

# 教会及其与科学的对话<sup>1</sup>

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尽管教会受到了古往今来科学发展的挑战，但是宗教与科学之间依然存在巨大的对话潜力。耶稣会士约翰·莫法特在 2008 年于杜伦大学伍绍学院举办的“活的神学”暑期班所作的最后一个系列主题讲座中，对这一潜力进行了探讨。

开讲伊始就声明自己实际上不是任何方面的专家，是公平合理的。然而我却有幸向几位科学家讨教，因此至少从那个角度来说，希望在宗教与科学的对话状态方面，给大家提供一些有益的反思。我打算探讨四个不同方面：现代科学对宗教思想提出的挑战，当前对话得以发生的适合领域，宗教与科学的广义冲突史，以及基于古代基督教逻各斯（即上帝的言辞）学说的神学观点。

## 科学挑战

在过去的 500 年间，基督教面临的富于想象力的最大挑战之一，便是从地心说的宇宙观向实际上的无限宇宙观的转变。无限宇宙观认为，地球是一个在一个微小星系（此类星系达数十亿之多）中围绕一个微小太阳公转的微小行星。过去的说法是，只要太阳围着地球转，我们就知道自己的所在。每一事物，每一个人，如上帝、我们、天堂、地狱、今生、来世，都有其明确位置。基督教综合柏拉图和亚里斯多德的思想，和谐地处理了天文学、科学、神修、神学及圣经的联系，圆满地阐释了我们、我们的世界、现在及永恒的关系。然而在过去的四个世纪中，那种和谐及圆满却遭到了剥夺。在一个从某一点向外无限延伸的宇宙里，我们再也不能讲述万物在信仰的说法中的归属故事；又由于宇宙在一个极广的时间尺度上朝着大挤压或冰冷的死亡延伸，我们甚至连“时间”的概念也弄不清楚了。

但是自 19 世纪末以来，造成科学与宗教之间最紧张的冲突的，或许当推形形色色的达尔文思想。该思想最初仅就旧约的某一释义提出针对性挑战。然而随着基督教的应答变得日益圆滑，支持达尔文理论的科学也变得日益先进。在我们这个时代，理查德·道金斯教授在其论述中阐释了达尔文的遗传学说。在那个基础上，道金斯称，任何对上帝的信仰均为非理性的。<sup>2</sup> 许多非信徒对道金斯感激不尽，因为他为他们阐释了常年困扰他们的宗教问题。但是我认为他对信徒同样做了一件好事。自开始不提上帝而清晰一贯地描述生命及人类的起源以来，他的确对信徒提出了不少难题，迫使我们在这段时间内对自己的回答作比以往更为清晰、更为深刻的思考。现在让我们先来看看科学对排斥信仰的世界是怎么解释的。

宇宙史上的两大飞跃，或许是从无机物到生物的转变及从无意识有机体到有意识有机体（特别是像我们这样能够自觉反思的有机体）的转变。道金斯用复制型分子为主体的生物创造说解释了前一种转变。处在更小分子均匀分布的环境中的分子，能够促使类似自身的分子的形成。这类现象的确存在。我们估计，它们是在条件恰巧适宜的宇宙的某处偶然出现的。由于宇宙浩瀚无际，因此只要此类现象是**可能的**（生物有机体证实了这一点），**不可能性**就决然不是问题。一旦分子开始复制，演化进程就随之启动。由于代与代之间有变异发生，一些变异体就比另一些变异体复制得更为成功，因此下一代中像它们的分子就更多。一切生命形式，说到底，都是通过这个过程演化而来的。

在讨论意识时，道金斯提到了丹尼尔·丹尼特的论点。在（偏颇得可爱的）《意识的解释》<sup>3</sup>一书中，丹尼特用了一个人工智能模型来解释人的心智活动。我们的心智活动，是由大脑这个硬件演化而来的复杂软件组合，用以满足解释存在于过去数百万年中的哺乳动物及人类的迫切需要。这些历程的一个副产品，便是自我意识，**那些**知觉、思想、情感归依的主体意识。但那个自我、**自我**经验及**自我**自由，无非是些幻觉而已。产生那些东西的历程，尽管复杂得难以言表，说白了就如个人电脑那般机械。

由此便引出了排斥有神论的理由：我们不需要它来解释关于我们或这个世界的任何东西。这一论点可以略陈如下：

- 通过自己的观察及业已掌握的规律，我们能够对自然界出现的生物复杂性做出解释。
- 增加另一层解释不仅没有必要，而且也不合理（不科学）。
- 一旦额外解释本身（上帝）比它准备解释的东西复杂，那么它就不合理。

这一以科学为基础的对宗教的特定挑战，缺乏一个解释。它不仅应当告诉我们，我们是怎样从大爆炸演化到有意识的生命形式的，还应当告诉我们，我们为什么能够以这种形态生活在这个世界。为了给这一解答寻找素材，我们不得不求助于科幻作家。在其《黑质三部曲》中，菲利普·普尔曼展开了超常的想象翅膀，在史诗的层面刻意探讨了平衡问题，指向一个虽然无神但却富于价值的宇宙。电视剧《神秘博士》（里查德·道金斯曾两度客串该节目）则提供了另一个论坛。作者们在该论坛始终如一地、睿智地呈现了一个美好、复杂但却解释得通的宇宙。善与恶是实在的，人类的选择是至关重要的。虽然存在着超越，但并未越界。尽管这里存在理念上的矛盾，但解说词却始终令人信服的。

然而，许多科学家（无论他们在信仰问题上立场如何）并不认为，信仰上帝是绝对不合理的，部分原因在于，他们还不相信，对宇宙的物理学描述的各个环节，都解释得天衣无缝。尽管信上帝没有足够的科学道理，但宣告对上帝的一切信仰都是误导也同样缺乏充分的科学依据。在某些环节中，的确仍然存在一些实在领域，其难解性使宗教与科学的兴趣有可能合理重合。

## 对话空间

现在让我们来看看三位乐于给我时间并与我交谈的科学家。

苏珊·格林菲尔德教授<sup>4</sup>是一位任职于牛津大学药学院的神经学家，其主要研究方向为大脑退行性疾病。这使她对意识现象产生了特别的兴趣。她不接受丹尼特用还原法来解释意识特征如“我的观点”或“我所知的世界”。在研究了这类心智状态的生理学关联之后，她提出了一个整个大脑活动对某一刺激的反应达到某一强度时发生的意识自觉模式。她用了一个石头击水产生涟漪的意象。感官刺激在大脑中引发电化学活动涟漪。这些涟漪（急速）扩散，波及越来越多的脑器官。在这个过程的某一刻，即当活动变得足够剧烈、涟漪变得足够宽阔时，大脑的主人便会自觉地意识到刺激。但是她清楚，明确心智活动发生的物理学条件，并不等于解释那些活动。那完全是两码事。像许多人那样，她对宗教经验可能涉及的生理学过程深感兴趣，并对时间、永恒、无聊的体验、自我及其它感觉的存在与缺失的物理学关系进行了探索性研究。但是她的科学敬业精神，却使她不相信这类体验的终极原因，而不是把生理学解释看作是至足的解答。对她来说，宗教与科学之间不存在实质性矛盾。

第二位与我交谈的是罗杰·彭罗斯教授。<sup>5</sup>他是牛津大学的数学物理学家，对广义相对论数学做出过重大贡献。谈话从正儿八经的化和生物学领域开始，一直谈到它们的物理学基础。我们最终发现，终极实在显得是多么的怪诞和反直觉。以量子力学的基本方程之一薛定谔方程<sup>6</sup>为例。虽然该方程可以算出任何时刻的粒子位置，但是在计算过程中，你会发现，粒子实际上并非任何时刻都处在那个特定位置的。如果你想象抛接橙子的杂耍，那么不妨想象每个橙子都是一个粒子（如电子），但每个橙子都是同一粒子。每一个橙子，同一时间处在不同位置的每一个粒子变体，都附带有一个数。更糟糕的是，该数是一个复数，即包括16世纪意大利一位数学家臆想出来的荒诞的-1的平方根。有一个带复数的橙子甚至处在房间的另一端。到处都是粒子变体。然而荒诞并未就此结束，因为这只是在你不看的前提下才会发生。一旦你开始测算，粒子便突然聚在一处而非散在四方。我们的薛定谔方程试图告诉我们粒子可能会在何处。但是该方程和某个突然跳出的特定读数（如地上的一个橙子）之间，仍然存在一个离奇的解释空白。前者给了我们一个稳定的自旋波（被抛接的橙子），后者只能用概率来推测，而非精确计算。（稍后你们将理解这个例子的含意）。

身为物理学家的彭罗斯，和格林菲尔德一样，也对意识问题着迷。他同样不接受丹尼特及其他人工智能拥戴者对意识所做的还原法解释。他提出一个论点，认为人类意识和任何可用计算中不可或缺的、受规则制约的算术程序生成的东西有着本质区别。其中一个差别就是人类认识此类规则及程序的能力，即跳出规则程序之外来认识它们的能力。数字系统能够产生那种状态的唯一方式，要么是其前后不一致，要么是其基本规则产生了矛盾。但是数字计算之所以可能，正是因为一致性。因此，彭罗斯推论，如果我们想要了解人类自我的运作机制，那么我们就应该去研究电脑。彭罗斯建议，如果我们想要确定人类心智在物理宇宙中的位置，那么我们就应该去探究那部分似乎存在内在矛盾的物理现实。我们刚才探讨的作为可预测稳定波的粒子和处在某一特定位置的不可测算的粒子之间的跳跃，似乎正好提供了那种矛盾。量子理论的未解之谜和人类意识的未解之谜，因此就会聚到一处。彭罗斯指出，物理学的范畴需要扩大，量子理论需要修正。这两项任务完成之后，对宇宙（心智存在于其中的某个恰当位置）的解释就会更加丰富。

彭罗斯并不是在为心智寻求一个超自然的解释，而是想用扩大我们对自然的认识的方法来包容心智。和许多人一样，他尚未发现任何令人信服的特定宗教系统。然而和道金斯有别的是，他并不认为反对一切宗教信仰的案子是盖棺定论。根据这一科学观点，对好科学来说，信仰既不一定是非理性的，也不一定是有害的。而且这个领域存在一些对话的有趣空间。

艾玛·科恩博士<sup>7</sup>是一位人类学家，供职于牛津大学相对较新的认知与进化人类学研究所，其田野调查研究过非裔巴西人的心智、身体及精神状况。尽管她在科学上不相信形而上学的说法，但却对宗教观点颇具同情。她关切的领域是观念之形成，包括那些与诸文化中对心智、鬼神及伦理信仰有关的东西。那是一个大项目中的子项目，旨在寻找我们人类是如何随着不断成熟在认知方面产生特定倾向、接受不同观念的证据。有关孩童的大脑是一块白板，等着别人往上涂抹的老观念，似乎与证据不符。有些事物孩童接受，有些事物他们拒绝接受。他们接受“上帝”的概念及话题，但不接受任何陈腐的形而上学说法。他们需要更多的诱导，比如要对他们说，天上有个巨茶壶。幼童对不同情境的道德反应前兆，也是可能发现的。一旦全人类共有的概念“空间”得以确定，接下来便是为这些心智空间是如何在人类的进化过程中出现的寻找一个恰当的解释。

科恩清楚，如此推论的结果存在局限。解释概念空间的演化起源，无论是其与上帝还是科学相关，都能够推进我们的认识，但却不一定能够解答前来充实空间的概念的意义及真相。对上帝-空间起源的演化解释，既不意味着上帝的存在，也不意味着上帝的不存在。

因此，科学与对上帝的合理信仰并非完全水火不容，是有科学道理的。许多科研领域，为着他们信仰的知识完整性，的确需要信神者的参与。与此同时，另一些信仰传统做过某些特定主张的领域，将受到科学研究的严厉挑战。我想对我们天主教徒强调以下几点：关于人性及堕落的教义，关于人的灵魂及来世性质的教义，以及关于生物伦理学的教义。至于信仰者对他们那方的对话如何反应，仍然有待考察。

## 辩论史

现在我想用点时间来追述科学与宗教的辩论史。我想把你们带回那些动荡的岁月。当时的新繁荣开始导致旧社会秩序的崩溃。代沟随之出现。由于民主鼓励个人崇拜，传统价值观念被弃置一旁。又由于物理学的新认识站稳了脚跟，宗教信仰便被视作毫不相干的东西，上帝也被撵出历史舞台。当然，我指的是公元五世纪的雅典。关键人物是德谟克利特，其关于物质结构的早期原子理论在过去的300年间再度影响鹊起。和当时的其他物理哲学家一样，他试图尽可能简单地用基本物质状态来解释世界。在这个过程中，他构建的解构模型在马克思的著作及《上帝的错觉》这样迥然不同的作品中产生了现代反响。

一代人之后，柏拉图及其学生亚里斯多德忙着为那个解构时代准备答案。柏拉图毕生致力于重新确立处于人类现实中心的价值观念：公正、智慧、自制、勇敢、善良。相比之下，亚里斯多德更加务实、更注重观察。他专注于构建一个针对现实（物质现实、物理现实、生物现实、社会现实）的条理清晰、首尾一贯的解释，对伦理学的知识修养及伦理改革不甚感兴趣。在亚里斯多德的现实中，价值与神灵各得其所。对柏拉图和亚里斯多德两人来说，“心智”均为第一实在；而对亚里斯多德而言，目的性总是妥善解释万物为什么会在自然中发生的不可或缺的要素。说“因为甲击打乙，所以乙发生了移动”，理由并不总是十分充分。有时，特别是在生物学方面，除非你同时说出乙为什么会被移动，否则解释是不全面的。

亚里斯多德的宇宙模型及其充分物理解释模型（最终被基督教化了），在哲学思想上一统天下长达17个世纪之久。但是，少数派报告也是一如既往存在的。在这一个案中，在德谟克利特原子论的基础上，伊壁鸠鲁发展出一个有关人类状况的整体理论。我们的存在遭到了随机游离在无限、冷漠的宇宙中的原子的轰击。我们生存的唯一方式，便是在生活压力之外寻求庇护，紧紧抱住向我们走来、使我们感到欣慰的小“金块”不放。与凯撒大帝同时代的罗马诗人卢克莱修，对他的学说进行了最全面的阐释。当我们读到他强烈谴责以宗教的名义作恶（如战争、孩童祭祀），看到他因这个脆弱、缺乏终极意义的世界之美而欣喜，听到他劝我们“抓住机遇”的忠告时，我们能够分辨出我们这个时代的、力图理解做人的意义的声音。

宗教与科学的冲突是一个古老问题，部分原因在于个人经验，部分原因在于对什么才是妥善解释的设想。对生物学家亚里斯多德来说，如果某一科学解释未能解答可能合法提出的全部问题，包括“为什么”，那么那个解释显然是不充分的。对其他人来说，任何一个能够从物质上解答出现由简到繁的过程的解释，都是充分的。但是，哲学家维特根斯坦却选择这样来精辟地阐释存在之谜：在科学可以回答的全部问题均被提出并得到解答之后，生命的问题仍然未被触及。

## “逻各斯”

我想以探讨一个在犹太教及基督教传统中占据重要地位的神学术语来结束今天的讲座。这个术语结合了物理知识的探索和意义及价值的研究。这个术语就是“逻各斯”。在谈到三位一体的第二位格时，我们基督徒称其为“创造万物的言辞”。但是“言辞”这个词是有着悠久传统的。它将哲学家描述或解释世界

的欲望和以色列人的经历拢在了一起。为了以色列人，上帝的命令既造就了万物，又在他们的历史的每时每刻对他们说话。万物被犹太人和基督徒用希腊词“逻各斯”串了起来。但是它也有人类本身最高本领的“智慧”或“理性”之意，能够识别价值和上帝并对它们做出反应。

上帝的逻各斯可以看作是宇宙的建筑师抑或甚至是蓝图。“万物通过他并为他而生”。世界（包括我们自己）以及那个我们通过他才来到这个世界的存在之间，存在着一种深厚的关系。人格和价值是这一关系中的首要实在。

然而在把逻各斯视为蓝图或设计师时，我们必须谨慎，切勿把它想得太小。我们习惯的设计，是棱角分明、定义明确的。在我们人类设计出某个东西并批量生产后，无论你走到世界的什么地方，我们的产品，如巨无霸，都是一样的（包括里面夹的那丁点儿小黄瓜）。然而当我们放眼宇宙时，我们看到的是璀璨的群星、森林及山脉，虽然每一个体都大致相同，但在演化方面却是独一无二的。如果我们要在这里谈设计，那么那个设计便更像是一个可能性空间。生灵得以进入这个空间，生长，成形，进行持续的塑造及自主的交互作用。上帝的言辞不是简单意义上的言辞，而是富于爱、塑造爱的空间。不同的神造物可以在这个空间找到各自的定义及路径，就像闪电能够找到通向地面的路径那样。

当我们心里想着上帝的言辞时，我们会认识到，我们已被唤去进行宇宙的思考。天（及地）依然称颂着上帝的荣光，这一点我们理解得比以往更深刻、更离奇。宗教与科学的对话，通过并超越一切冲突而继续，而维持这一对话的，则是一种共有的创造奇迹的能力。

本文根据 2008 年 7 月在杜伦大学伍绍学院举办的“活的神学”暑期班所作的讲座改写。非常感谢苏珊·格林菲尔德教授、罗杰·彭罗斯教授和艾玛·科恩博士慷慨给我时间。版权© Jesuit Media Initiatives。转载及中文翻译蒙作者特许。

耶稣会士约翰·莫法特是牛津大学附属天主教堂神父，著有《超越教义问答：为爱提问的天主教徒而设计的智力习题》（Lulu 出版社，2006）。

注释：

- 1 伊安·博伊德摄影，详见 [www.flickr.com/photos/itsaboyd](http://www.flickr.com/photos/itsaboyd)。
- 2 理查德·道金斯，《上帝的错觉》，波士顿：霍顿·米夫林出版社，2006，第 406 页。
- 3 丹尼尔·丹尼特，《意识的解释》，Back Bay Books，1992，第 528 页。
- 4 苏珊·格林菲尔德男爵为英国皇家研究院院长，林肯学院富勒生理学教授、高级研究员及圣希尔达学院名誉研究员，其非专业著述计有：《走向大脑中心之旅：向意识科学迈进》（弗里曼出版公司，1995）、《大脑的私生活》（企鹅出版社，2000）及《明日之人：21 世纪的技术是如何改变我们的思维及感觉方式的》（企鹅出版社，2003）。
- 5 罗杰·彭罗斯爵士为哲学博士、OM、皇家学会会员、牛津大学数学研究所罗斯·波耳名誉教授及瓦德汉学院名誉研究员，其非专业著述计有：《皇帝的新脑》（1989）、《心智的阴影》（1994）及《通向实在之路：宇宙法则的完全指南》（2004）。
- 6 薛定谔方程为物理学描述量子力学形态的基本方程。（编注）
- 7 艾玛·科恩博士为牛津大学认知与进化人类学研究所人类学与心智中心的研究员，著有《鬼迷心窍：认识非裔巴西人宗教传统中的神灵附体》，纽约：牛津大学出版社，2007。

郭颐顿译

# The Church and the Dialogue with Science<sup>1</sup>

John Moffatt SJ

**Despite the current and historical challenges presented to the Church by scientific progress, there remains great potential for dialogue between religion and science. John Moffatt SJ explores this potential in the final serialisation of the keynote lectures from the 2008 Living Theology summer school at Ushaw College, Durham.**

It is only fair to make clear from the beginning that I am not actually an expert on anything. However, I have been lucky enough to talk to some scientists and at least on that basis hope to be able to offer some useful reflections on the state of the dialogue between religion and science. I should like to look at four different areas: the challenge to religious thinking presented by modern science; the current areas of compatibility where dialogue can take place; the wider history of the tensions between the two; and finally a theological perspective centring on the ancient Christian teaching of the Logos, the Word of God.

## The challenge of science

One of the biggest imaginative challenges to Christianity in the last five hundred years has been the shift from thinking of the universe as centred around the earth to coping with an effectively infinite universe, in which we are one tiny planet circling one tiny sun in the middle of one tiny galaxy amongst billions. As long as the sun went round the earth, we all knew where we were. There was a clear place for everything and everyone: God, us, heaven and hell, this life and the next.



Using a mixture of Platonic and Aristotelian thought, Christianity had harmonised astronomy, science, spirituality, theology and scripture into a complete account of us and our world, now and eternity. But in the last four centuries that has been taken away. In a universe expanding from a point without extent, we can no longer tell a story of ‘where’ all those things belong which faith proclaims, and as it stretches on a vast time-scale towards a big crunch or a cold death, we are hard pushed to make sense of the ‘when’ either.

challenges to Christianity in the shift from thinking of the universe with an effectively infinite planet circling one tiny sun in the billions. As long as the sun went round the earth, we all knew where we were. There was a clear place for everything and everyone: God, us, heaven and hell, this life and the next.

But since the end of the nineteenth Century it has probably been Darwinian thinking, in its various forms, that has produced the greatest tension between science and religion. Initially it was a specific challenge to a literal interpretation of the Old Testament. But as the Christian response has become more sophisticated, so has the science supporting Darwinian theory. In our own time the writings of Professor Richard Dawkins give an account of genetic Darwinism on the basis of which he argues that any faith in God is irrational.\*<sup>2</sup> Many non-believers are grateful to him for articulating for them things which have long troubled them about religion. But I think he has done believers a favour as well. By beginning to give a clear and consistent account of the origins of life and humanity without reference to God, he does indeed raise some tough questions for people of faith, which force us to think much more clearly and profoundly about our own answers than we have needed to for a while. So let us look first at that scientific account of the world which dismisses faith.

Perhaps the two biggest leaps within the history of the universe are the transition from inorganic material to living organisms, and the transition from non-conscious organisms to conscious ones, especially self-conscious reflecting ones like us. Dawkins accounts for the first transition with a biological creation narrative whose key figures are replicating molecules. Such things do indeed exist: molecules which, in an environment with the right mixture of smaller molecules available, cause other molecules like themselves to form. We suppose them to emerge by accident somewhere in the universe where the conditions happen to be right. So long as they are *possible* (and living organisms are testament to this), *improbability* is not a problem, given the vastness of the universe. Once molecules start replicating, the evolutionary process begins. As mutations occur between one generation and the next, some mutations reproduce more successfully than others and so there are more molecules like them in the next generation. From this process all of life ultimately evolves.

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<sup>1</sup> [Photo by ian boyd at flickr.com](http://www.flickr.com/photos/itsaboyd/) [ [www.flickr.com/photos/itsaboyd](http://www.flickr.com/photos/itsaboyd/) ] 

<sup>2</sup> Dawkins, Richard, *The God Delusion*, Boston,: Houghton Mifflin, 2006, 406 pp.

In the case of consciousness, Dawkins refers to the arguments of Daniel Dennett. In the (wonderfully titled) *Consciousness Explained*,<sup>3</sup> Dennett uses an artificial intelligence model to account for human mental activity. Our mental activity is the complex assortment of software that has evolved on the hardware of the brain to cope with the exigencies of mammalian and human existence over the last few million years. A by-product of these processes is the sense of self, of a subject to whom *these* sensations, thoughts, feelings belong. But that self, *its* experience and *its* freedom, are illusions. The processes which produce them, though complex beyond description, are ultimately as mechanical as a PC.

And this leads to the reason for rejecting theism: We do not need it to explain anything about us or about the world. The argument can be stated as follows:

—We can account for the emergence of biological complexity in nature using what we can observe and the laws we already understand.

—It is unreasonable (unscientific) to add another layer of explanation, when this is unnecessary.

—It is even more unreasonable, when the extra explanation itself (God) must be more complex than what it purports to explain.

What is missing in this particular science-based challenge to religion is a narrative that tells us not only how we evolved from the big bang to conscious life-forms, but also how we can live as such beings in such a world. Here we have to turn to the science fiction and fantasy writers to provide the material for an answer. The terrific imaginative effort of Philip Pullman in the ‘His Dark Materials’ trilogy\* very consciously redresses the balance on an epic scale, pointing the way to a universe without gods but rich in value. The series Dr. Who (on which Richard Dawkins has made, I think, two guest appearances) provides another forum where the writers consistently and intelligently present a vision of a universe wonderful yet explicable in its complexity. Good and evil are real; human choices matter. There is transcendence — but no beyond. There is a conceptual inconsistency here, but the narrative remains compelling.

However, there are many scientists who, whatever their standpoints in matters of faith, do not regard faith in a God as essentially unreasonable, and partly because they are not convinced that all the joins in the material account of the universe are yet sufficiently smoothed over. There may be no sufficient scientific reason for believing in God, but neither is there yet sufficient scientific reason to declare all belief in God misguided. Indeed, in some of those joins remain areas of reality whose puzzling nature permits a legitimate overlap of interests between religion and science.

### Room for dialogue

And so we come to the three scientists who were kind enough to give me their time for a conversation.

Professor Susan Greenfield<sup>4</sup> works as a neuroscientist at the Institute of Pharmacology in Oxford. Her principle line of research concerns degenerative disorders of the brain, but this has led her to a specific interest in the phenomenon of consciousness. She does not accept Dennett’s reductive approach to that sense of ‘my perceptions’ or ‘the world as I see it’ which is a distinctive feature of consciousness. She has investigated the physiological correlates of such mental states and suggests a model of conscious awareness as something that takes place when whole-brain activity in response to a stimulus reaches a certain level of intensity. She uses the image of ripples from a stone thrown in water. A sensory stimulus starts a ripple of electro-chemical activity in the brain. The ripples expand (very fast) involving more and more of the brain. And at a certain point in the process, when the activity is sufficiently intense, the ripples sufficiently wide, the owner of the brain becomes consciously aware of the stimulus. But she is clear that identifying the physical conditions under which mental events take place is not the same as giving an account of those events, which remain an irreducibly different sort of thing. Like many, she has been intrigued by the physiological processes that might be involved in religious experience and has explored the physical correlates of the experience of time, timelessness and boredom, the presence and the absence of the sense of self and other. But her sense of the scientific enterprise leads her to be agnostic about ultimate causes of such experiences, rather than to

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<sup>3</sup> Daniel Dennett, *Consciousness Explained*, Back Bay Books; 1992, 528pp.

<sup>4</sup> Baroness Susan Greenfield: Director of the Royal Institution of Great Britain, Fullerian Professor of Physiology, Senior Research Fellow Lincoln College, Honorary Fellow, St. Hilda’s College. Non-specialist writings include: *Journey to the Centres of the Mind Toward a Science of Consciousness* (W H Freeman Co, 1995), *Private Life of the Brain* (Penguin, 2000), *Tomorrow’s People: How 21st Century technology is changing the way we think and feel* (Penguin, 2003).

regard the physiological account as being all-sufficient. For her there is no essential contradiction between science and religion.

My second interlocutor was Professor Roger Penrose.<sup>5</sup> He is a mathematical physicist, based in Oxford, who has made major contributions to the mathematics of general relativity. This conversation takes us from the matter-of-fact world of Chemistry and Biology to the Physics on which they depend. And we are led to the refreshing discovery of how weird and counterintuitive ultimate reality seems to be. Take the Schroedinger Equation<sup>6</sup>, for example, one of the ingredients of quantum physics, which allows you to work out where a particle might be at any point. When you do the sums, what it seems to mean is that the particle isn't actually in any *one* place at any one point. If you visualise someone juggling oranges, just imagine that each one is a particle, like an electron – but each one is *the same* particle. Each orange – each version of the particle in a different place at the same time – has a number attached to it, and just to make matters worse the number is complex, which means it includes the weird square root of minus one, dreamed up by a sixteenth Century Italian mathematician. There's even an orange with a complex number over on the other side of the room. There's a version of the particle everywhere. However, the weirdness doesn't end there, because this works only as long as you don't look. The moment you take a measurement, the particle stops being everywhere and suddenly is in just one place. Our Schroedinger equation was trying to tell us where the particle was *probably* going to be. But there remains a strange explanatory gap between the equation, which gives us a steadily evolving wave (juggled oranges), and the jump to a particular reading (one orange on the floor), which can only be predicted with probability and never with certainty. (You'll see the point of this example a little later).

Penrose, though a physicist, is, like Greenfield, intrigued by the question of consciousness. He also does not accept the reductive account of it promoted by Dennett and other Artificial Intelligence enthusiasts. He has developed an argument to suggest that human consciousness is *essentially* different from anything which could be generated by the sort of rule-governed sequence of arithmetical procedures which are necessary in computing. One difference lies in the very ability of human beings to understand such rules and procedures, that is, to step outside them and comprehend them. The only way a digital-based system could behave like that would be if it were inconsistent, if the rules on which it was based led to contradictions. But consistency is precisely what makes digital computing possible. So (the argument runs) if we want to understand how the human self works, then we should not be looking at computers. Instead, Penrose suggests, if we want to locate the human mind in the physical universe, we should be looking at that part of physical reality where there appears to be a built-in inconsistency. The jump that we have just looked at between the particle as a predictable steady wave and the unpredictable measurement of the particle in a specific place seems to provide just such an inconsistency. The puzzle of quantum theory and the puzzle of human consciousness come together. Penrose suggests that physics will need to be expanded, quantum theory revised, but when this is done, there will be a richer account of the universe in which the mind finds its proper place.

Penrose is not looking for an explanation of mind beyond nature, but wants to expand our understanding of nature to include mind. Like many, he has not found any particular religious system compelling. Nevertheless, unlike Dawkins, he does not regard the case against all religious belief as established. Again, in this scientific perspective, belief need be neither irrational nor inimical to good science. And in this area there is some very interesting room for dialogue.

Dr. Emma Cohen<sup>7</sup> is an anthropologist who works at the relatively new Institute for Cognitive and Evolutionary Anthropology in Oxford. Her fieldwork has investigated concepts of mind, body and spirit amongst Afro-Brazilians. She is sympathetic to a religious viewpoint, though scientifically agnostic about metaphysical claims. Her area of concern is the formation of concepts, including those to do with beliefs in mind, spirits, gods and ethics, across cultures. It is part of a wider programme to find evidence for how we humans are predisposed (cognitively) to be receptive to different sorts of concept as we mature. It seems as if the old idea that children's minds are blank slates waiting to be chalked on does not match the

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<sup>5</sup> Sir Roger Penrose, Ph.D., OM, FRS, Emeritus Rouse Ball Professor of Mathematics at the Mathematical Institute, Oxford, Emeritus Fellow of Wadham College. Non-specialist writings include: *The Emperor's New Mind* (1989), *Shadows of the Mind* (1994), *The Road To Reality: A Complete Guide to the Laws of the Universe* (2004).

<sup>6</sup> The Schrödinger equation is the fundamental equation of physics for describing quantum mechanical behaviour. (Editor's note).

<sup>7</sup> Dr. Emma Cohen, researcher at the Centre for Anthropology and Mind within the Institute of Cognitive and Evolutionary Anthropology at the University of Oxford. Writings include: *The mind possessed: The cognition of spirit possession in an Afro-Brazilian religious tradition*, New York, Oxford University Press, 2007.

evidence. There are some things they are receptive to, some things to which they are resistant. They are receptive to ‘god’ concepts and talk but not to any old metaphysical claim — they would take a lot more persuading, for instance, that there was a giant teapot in the sky. It is also possible to detect the precursors of ethical responses to different situations in very young children. Once the conceptual ‘spaces’ common to all human beings are identified, it is then time to look for a suitable account of how these mental spaces emerged in the course of human evolution.

Cohen is clear about the limit on what can be inferred from this. Giving an account of the evolutionary origins of conceptual space, whether God-related or science-related, can move our understanding forward, but will not necessarily provide answers to questions of the meaning and truth of the concepts that come to fill the space. An evolutionary account of the origin of God-space implies neither the non-existence nor the existence of a God.

It emerges that science is not so incompatible with a reasonable belief in God, and for good scientific reasons. Indeed there are many areas of scientific enquiry where believing people need to be engaged for the sake of the intellectual integrity of their beliefs. At the same time there are some of those areas where specific claims made in a belief tradition will be severely challenged by scientific enquiry. For us Catholics, I would highlight the following: teaching on the nature of humanity and the narrative of the fall; teaching on the nature of the human soul and the afterlife; and teaching on bio-ethics. How believers respond to their side of the dialogue is something still to be worked out.

### **The history of the debate**

But now I want to take a little time to look at the science-religion debate in perspective. I want to take you back to those years of turmoil, when a new prosperity began to bring about a breakdown of the old social order. A generation gap opened up. Traditional values were thrown aside as democracy encouraged the cult of the individual. Religious beliefs were treated as irrelevant, as an understanding of the new physics took hold — and God was written out of history. I am referring, of course, to fifth century Athens. A key figure is Democritus, whose primitive atomic theory of matter has only become influential again in the last three hundred years. Like the other physical philosophers of the time, he attempted to explain the world as simply as possible in terms of the behaviour of elementary matter. In doing so he modelled a process of deconstruction which has modern echoes as diverse as the writings of Marx and *The God Delusion*.

A generation later Plato, with his pupil Aristotle, was busy formulating responses to that age of deconstruction. Plato’s life work centres on re-establishing value at the heart of human reality: justice, wisdom, self-control, courage, goodness. Aristotle, more empirically and observationally minded, is less interested in an intellectual spirituality of ethics and ethical reform than in constructing a coherent account of reality – material, physical, biological, social – in which value and the divine have their due place. For both of them ‘mind’ is taken as a primary reality and for Aristotle, purposiveness belongs in any good account of why things happen in nature. It is not always enough to say ‘A hit B so B moved’. Sometimes, especially in biology, the explanation is not complete unless you also say what B was moved *for*.

Aristotle’s model of the universe and his model of sufficient physical explanation (eventually christianised) dominated philosophical thought for 17 centuries. But there was of course, as always, a minority report. In this case it was provided by Epicurus who built on Democritus’ atomic theory to develop a holistic theory of the human condition. We exist battered by atoms drifting randomly in an infinite and uncaring universe. Our only way to survive is to seek refuge from the stresses of life and to hold on to the small nuggets of delight that come our way. The Roman Poet Lucretius, a contemporary of Caesar, provides the fullest account of his teaching. When we read his powerful denunciation of the evils done in the name of religion (wars, child sacrifice), see his delight in the beauty of a fragile and ultimately meaningless world and hear the advice to ‘seize the moment’, we can recognise voices of our own time, struggling to make a similar sense of what it is to be human.

The tension between religion and science is an ancient one and rests in part on personal experience, but partly also on assumptions about what makes a good explanation. For Aristotle, a biologist, it was clear that a scientific explanation was not sufficient until it had answered all the questions that could legitimately be asked, including ‘what for?’ For others, any explanation that plausibly accounted for the emergence of complexity from simplicity in material terms was sufficient. Richard Dawkins places himself in the latter ancient tradition. But the philosopher Wittgenstein puts elegantly the existential puzzle raised by this choice: when all the questions that science can answer have been asked and answered, the problems of life remain untouched.



## ‘Logos’

I want to finish by looking at a theological term which has been important in the Jewish and the Christian traditions and which can unite the quest for physical understanding and the search for meaning and value. It is the term ‘Logos’. We Christians speak of the 2<sup>nd</sup> person of the Trinity as the ‘Word through whom all things were made’. But the word ‘Word’ has a long tradition that draws together the philosophers’ desire to describe the world or to give an account of it, and the experience of the people of Israel, for whom God’s commanding word both calls all things into existence and speaks to them in every moment of their history. The Greek word ‘Logos’ is used by Jews and Christians to hold all this together. But it also carries the sense of ‘intellect’ or ‘reason’, the highest power in the human self, capable of recognising and responding to value and the divine.

The divine Logos can be imaged as the architect or even the blueprint of universe. ‘All things come to be through him and for him’. There is a deep relationship between the world (including ourselves) and the one through whom we come into being, and it is a relationship in which personhood and value are primary realities.

We have to be careful, though, when thinking of the Logos as blueprint, or designer, not to think too small. We are used to design as something sharp-edged, clearly defined. When we human beings design something for mass production our product is, for instance, the Big Mac: the same (including the little bit of gherkin) wherever you go in the world. Yet when we look at the universe we see a galaxy of stars, a forest of trees, a range of mountains, each one recognisably similar but also unique in its development. Here, if we are to speak of design, that design is more like a space of possibility into which a creature can grow and take shape – a continuous interplay of shaping creativity and freedom. This Word of God is not the word of simple definition, but the rich and shaping space of love in which different creatures can find their definition and their pathway, as lightning finds its pathway to the ground.

When we take this Word to heart, we recognise that we are called to cosmic contemplation. More deeply and strangely than we have ever grasped before, the heavens (and the earth) still proclaim the glory of God. The dialogue between religion and science continues through and beyond all tensions and it is sustained by a shared capacity for wonder.

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