**Chartres Cathedral, The School of Chartres was a major centre of scholarship in the 12th century**

## *A Historical Reminder: Direct Introspection in Roger Bacon in the 13th Century*

It is interesting to note that such a comprehensive view of experience – directed to the outside world as sense experience of science, and directed to the inner world as mystical experience – was present in the very cradle of Western science. Roger Bacon, the Franciscan friar and one of the forerunners of a scientific approach in the West, was requested by the Pope to write down his ideas for a reform of university teaching and learning for the Western church in the 13th century, as the Pope agreed with Roger Bacon's assessment that it was in dire need of reform. So, in haste, and probably also in secrecy - because at his time of writing there was a general publication ban active for all Franciscan authors except for what was approved by the head of the order, Bonaventure - Bacon put together his thoughts and had them sent to Rome in 1267.

What he had written he called "Opus Majus", his larger work, to differentiate it from a postscriptum, the "Opus Minor", the smaller piece, which he sent later, and still a third book, in which he put together what he thought he had forgotten, the "Opus Tertium". It is noteworthy that Bacon conceived of these four volumes only as sketches for his "Scriptum Principale" or his Main Text, which he offered to write on Papal orders, should the Pope like his ideas and move forward with his suggested reforms. Unfortunately, such a move never happened, because the Pope died shortly after having received Bacon's books, probably without even having had time to read them; a ceiling came down and killed him.

So Bacon's ideas went largely unheard, except for some excerpts regarding mathematics, optics and other parts which were copied in his order and read eagerly in Paris (Clegg, 2003; Easton, 1971, orig. 1952; Hackett, 1995, 1997a, 1997b; Lindberg, 1983; Mandonnet, 1910; Moorman, 1968; Power, 2012). Along some convoluted paths Roger Bacon's ideas found their way, via Pico della Mirandola, back to England, where they were taken up by Francis Bacon in the 17th century, otherwise no relative. Francis Bacon's teachings of the idols, for instance, can already be found in the older Bacon's writings.

This text of Roger Bacon contains many suggestions. In the main, Bacon wanted to ground learning in experience; scientific experience and mathematical analysis for the sciences, thorough knowledge of languages, especially Greek and Hebrew including good grammar, and inner

mystical experience to inform practical life, political decision making and governance and individual happiness.

He writes: "*Duo enim sunt modi cognoscendi, scilicet per argumentum et experimentum. Argumentum... non certificat neque removet dubitationem ut quiescat animus in intuitu veritatis, nisi eam inveniat via experientiae; ... ergo argumentum non sufficit, sed experientia ... Sed hic loquor de experto, qui rationem et causam novit per experientiam. ... Sed duplex est experientia; una est per sensus exteriores, et sic experimenta ea, quae in coelo sunt... et haec inferiora... experimur.... Et haec experientia est humana et philosophica, quantum homo potest facere secundum gratiam ei datam; sed haec experientia non sufficit homini, quia non plene certificat de corporalibus propter sui difficultatem, et de spiritualibus nihil attingit. Ergo oportet quod intellectus hominis aliter juvetur, et ideo sancti patriarchae et prophetae, qui primo dederunt scientias mundo, receperunt illuminationes interiores et non solum stabant in sensu... secundum quod Ptolemaeus dicit in Centilogio quod duplex est via deveniendi ad notitiam rerum, una per experientiam philosohiae, alia per divinam inspirationem quae longe melior est, ut dicit. Et sunt septem gradus hujus scientiae interioris, ... Septimus consistit in raptibus et modis eorum secundum quod diversi diversismode capiuntur, ut videant multa, quae non licet homini loqui. Et qui in his experientiis vel in pluribus eorum est diligenter exercitatus, ipse potest certificare se et alios non solum de spiritualibus, sed omnibus scientiis humanis.... necessaria est nobis scientia, quae experimentalis vocatur. Et volo eam explanare, non solum ut utilis est philosophiae, sed sapientiae Dei, et totius mundi regimini* -

*There are two ways to gain knowledge: experience and argument. Argument does not give us certainty and does not remove doubt so that our mind might rest in the intuition of truth, except it finds it in experience [He then explains how we only know about fire through experience, not argument]... Consequently, argument is not sufficient, but experience. But here I am talking about someone who has made an experience, and thus knows about reason and cause through experience... But experience comes in two modalities. One is experience through the exterior senses, and through those experiences we experience what is in the heavens and what is below... And this is human and philosophical experience. We can have as much of it as is given to us by grace. But this experience is not sufficient for us humans, because it does not give certainty about material bodies, because of their difficulty, and in spiritual things it does not attain anything.*

*Therefore the human intellect needs support from elsewhere. And this is exactly the way the holy patriarchs and prophets, who have first given knowledge to the world, received inner illuminations and have not just remained in the outer senses... Ptolemy says, in his book Centilogion, that there are two kinds of attaining knowledge about things, one through philosophical (i.e. scientific) experience, one through divine inspiration, which is much better, as he says. This inner science has seven steps [he now goes on to explain them; this is the classical Franciscan path of contemplation]... The seventh consists in ecstatic enlightenment and its various modes of understanding, according to which various people understand various things, such that they see a lot, about which humans are not allowed to speak. And whoever has a lot of careful practice in these experiences or in many of these, can assure himself and others, not only about spiritual matters, but about all human sciences... We need such a science, that is called a science of experience. And I want to explain it, not only how useful it is for philosophy, but also for Divine wisdom, and for the governance of the whole world.*" (Bacon, 1897, vol 2, p. 167 ff.)

Hence we can see: at the very origin of Western science there was an idea of a holistic type of experience, directed outwards to experience the world, what we today call science proper. In addition, though, there is also experience directed inwards, called spiritual or mystical experience in the language of the time, called pure introspective knowledge by us in our context. Both are necessary, both belong together, Bacon says. Well, we think he is correct, and had the Pope lived on and had read Bacon's text, he might have enacted his ideas, and might have asked him to move forward with his idea of reform; in that case we might have had another, even more comprehensive science today. But history is as it has developed and there is no point in moaning and wishing otherwise. But historical reflexivity can actually teach us that such ideas have been around, even in the West, for a long time, buried in archives and dusty volumes, but present nevertheless. Perhaps it is now time to revisit them and take them seriously?

At any rate, what we have in mind, a direct or radical introspection, is not a novel or outlandish idea. It only sounds like it in the context of Science 2 as we have it currently, in our materialist scientific world view. This, we have argued, is neither a necessary, nor a particularly useful stance.

Looking into current scientific practice, we can actually see some first attempts. The movement of "*Contemplative Neuroscience*" is such an attempt.

It tries to parallel third person perspectives of neuroscientific approaches, through MRI, EEG, MEG, with phenomenological, first person accounts of such experiences, thereby enriching the otherwise somewhat sterile data (Beauregard & Paquette, 2006; Dor-Ziderman, Berkovich-Ohana, Glicksohn, & Goldstein, 2013; Jo et al., 2015; Jo et al., 2014; Lancaster, 2011; Naranjo & Schmidt, 2012; Singer & Klimecki, 2014; Trautwein, Naranjo, & Schmidt, 2016; Walach, 2011; Wittmann et al., 2015). While these studies use traditional approaches of introspection and pair them with neuroscientific methods of observation from a third-person perspective, they still point to a rehabilitation of conscious phenomenological viewpoints as postulated by Varela, Thompson, and Rosch (1991) and demanded more recently by Bitbol and Petitmengin (2013).

The point of radical or direct introspection takes matters one step further. It is the suggestion that we include systematic approaches of meditation or contemplation in the scientific arsenal and develop methods to share, discuss, and potentially verify the resulting experiences in order to distil out common and potentially intersubjective elements. The first step would be towards openness and acceptance of such approaches and a common understanding that this is an important potential new development. Whether it will then be followed by activity such as publications and insights worth sharing remains to be seen.

## *Inclusive Thinking and Classical Logic*

This move may well have a further beneficial consequence: it will complement logical thinking with inclusive thinking, which again, are not opposites, but actually complementary pairs of one global rational approach to our world. Logic, we repeat, is a necessary basis for science, as without it we would be prone to all kinds of incoherent statements. But logic is not enough. It only applies to sentences and to predicative structures, as elaborated above. And our bias towards this kind of thinking is very likely a cultural bias which is preventing innovation, creativity and insight (McGilchrist, 2009). Aristotle emphasised that the final reality, has to be "seen" in what he called "noesis" thinking. But this kind of "thinking" is not, what we mean when we say "thinking". It is more akin to insight and the result of direct introspection as formulated above. In that sense, what we have in mind here is very much akin to the ancient Greek notion of "thinking" or intuiting (Bouratinos, 2018). Such an insight or intuition of reality is of course something that then needs to be spelled out, developed in detail, narrated or related in language. This is, then, when logic is called for. The transposition of first-person-singular experiential statements into first-person-plural common statements will require the application of reason and basic logic. But it is important to realise that the basic intuition of reality itself might actually transcend classical, binary logic. This has already been observed regarding the structure of quantum mechanics, which is a description of the deep structure of reality (Isham, 2005; Putnam, 1985).

While classical logic operates via the exclusion principle "either-or", an inclusive type of thinking or a more-valued logic operates via "both-and" inclusion, recognising that there may be situations where logically exclusive alternatives *appear* to be applicable, but are actually wrong. Everyday experience is rich in examples. For instance, in human relationships we rarely have clear cut alternatives, where we either like others, or hate them. Most of the time our attitudes are mixed, and clear cut division is actually a sign of psychopathology, where grey shades or the contradictions in the perception of others are missing, or cannot be integrated (Kernberg, 1985, orig. 1975). For instance, most of the time our parents were both helpful and supportive, as well as sometimes unempathic and unsupportive. It is the task of growing up to integrate these experiences into a rich and realistic image of our parents which is a hallmark of an adult perspective on one's childhood (Main & Goldwyn, 1996). In the same sense, reality is likely to offer many situations where inclusiveness is a better heuristic than the application of exclusive logic. Politics offers a rich field of application as well, where it is only in rare cases helpful to condemn the actions of others or to separate other nations into those that are "good" and those that are "bad".

In science, inclusive thinking is also useful, mainly in the context of discovery. As already mentioned, the strict application of exclusive thinking has hindered progress in many fields. Neurotransmitters, for instance, can have different, even opposite effects, depending on the receptors they bind to. It took a long time to realise this, because of an overly active application of exclusive reasoning. Hormones can also act as neurotransmitters, depending on where they operate and what receptors they interact with. Peptides can have both immunological and transmitter functions, depending on the context. These discoveries would have been arrived at sooner, had there been more openness to inclusive reasoning.

The application of more inclusive thinking is already common in many branches of social science. It would likely produce more sustainable solutions in politics and economics and would be more helpful in science and various other areas, especially in discovery and in the context of solving problems or finding creative solutions. In fact, Reich has found in an empirical study that young people often develop beyond the stage of formal logic which was considered the highest cognitive developmental stage by Jean Piaget (Reich, 1999, 2003). He called this type of thinking at first "complementaristic" thinking, and later "relational-contextual reasoning", because it is a reasoning that considers the context of situations and understands that there often is no clear cut solution, and hence problems cannot be solved by stating "either" this, "or" that, but by structures like "if-then", or "both-and". It is interesting to see that adolescents seem to grow into this by themselves and that classical developmental psychology has so far not integrated this finding.

Inclusive thinking can also be applied to the proposals made here. It is not either "science, objectivity, materialism" or "spirituality, introspection, consciousness". It is both. We need both a clear intersubjective study of matter, as in science. But we *also* need an enlarged set of background assumptions that allows the study of consciousness, direct introspection and the intersubjective scrutiny of first-person accounts of direct experiences of reality. It would be a large step forward for our culture and for all kinds of developments, from political peace keeping missions to economic developments, from education to university training, if more inclusive and systemic thinking were employed and the logical "either-or" structure relegated to situations where it belongs: to predicative structures of decidable observations or statements.

Many seemingly irreconcilable opposites would then dissolve, for instance the opposition between economy and ecology, growth and sustainability, freedom and peace, taking care of oneself and being responsible for others. In fact, it is arguably a sign of psychological development if someone is able to hold what appears as opposites as belonging together. For instance, if the exclusive logic of either-or is applied to child-rearing, disaster is pre-programmed. Children always need both: freedom and structure, love and challenge. If they are left to their own devices entirely, they will create havoc, become unhappy and challenge adults with their behaviour into showing them borders and stop signals. If they are always kept within safe borders, not allowed to explore and also overstep some boundaries every now and then, they will develop into anxious, fearful, but also uninspired individuals with little creativity. So it is the combination of two opposites together that is necessary. It would be an interesting task for a broader Science 3 to explore the contexts in which a certain type of logic is appropriate. We expect that whenever we touch the deep structures of our world we will need to fall back on a more inclusive logic. Whenever we are moving at a surface structure we can apply the either-or of exclusive logic. It would be an important task of a more comprehensive and inclusive science to explore these issues.

But in order to do this, it will be necessary to move beyond the exclusive connection of Science 1, the practice and everyday business of science, to Science 2, the materialist world view which comes with a narrow methodology and an overreliance on a certain type of rationality.

If spiritual experiences, or direct introspection, are going to be taken seriously, then such inclusive thinking or a transcendence of binary logic will be inherent. We saw already with Bacon, in the text quoted above, that what is experienced in such types of spiritual experiences "men are not allowed to speak of". This we take to mean that the content of such experiences is too rich to be pressed in the structure of simple sentences, and to be submitted to exclusive logic. This is also the reason why many religious texts are full of contradictions, or work with paradox in a systematic manner, such as in Zen practice (Miura & Fuller Sasaki, 1966).

Whenever we consider the phenomenology of such experiences, for instance in scholarly or personal accounts (Barendregt, 1996; Bucke, 1901; Forman, 1999; W. James, 1985; MacPhail, 2017; Wirtz, 2014), we find that the content is not expressible in simple structures. Experiences are said to be "too big" to be expressed. They are often clear but need time to be spelled out, as Ignatius of Loyola said of his own experience in his retrospective autobiography (Loyola, 1977). They often contain seemingly contradictory elements, like pain and joy, dread and liberation at once (Wirtz, 2014).

This may be due to the fact that such direct, radically introspective experiences of reality touch upon the deep structure of reality from within. Here is a modern example of such an experience from a prominent astrophysicist who calls himself an atheist, who had this experience spontaneously, when he travelled to his island residence in a boat, switched off his engine and looked at the stars from his boat:

"*I lay down in the boat and looked up. A very dark night sky seen from the ocean is a mystical experience. After a few minutes, my world had dissolved into that star-littered sky. The boat disappeared. My body disappeared. And I found myself falling into infinity. A feeling came over me I'd not experienced before. Perhaps a sensation experienced by the ancients at Font-de-Gaume [a cave with Paleolithic paintings he had described earlier]. I felt an overwhelming connection to the stars, as if I were part of them. And the vast expanse of time - extending from the far distant past long before I was born and then into the far distant future long after I will die - seemed compressed to a dot. I felt connected not only to the stars but to all of nature, and to the entire cosmos. I felt a merging with something far larger than myself, a grand and eternal unity, a hint of something absolute. After a time, I sat up and started the engine again. I had no idea how long I'd been lying there looking up*." (A. Lightman, 2018, p. 6)

We see here many elements of such an experience also reported by others: an experience of unity with something much larger; an experience of timelessness compressed into a dot; a feeling of connectedness with the whole cosmos. A modern introductory text on Zen contains quite a few such experiences from Japanese and Western practitioners (Kapleau, 1969). Here is, as a complement to the experience of Lightman, an astrophysicist and self-professed atheist, the experience of a young modern day Zen practitioner. He reported, as part of his Kensho-report, which he had to submit to his teacher after acknowledgement of his first break-through experience, also an earlier experience which he had in a completely different context many years previously:

"*Suddenly it appeared as if a door opened. Reality broke asunder, or, to be more precise, it did not break but it was as if a curtain was drawn apart. The very same reality showed itself in a completely different light, as it were, and it was clear as the sun, in the truest sense of the word, for, at the same time, I saw a miraculously bright light which was as bright as the sun but still did not blind me. It made everything appear clearly. It was clear as the sun that this is exactly the reality and at the same time separated from us by a wall of paper, although it is not separated... In Zen-terminology it was the true being - and I am identical with it. Within me and within everything else, there lives the very same light and I am it, completely identical with it. An incredible wave of joy, never experienced before or after, literally washed me from the path I was walking on... And I knew: this reality is reality itself; it is always there, only we do not see it. Suddenly I understood a lot, with an understanding that is happening, as it were, in a huge lightening of the now, and whose explication is still ongoing...*" (Walach, 2017b)

We see here similar structures: insight and connectedness, suddenness and understanding, light and the metaphor of a bright light like the sun, the compression of the experience into a seeming dot or moment, and in addition to the experience beyond the experience of joy. In both experiences – and the examples could be multiplied – we see seemingly contradictory structures: here and everywhere, individual and the whole, now and eternity, time and duration, separation and connection, all of which do not fit a structure of a simple, exclusive, bivalent logic.

While physics and quantum mechanics touch on the deep structure of reality from an outside approach as it were and reveal a rich reality that does not obey the bivalent logic, radical introspection or spiritual experiences seem to do the same, using the route via consciousness. We posit that systematic training of such practices, through meditation, contemplation or any other practice of a culture of consciousness will enhance people's capacity to think in more inclusive and less exclusive terms and use a richer structure of rationality to approach our reality and other people.

## *Abductive Reasoning – The Scientific Equivalent to Direct Introspection*

A similar process is already in fact inherent in scientific discovery, one which is little studied and little known. This is the process of abduction: the way scientists order disparate pieces of information and data creatively into a new theoretical structure. The term "abduction" or "abductive reasoning" was coined by Charles S. Peirce who called abduction "*facts in search of a theory*" (Peirce, 1931, VII p. 218). Abduction in science is similar to the way the detective pieces together snippets of evidence to gain a full picture (Caprettini, 1985; Eco & Sebeok, 1985; Hintikka & Hintikka, 1985; Nickles, 1980; Sebeok & Umiker-Sebeok, 1985). Peirce showed that it is always the first step in a circle of scientific reasoning (Hulswit, 2000; Nickles, 1980). In fact, this idea was already present at the beginning of Western theory of science and had been formulated by Aristotle in his Organon (Aristoteles,