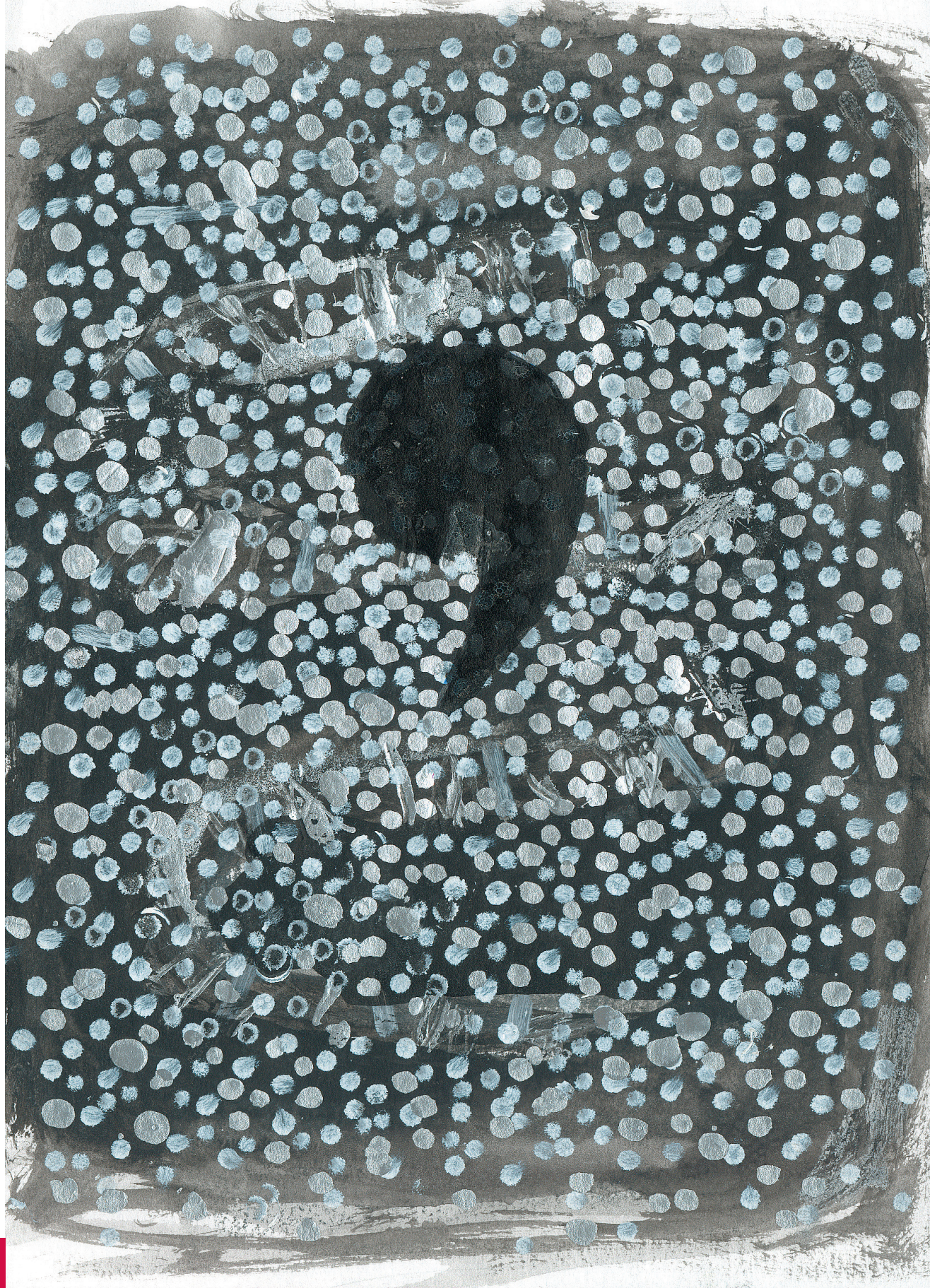
Weeks after the article appeared, an open letter to Pope Benedict XVI was published, signed by the theoretical physicist Lawrence Krauss and the biologists Kenneth Miller and Francisco Ayala, requesting him to clarify the Church’s position²⁰. Even though some distinguished voices, like that of the Jesuit George Coyne²¹, director of the Vatican Observatory, have rebutted Schönborn’s views, the latter has recognised that he has the support of the present pontiff and has continued working on his arguments in writings and lectures. It is revealing that the subject he has chosen this year for his catechism teaching at Saint Stephen’s Cathedral in Vienna should be Creation.

■ ¹⁹ See <http://www.nytimes.com/2005/07/07/opinion/07schonborn.html>.

This text, along with other contributions and views of Christoph Schönborn, may be found at http://www.cardinalrating.com/cardinal_97.htm.

²⁰ See <http://genesis1.phys.cwru.edu/~krauss/papallettxt.htm>. See also, L. Krauss (2005) “The Pope and I”. *The Skeptical Inquirer*, November, pp. 46-47.

²¹ See, for example, C. Holden (2005) “Vatican Astronomer Rebutts Cardinal’s Attack on Darwinism”. *Science* 309, pp. 996-997; or the text of a recent lecture by Coyne entitled “Science does not need God. Or does it? A Catholic Scientist Looks at Evolution”



It is well-known that certain radical Catholic groups in the United States—who are involved, for example, in the anti-abortion struggle—have been giving their support to the neocreationist movement of intelligent design, but the entry on to the scene of top members of the Church hierarchy is an unexpected and disturbing development.

Pope Benedict XVI used his weekly public audience of 9 November 2005 before the Austrian Episcopal Conference, of which Schönborn is the president, to refer to the “intelligent project of the cosmos”. This terminology, which is very close to that of neocreationism, although it has different theological roots, might not, in principle, be incompatible with the evolutionary view of the universe and of life²². However, this reference in the papal discourse was ad hoc and the Vatican’s official press note to *L’osservatore romano* made no reference to it, and it all happened precisely the day after Cardinal Poupard, who is the equivalent of the Vatican Minister of Culture, had made some explicit anti-creationist declarations.

In recent months Schönborn has conceded interviews and published texts (apart from his monthly catechism teaching in Vienna) and has attempted to refine his ideas with the aim of distinguishing between the scientific study of biological evolution, which he accepts as such and “Darwinist explanations”—or Neo-Darwinism—which he describes as ideological excess. Whatever the case, future changes in the Curia and the line of discussion opened up by Schönborn might be keys to understanding and clarifying the true position of the Church vis-à-vis evolution. Perhaps the Church wishes to distance itself clearly from the anti-scientific radicalism that is so obscenely paraded around by evangelists, Islamic fundamentalists and orthodox Jews. Or maybe not... II

■ ²² Thus it seems to Fiorenzo Facchini, an anthropologist and professor of Evolutionary Biology at the University of Bologna, in his article “Evoluzione e creazione”, *L’Osservatore romano*, 17th January 2006 where he applauds Judge Jones’s sentence in the case against intelligent design and vehemently refutes this “theory”.

²³ See <http://www.royalsoc.ac.uk/news.asp?id=4298>.

Juli Peretó is associate professor in Biochemistry and member of the Cavanilles Institute for Biodiversity and Evolutionary Biology at the University of Valencia. He is presently Secretary of ISSOL, The International Astrobiology Society.

❖ Annex

A STATEMENT BY THE ROYAL SOCIETY ON EVOLUTION, CREATIONISM AND INTELLIGENT DESIGN²³

April 2006

The Royal Society was founded in 1660 by a group of scholars whose desire was to promote an understanding of ourselves and the universe through experiment and observation. This approach to the acquisition of knowledge forms the basis of the scientific method, which involves the testing of theories against observational evidence. It has led to major advances of understanding over more than 300 years. Although there is still much left to be discovered, we now have a broad knowledge of how the universe developed after the Big Bang and of how humans and other species appeared on Earth.

One of the most important advances in our knowledge has been the development of the theory of evolution by natural selection. Since being proposed by Charles Darwin nearly 150 years ago, the theory of evolution has been supported by a mounting body of scientific evidence. Today it is recognised as the best explanation for the development of life on Earth from its beginnings and for the diversity of species. Evolution is rightly taught as an essential part of biology and science courses in schools, colleges and universities across the world.

The process of evolution can be seen in action today, for example in the development of resistance to antibiotics in disease-causing bacteria, of resistance to pesticides by insect pests, and the rapid evolution of viruses that are responsible for influenza and AIDS. Darwin's theory of evolution helps us to understand these problems and to find solutions to them.

Many other explanations, some of them based on religious belief, have been offered for the development of life on Earth, and the existence of a "creator" is fundamental to many religions. Many people both believe in a creator and accept the scientific evidence for how the universe, and life on Earth, developed. Creationism is a belief that may be taught as part of religious education in schools, colleges and universities. Creationism may also be taught in some science classes to demonstrate the difference between theories, such as evolution, that are based on scientific evidence, and beliefs, such as creationism, that are based on faith.

However, some versions of creationism are incompatible with the scientific evidence. For instance, a belief that all species on Earth have always existed in their present form is not consistent with the wealth of evidence for evolution, such as the fossil record. Similarly, a belief that the Earth was formed in 4004 BC is not consistent with the evidence from geology, astronomy and physics that the solar system, including Earth, formed about 4600 million years ago.

Some proponents of an alternative explanation for the diversity of life on Earth now claim that their theories are based on scientific evidence. One such view is presented as the theory of intelligent design. This proposes that some species are too complex to have evolved through natural selection and that therefore life on Earth must be the product of a "designer". Its supporters make only selective reference to the overwhelming scientific evidence that supports evolution, and treat gaps in current knowledge which, as in all areas of science, certainly exist —as if they were evidence for a "designer". In this respect, intelligent design has far more in common with a religious belief in creationism than it has with science, which is based on evidence acquired through experiment and observation. The theory of evolution is supported by the weight of scientific evidence; the theory of intelligent design is not.

Science has proved enormously successful in advancing our understanding of the world, and young people are entitled to learn about scientific knowledge, including evolution. They also have a right to learn how science advances, and that there are, of course, many things that science cannot yet explain. Some may wish to explore the compatibility, or otherwise, of science with various religious beliefs, and they should be encouraged to do so. However, young people are poorly served by deliberate attempts to withhold, distort or misrepresent scientific knowledge and understanding in order to promote particular religious beliefs.