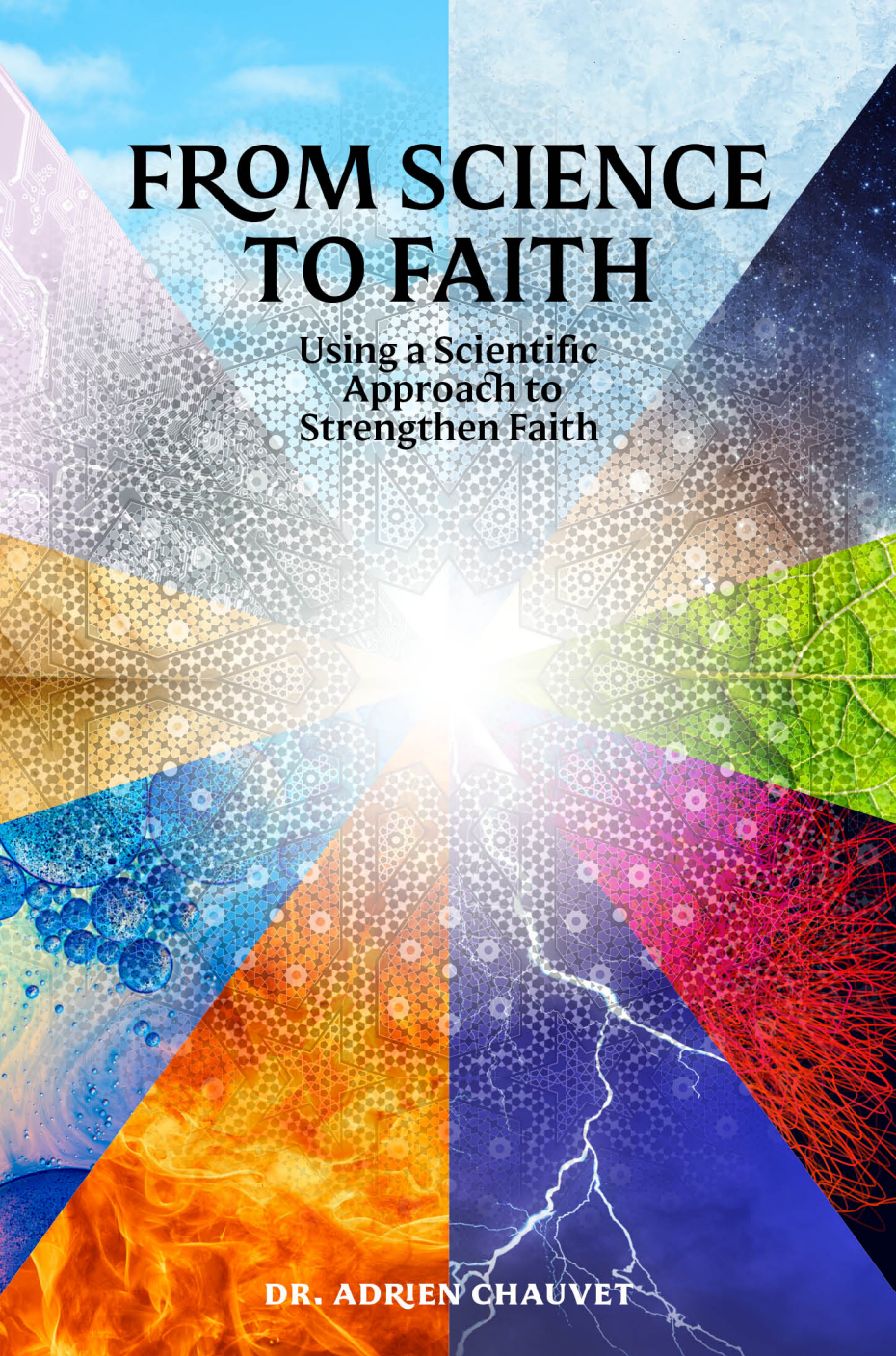
FROM SCIENCE TO FAITH
Using a Scientific Approach to Strengthen Faith
DR. ADRIEN CHAUVET

CONTENTS

TRANSLITERATION TABLE

Arabic Consonants

Initial, unexpressed medial and final: ء ’

ا	a	د	d	ض	ḍ	ك	k
ب	b	ذ	dh	ط	ṭ	ل	l
ت	t	ر	r	ظ	ẓ	م	m
ث	th	ز	z	ع	‘	ن	n
ج	j	س	s	غ	gh	هـ	h
ح	ḥ	ش	sh	ف	f	و	w
خ	kh	ص	ṣ	ق	q	ي	y

Vowels, diphthongs, etc.

Short:	ـَ a	ـِ i	ـُ u
Long:	ـَا ā	ـِي ī	ـُو ū
Diphthongs:	ـَوْ aw		
	ـَيْ ay		

INTRODUCTION

My life-long goal has always been to seek meaning in this world, my place within it, and the path I must take. In this pursuit, I essentially seek inner peace, which my travails have come to indicate comes from Truth. By 'Truth' I mean a conception of the world that is logical, practical and universal—encompassing all disciplines and beings. I hope that this Truth will give me the satisfaction of having made the right choice, and of being on the right path. And since I doubt that I am the only one looking for this kind of reassurance, I am sharing my experiences here.

Since a young age, I was immersed in the world of so-called 'hard' sciences: mathematics, physics, chemistry and biology. This socialization was initiated by the scientists and teachers in my family. This admiration for the sciences was then nurtured and reinforced in school, where I was acquainted with formal physics, chemistry and biology.

Through these studies I learned about the material world and about its governing laws. But my background is far from being devoid of religiosity. I come from a place where the church's campanile towers above all the other houses in town, and where chapels and stone crosses are scattered throughout the surrounding hills. I was understandably raised as a practising Christian, going to church twice a week and occasionally serving as the altar boy. However, besides the context of the church, religion was never made relevant in my every-day life. These monuments and rituals were only vestiges of a past that was made obsolete by science. Indeed, with modern sciences being in direct conflict with some Christian texts, when taken literally, I quickly left aside all religious practice and opted for a type of agnosticism. Religious morality and norms were still part of my mindset, but when it came to making sense of this world, I was conditioned to make science prevail over all other conceptual frameworks.

On the way to becoming a scientist, I realized that science was not as 'hard' as I initially thought it was. During these period of study, I also had the chance to travel and discover various cultures and mentalities. Interestingly, out of all my experiences, only spirituality has allowed me to achieve a peace of mind and a sense of satisfaction that transcends the challenges of this life in a way that is lasting and all-encompassing. It is only during my post-graduate studies that I was invited to Islam. I was attracted by its apparent logic and practicality. Soon after my conversion, I had the opportunity to learn about the different aspects of this religion alongside local and international scholars,

through private lessons, public lectures and various scholarly and recreational travels. I discovered in Islam a much more convincing and practical philosophy of life that was not in apparent conflict with my scientific background. As a result of my upbringing, I had never put aside this love for science and I naturally decided to continue this spiritual journey in harmony with a certain scientific rationale. More specifically, I sought to use this scientific rationale to validate my spiritual quest.

While my religious studies were marked by spirituality, my scientific studies were instilled with materiality. Unfortunately, many people around me have set these two notions at odds with each other by associating materiality with reason and spirituality with irrationality. Often times, materiality and spirituality end in opposition to each other to the point of becoming contradictory. Nowadays, believing without having material evidence is absurd. Moreover, in the academic world, religion disturbs; it is synonymous with irrationality, manipulation, being old-fashioned and backwardness. Materialistic ideology, on the other hand, is of greater value because it is founded on purely scientific grounds. Indeed, why should one accept the constraint of an ideology that is more than 1,400 years old and follow practices in the name of a God whose existence cannot be scientifically evaluated? The secular discourse of today's societies is essentially fuelled by scientific advances used to discredit the existence of a superior entity. Broadly speaking, materialistic societies reject anything that cannot be measured by physical instruments. They reject anything that cannot be 'datafied'. Whether it is a matter

of palaeontology, genetics, astrophysics, chemistry, or other sciences, all the arguments and demonstrations lead one to believe that these so-called exact or hard sciences are worth much more than religious teachings, especially if one's life choices depend on them.

To illustrate this opposition, let me narrate an experience I had during a visit to the University of Zurich, one of the leading research institutes in Europe. It was in 2014, and it happened between two presentations of the *Swiss Chemical Society*. While I was walking across the Irchel campus and I had stopped in front of a small anthropology museum. The museum's primary function was to illustrate the evolution of the human species through about twenty thematic displays. To my surprise, the first display quoted a passage from the Bible stating that the world was only 6,000 years old. This sentence was then ridiculed by contemporary scientific discourse. With implicit and abusive generalizations, the message was clear: the goal was to discredit religious views and show that the secular vision of the world is based on sound and objective scientific facts. A few metres further down the exhibit, the second display proposed a genealogical tree of the human species. It explicitly showed, by means of lighted pathways, that after each discovery of ancient human skeletons, this tree had to be entirely remodelled about a dozen times during the last century! A question naturally came to my mind: how on earth would such "scientific facts" be less illusory than religious texts when both are subjected to the same aleatory interpretations?

The evolution of the human species is only one example, but the opposition between science and religion

is noticeable in all aspects of society. Whether it is through the radio broadcasts, newspapers or school curricula, one is constantly challenged to maintain the prevalence of the scientific over the religious and the material over the spiritual. It is therefore no wonder that many of my classmates choose not to believe in God as an outcome of their scientific studies. However, I argue that I found in Islam a logical and practical guide that allows me to follow a rational path on the spiritual land and achieve inner peace.

I thus hope to correct this apparent opposition between scientific and religious thinking. My goal is not to prove scientifically that God exists—at least not directly—but to demonstrate that scientific logic is not foreign to religious logic. Rather, I shed some light on their complementarity and justify, using scientific methods and arguments, a theistic vision of the world. Pursuing this aim, I share in the first chapter a few of the introspective steps that I used to start this journey. The goal is to agree on definitions and a frame of reference that helped me go beyond my comfort zone. In the second chapter I demystify science as it is perceived today. Through a series of examples drawn from my own experiences, I expose the limits of science. The goal of this chapter is helping one to not fall prey to the current scientific dogma. I refer to scientific notions that I have simplified in order to make them accessible to the non-specialists. Technical details are left in footnotes to satisfy the more curious. The third chapter is concerned with the establishment of a scientific theory and its requirements. I then compare

these requirements to those that form the basis of faith, Islamically speaking. By comparing the two modes of thinking, the goal is to underline the rationality of the Islamic faith. It is in this chapter that I justify and describe an Islamic vision of the world. Consequently, the language used is framed to assume the truth of Muhammad ﷺ as a Prophet. His name is followed by the honourable mention "ﷺ," which means "May God's peace and blessings be upon him." Likewise, the mention of every other Prophet is followed by "ﷺ" which means "Peace be upon him," and that of the Companions of the Prophet ﷺ are followed by "ﷺ," which means "May God be pleased with him." Some passages in this chapter also include extensive footnotes, which give the reader the choice to hover over or delve into the details of the arguments presented. I however encourage whoever is compelled by the so-called "scientific miracle of the Qur'an" to read them carefully, as they address some common misconceptions. In the fourth chapter, I discuss the limits of purely materialist thinking. The goal is to keep a harmony between the brain and the heart, the intellect and sentience, in one's path to God. Finally, I have kept in an appendix a more detailed discussion about the theory of evolution which assesses both the scientific arguments and the religious texts.

With regard to the Qur'anic passages, I based all translations on Ṣaḥīḥ International. All verses are referenced according to the Uthmanic codex. Regarding the prophetic narrations, they are referenced according to the electronic classification of the USC-MSA. Given the universal nature of the arguments in Chapters I, II and IV,

this text is addressed to whoever is in search of spirituality, whatever their belief. It is only in Chapter III that I justify an Islamic worldview, which implicitly leaves the followers of all other denominations the duty to justify their own beliefs. My goal is not to impose a vision of the world, but to propose one that I find appealing and then proceed to discuss it.

I

THE FIRST STEPS IN MY SPIRITUAL QUEST

As a scientist, I was faced with the question of determining the facts that could prove the existence of God and justify adherence to a specific religion. This question prompted me to look for proofs and justifications and undertake a quest for truth. I embarked on this journey more than a decade ago by questioning my own conceptions, norms and cultural practices and evaluating new ones. In this chapter I enumerate the different intellectual positions that allowed me to undertake this journey.

1. Looking beyond materiality

As I was raised in an ultra-capitalist society (ultra, given the number of toys I had), I was naturally tempted to value what brings me the most benefit, whether material or psychological. However, all material benefits derived from

people, practices or ideologies ended up disappointing me with the passage of time because they inevitably wane: bodies age, objects wear out and desires change. By seeking only material pleasures, I thus condemned myself to be continually dissatisfied. Consequently, my quest could not confine itself to a mere search for materiality but rather focus on the psychological well-being that the material world provides. For example, an athlete who competes in a championship wants to see his or her efforts validated by a medal. Since the medal can be bought in a specialised store, what the athlete is looking for is not the medal itself, but what it represents and the feeling it provides, namely, success in a competition and the appreciation of others. To achieve this sense of satisfaction, the athlete is ready to go through considerable sacrifices: dietary restrictions, intensive training and high-level competition.

The next step is to choose what psychological pleasure would benefit me the most. For example, I can derive pleasure from eating a sweet but will suffer from its side effects. If I am looking for an ever-lasting pleasure, then I should seek to derive it from something that is not only uncircumscribed by people or materiality but also ever-lasting, such as truth. Assuming that truth is constant and absolute, it becomes a source of security and permanent satisfaction: to do the "right thing" is satisfying, it soothes and gives confidence. As a scientist, I have this feeling of satisfaction, for example, when I find the solution to a maths problem after many attempts or when I finally understand an abstract notion of physics. The feeling of satisfaction therefore follows after exerting a measure of

effort, whether physical or intellectual. I therefore assume that the noblest and most lasting satisfaction lies in this quest for truth. And, like a high-level athlete, I must dare to put aside some of the immediate material pleasures for the purpose of striving for higher objectives; to make an effort and invest in a potentially better future.

2. Being aware of the circles of influence

Once I was ready to make an effort to look for an ultimate Truth, the next step was to find out where my ideas and norms came from, and then dare to question them. For example, current statistics show that a student spends on average three hours per day in school—being schooled—and a bit more than that on social media (including news feeds). Thus, schools and broadcasted news are two leading socialising factors of our times. The issue that arises from growing up within such socialising circles is that most of the acquired information is transmitted to us by a third party. Whether it is through a TV host who reads a text that scrolls before his eyes, or through a teacher who follows a certain curriculum, the reported information is stamped with the perception of the one who transmits it: the chain of transmission between the one who witnesses the act and ourselves can be quite long. Indeed, the broadcasted news come from an unknown reporter whose agenda and ideology are often unknown. Moreover, one does not see what is hidden in the blind spot of the camera. Being positioned on the other side of the screen, with no access to the scene from which images are taken, means the tools

II

RE-EVALUATING FAITH IN SCIENCE

Here I stand, ready to take on this journey toward Truth with the aim of achieving inner peace. In order to fully explore new horizons, other religions or new ideologies, I choose to re-evaluate the basis on which my conception of the world stands. In other words, I am going to re-evaluate, using scientific reasoning, what I used to consider as 'scientific truths.' I posit that this re-evaluation takes place in four stages. First, I think it is necessary to beware of the limits of one's physical abilities as well as the scope of one's current understanding of the world. Second, I show that one can overcome these limitations by using probabilities. Third, from a scientific point of view, I illustrate that a set of probabilities or, more generally, a set of indirect evidence are sufficient to validate an abstract concept, whether it is quantum mechanics or the existence of God. Fourth, I show that

the current scientific understanding of the world only demonstrates its exceptionality. In conclusion, I will argue that the idea of the Divine is no more simplistic than an atheistic conception of the universe. On the contrary, the uniqueness of the world can serve as evidence to support a theist worldview.

1. The fringes of our perception

As a human, I perceive my environment through my senses (touch, sight, hearing, etc.), which are naturally restricted. I cannot see through walls, nor hear the footsteps of an ant. Technological advances allow me to overcome these limitations, to push them further and, as a result, help me see new phenomena and boundaries. The following are a few examples to illustrate the limits of our physical laws:

a. *At the frontiers of the extreme*

Scientific theories only describe what we perceive from the world. They are thus contextual in the sense that they evolve as a function of new scientific discoveries. For example, unlike the macroscopic world in which I evolve, the world of the infinitely small is 'quantized.' While a piece of furniture can be placed anywhere in a room, one finds that the electron, for instance, does not accept to be placed at any random place around the atom's nucleus. On the contrary, an electron can only be found in a well-defined state such as energy level, orbit or spin). Another fundamental theory that reshaped the

past century is Einstein's theory of general relativity. In agreement with this theory, one finds that time passes faster or slower depending on the speed at which one moves. This new theory compelled scientists to correct the intuitive Newtonian notions that had prevailed until then because they could not explain the phenomena studied at the time. In other words, our theories and physical laws are a function of our awareness of the physical world. Definitions are either refined or changed according to new discoveries. Thus, I must not see physical laws as absolute truths but rather as approximations that allow me to describe what I currently perceive of the world. The laws in place are therefore contextual and I must expect to see them evolving to embrace future discoveries.

b. *The subjective interpretation of objective results*

Regardless of how objective a measurement can be, its interpretation will always be done by a subjective human. Accordingly, scientific enquiry is an intrinsically sub-jective endeavour. For example, analytical tools such as a magnifying glass, microscope, computer or synchrotron, allow one to push the limits of one's abilities and perceptions. But regardless of the objectivity of the tools, the conclusion of the analysis will always be given by a subjective scientist. His or her interpretation will thus depend on his or her point of view, training and beliefs. For instance, the study of a molecule cannot be done with the naked eye because it is too small and it moves too fast. The molecule is studied

III

THE ISLAMIC PARADIGM

In this chapter I explore the common elements between science and religion in order to justify, using a scientific rationale, the Islamic worldview, which I call the Islamic paradigm. The first step in this discussion is to define what a scientific paradigm is and what are its implications. In brief, a scientific paradigm is to see the world through scientific lenses. To live in a scientific paradigm is to live in a world that is primarily informed by science. And accordingly, as science evolves, the paradigm also evolves. In other words, current scientific paradigms are governed by the scientific theories that are currently held to be true. But one is not bound to live by science. For example, religiously-oriented people live according to a religious paradigm. And while scientific paradigms are informed by scientific theories, religious paradigms, at least in the three Abrahamic religions, are informed by Revelation. The goal of this chapter is then to compare the establishment and, thus, the validity of each of these two paradigms. The goal

is not to discredit one in favour of the other, because I don't necessarily hold them as being mutually exclusive, but to highlight the similarities between the two. I admit that, while scientific theories are man-made explanations of observed phenomena, religion is based on Revelation. But even if the production of knowledge in the two differs, both religion and science try to make sense of the same world. They both help explain human presence on Earth. They both help explain and interpret the events that take place in human life. On one hand, natural sciences enlightens one about the mechanisms of life and allows one to anticipate the material consequences of one's actions. Religion, on the other hand, describes the immaterial consequences of one's actions. In this regard, both science and religion guide one's decisions.

Furthermore, once the scientist has established his theory based on his observations, and once the theologian has established his understanding of the revealed texts, the methodologies and conditions for accepting either worldviews are intrinsically similar. I go so far as to argue that the thought process that allows me to accept a scientific theory is the same as the thought process required to accept a religious view of the world. It is therefore in light of these common elements that I evaluate the Islamic paradigm in the same way as I would evaluate any other scientific paradigms. I thus begin this chapter by enumerating the core criteria used to establish a scientific paradigm and, more specifically, a scientific theory: its origin, relevance and benefits. I then pursue with an evaluation of Islam according to the same scientific rational.

1. The establishment of a scientific theory

From a scientific point of view, a theory is a set of rules and concepts which explain observed phenomena. The scientific value of a theory lies in its ability to describe and predict events in this world. However, if one also takes into account the social aspect that contributes to the establishment of a theory and to its public recognition, then one must also take into account the author as well as the usefulness of the theory. This chapter therefore discusses the three main factors required to establish a theory: its origin, relevance and utility.

a. *Origin*

From a logical point of view, the validity of a theory should be independent of the person who proposes it. However, experience shows that the status of this person and his context are critical for promoting his theory, especially when it proposes a marginal vision of the world. Indeed, anyone can theorize about anything. But, as stated in the first chapter, a theory is taken seriously only if it comes from a reliable and respected source of knowledge. In particular, the more a person is versed in the science in which he theorizes, the more trusted his opinion will be. Similarly, a theory would be swiftly accepted when it validates other pre-established notions. The theory of special relativity, for example, was ignored by much of the British, French and American scientific community during the decade following its publication in 1905. The theory was initially devalued either because it did not hold

The universe and its forces

The description of the heavens as being maintained by invisible pillars and without abrupt boundaries corresponds to our conception of forces and their progressive field of action. In the case where the heavens refer to the extra-terrestrial space, these pillars then remind me of the gravitational forces:[37]

ٱللَّهُ ٱلَّذِى رَفَعَ ٱلسَّمَٰوَٰتِ بِغَيْرِ عَمَدٍ تَرَوْنَهَا ثُمَّ ٱسْتَوَىٰ عَلَى ٱلْعَرْشِ وَسَخَّرَ ٱلشَّمْسَ وَٱلْقَمَرَ كُلٌّ يَجْرِى لِأَجَلٍ مُّسَمًّى يُدَبِّرُ ٱلْأَمْرَ يُفَصِّلُ ٱلْءَايَٰتِ لَعَلَّكُم بِلِقَآءِ رَبِّكُمْ تُوقِنُونَ ۝

(الرعد ١٣ : ٢)

It is Allah who erected the heavens without pillars that you [can] see; then He established Himself above the Throne and made subject the sun and the moon, each running [its course] for a specified term. He arranges [each] matter; He details the signs that

37. Through the word "pillar," I understand a means to support and hold the sky, including all that it comprises, in place. Science today speaks in terms of forces, such as the gravitational force. Gravity, which on a cosmic scale prevails over the electromagnetic and nuclear forces, is effectively invisible to the human eye, and without apparent gaps or singularities between objects. Indeed, gravity follows a continuous and progressive function from one mass to another.

you may, of the meeting with your Lord, be certain. (*al-Raʿd* 13:2)

ٱلَّذِى خَلَقَ سَبۡعَ سَمَٰوَٰتٍ طِبَاقًاۖ مَّا تَرَىٰ فِى خَلۡقِ ٱلرَّحۡمَٰنِ مِن تَفَٰوُتٍۖ فَٱرۡجِعِ ٱلۡبَصَرَ هَلۡ تَرَىٰ مِن فُطُورٍ ۝

(الملك ٦٧ : ٣)

[And] who created seven heavens in layers. You do not see in the creation of the Most Merciful any inconsistency. So return [your] vision [to the sky]; do you see any breaks? (*al-Mulk* 67:3)

Mountains and their roots

The description of the mountains as pegs, being anchored in the ground and standing up in the sky, corresponds to the fact that at the junction between two tectonic plates, while one is sinking, the other rises to form a mountain range. As a result, at this junction, the Earth's crust becomes thicker. The lower part of the crust forming a sort of root that supports the mountain above:[38]

38. The thickness of the lithosphere at the level of the mountains can reach 90km, which can potentially be referred as a "root" when compared to the oceanic lithospheres which are typically thinner (J. Jackson, 2004, Mountain Roots and the Survival of Cratons, *Astron, Geophys.*, Vol. 46, pp. 33-36). The Qur'an however states that it is these mountains that prevent the surface from "moving or shaking with us" (*al-Naḥl* 16:15, *al-Anbiyā'* 21:31). While the notion of stability in geology is debatable, it is interesting to note that indeed the upper part of the mountains corresponds to the edges of the continental

IV

LIMITS AND DANGERS OF PURELY RATIONAL THOUGHT

Until now, I have used scientific reasoning to justify a religious worldview. However, this tool, which is called rationality, only allows me to build trust in the texts and accept the existence of a world that goes beyond this material realm. In my search for Truth and ultimate happiness, it is mostly to my feelings that I will be attentive and, to that end, scientific reasoning is of little use. Indeed, scientific reasoning is only effective with what can be "datafied," meaning things that can be empirically measured. Science cannot probe what exists beyond this material world. Reason thus paves the way but is not sufficient to undergo this spiritual journey. Rationality is necessary but it has its limits, and it is this limitation that I will highlight in the first section of this chapter. This will be followed by a discussion about the different ways we perceive the world, whether material or immaterial. And I will finish with a discussion on the use of the imagination in this spiritual quest.

1. Mathematics and programming as divine languages.

Isn't it impressive that the physical laws of our world can be so well described by mathematics? A man-made and universal language which, by means of numbers and equations, makes it possible to model the interactions between objects: a pebble that rolls can be described in terms of energy and momentum, which ought to be conserved; sunlight becomes an electromagnetic wave that is radiated; a meal becomes a number of kilocalories to be burned following the rules of calorimetry. Wasn't Einstein looking for a unifying equation that God would have used to create the whole of the universe? Every physical phenomenon can be translated into mathematical equations, and every equation can be translated into algorithms for efficient solving.

As far as computing is concerned, programming is a language with a well-defined grammar and vocabulary. It allows me to control machines and communicate with information repositories on which our lives are forever linked. Who is still able to go about his or her life without using the internet? Our means of communications, transport and even consumption are governed by computer programs. Financial institutions, in particular, are the most demanding and hire the best physicists, engineers and statisticians who are able to programme the most complicated equations. Maths and programming have become universal languages that are used to understand and exploit this world. My concern is that these languages are

Using a Scientific Approach to Strengthen Faith

How can we approach faith using scientific methodologies and frameworks? The author impressively speaks from a vast scientific background as well as a rigorous approach of the Islamic tradition. He avoids falling prey to either scientific or religious dogma, precluding dialogue between two paradigms that are unfortunately seen as diametrically opposed to one another.

This book takes the reader on a journey across various themes such as the weather, electrons, waves, photosynthesis and the origin of life. But beyond scientific themes, it also addresses metaphysical themes such as freewill, predestination, good and evil, success and failure, renunciation, engagement and evolution.

The aim of the book is not to convince the reader using peremptory arguments. Rather, it urges the reader to observe the world, to be attuned to spirituality, to understand that the Signs of God do not lead to the same path.

Hani Ramadan - Director of the Islamic Centre of Geneva

Adrien Chauvet obtained his bachelor in Physical Sciences from the University Louis Pasteur in Strasbourg, France. He pursued his postgraduate studies at Purdue University, USA, where he obtained his Master and PhD in Biophysics. He then undertook a Postdoctoral appointment at the department of Chemistry at the Swiss Federal Institute of Technology Lausanne (EPFL) and at the department of applied Physics at the University of Geneva. Adrien is currently a lecturer in Physical Chemistry at the University of Sheffield, United Kingdom. In addition to his scientific career, he was introduced to basic knowledge in Islamic sciences. He studied 'Aqîda, Tafsîr, Fiqh and Usûl al-fiqh with Sheikh Tewfik Choukri, Indianapolis, USA. He was then exposed to Islamic spirituality through the teachings of Imam Abdul wahid Kort, Lausanne, Switzerland, and Dr. Hani Ramadan, Geneva, Switzerland. He learned Arabic at Bayyinah Institute, USA.

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