

On Overcoming the Alleged Alienation between Christianity and Physics

(slide 1) Introduction

1. The idea I would like to suggest is this: *in order to be in deep harmony with the Catholic faith, doing science should be inspired by common sense*. The reason is that Catholic faith is not only a doctrine about *God, man and the world*, but also gives an orientation to one's *mindset*. And the mindset is Common Sense. To Common sense belong all purely natural understandings and knowledges, which human persons recognize as common.

Catholic doctrine gives *explanations* by conveying God's revelation through ordinary experience and language. In that way, it implicitly endorses Common Sense and thus *encourages* the believer to give his or her mindset a certain orientation. The topic of this talk is exclusively that *encouragement*, not theological explanation. I will end up with two results as samples of that encouragement.

(slide 2) 2. The reference to Common Sense is not superfluous, and that for historical reasons. The mindset of Western mankind in general, and of physicists in particular, has been influenced for centuries by philosophers such as René Descartes, who said that man is *deceived* by his senses. Therefore, he proposed a world view built by mental reconstruction. To the same line belongs Immanuel Kant, who maintained that we do not *learn* from nature *its laws*, but *impose our own laws* upon nature. Kant himself called that view 'counterintuitive'. He was explicitly echoed by Einstein, Heisenberg, Hertz and so many others, who did not *write* about that idea, but nevertheless *followed* it. Think also of Karl Popper, who defended the view that "nature does not answer" to questions, and of Carlo Rovelli, who published a book with the title "Reality is not what it seems" (2014). Of course, all these authors differ in many aspects, but all of them favour a world view that is rather dominated by mental reconstruction than by learning from nature.

3. By now, it has become clear that I am limiting myself to Physics, and that I maintain that the mindset dominant in Physics is alienated from the mindset of Catholic faith. To put it in other words: (i) The mindset of Catholic faith is close to Common Sense. (ii) The mindset of Physics is quite distant from Common Sense. *Ergo*, (iii) the mindset of Physics is quite distant - or alienated - from the mindset of Catholic faith.

4. Nevertheless, one could ask, *where is the problem?* Physics is a serious science. What for does it need an orientation by common sense? The problem is that Physics consists of *two* bodies of knowledge, namely experience and theories, and these two bodies are *not* sufficiently linked by experiments. The most obvious lack is that, while everybody knows *that* mathematics works in physics, nobody knows *why*. This problem continues being unsolved, and it cannot be tackled from the side of mathematics, but only from the side of experience. As long as it is not solved, a physicist is hosting in his mind two opposite mindsets: as a Christian (Catholic or not), he or she thinks and acts according to common sense, as a physicist, he or she acts in a mindset far from common sense. It is not only a problem of different doctrines, but also a problem of the splitting of mindsets within the same person.

5. The overcoming of that opposition of mindsets is a purely philosophical task that can be dealt with by any qualified person. Yet, a Catholic has a certain back up by pronouncements of the Catholic Church that fall into the category of theological *encouragement*. In one way or other, they touch upon the high cognitive value of ordinary experience and language. Therefore, I shall very briefly mention three of these pronouncements. Thereafter, I shall mention two major results of putting such encouragement into practice by focusing on ordinary experience.

(slide 3) 1. The encouragement by Christian revelation as reflected in the Catholic Magisterium

6a) The first and perhaps strongest pronouncement is that about the possibility of a natural theology. That is to say that “The ... Church holds and teaches that God, the beginning and end of all things, *can be known with certitude by the natural light of human reason from created things.*” This statement is very old, and the Church has formally made it part of Catholic faith in the First Vatican Council’s Dogmatic Constitution *Dei Filius*.

In our context, we are not concerned with the knowledge of the *Creator’s existence*, but with the knowledge of *nature*. Both knowledges are linked, because if the things of this world are intelligible in such a way that an attentive observer can be led to the insight of creation and Creator, then these same things also can lead an attentive observer to a certain insight into properties of material things, for instance, causalities and regular behaviours. It is as if Christian revelation said: “*Scientists, trust your eyes and your mind! Through them you are in contact with reality! For that precise purpose you have got them!*”

This said, it should be noted that nature and the ordinary experience of it have their own “language”. One should be prepared to adjust one’s intellectual optics to what experience suggests. In other words, the encouragement urges us to *focus* upon experience. This requires a strong intellectual discipline that one achieves only little by little over the decades. *Even more: one should be somehow reluctant to leave experiences out, although the sheer complexity of processes seems to insinuate abstractions or simplifications.* Precisely *that* might well be the most specific feature of theological encouragement.

The focus on experience by exhortations like “trust your eyes and your mind” and “learn from nature” also means “don’t *copy* from others”. For instance, the philosophers of nature before the Scientific Revolution of the 17th and 18th centuries had neither an idea of the microscopic world nor of higher mathematics. How could one reasonably copy from them?! - What one *could and should* learn from them is *being inspired by Common sense*, because all of them were unaffected by the turn to Modernity of the times of Descartes and amplified by the Scientific Revolution.

6b) Another pronouncement is contained in the encyclical “Fides et ratio” (14.9.1998) by John Paul II. In the final part of Fides et ratio, the Pope directly addresses scientists and encourages them, to do their science within a “*sapiential horizon*” (FR 106,2), freely paraphrased as “guided by wisdom”. While it is not made clear in that passage, what precisely that sapiential horizon is, it is absolutely clear that natural sciences are situated *within* such a horizon, which excludes the alternative that natural sciences themselves *constitute* such a sapiential horizon.

6c) Last not least, the third argument is that of the parallelism between the Incarnation of the Son of God, on the one hand, and the Word of God revealed in human language, on the other. (Address of His Holiness John Paul II on the Interpretation of the Bible in the Church, on April 23rd 1993, on the occasion of the publication (15.4.1993), by the Pontifical Biblical Commission, of the Document *The Interpretation of the Bible in the Church.*) I will not go into details.

Admittedly, only the first of these three pronouncements directly addresses the high cognitive value of ordinary experience and language, together with the cognitive capacities of the human mind. But taking them all together, they have considerable weight and, to my mind, can rightly be called an *encouragement* to trust the natural human means of

understanding and communication. A Catholic should make an evaluation of his or her own and decide how to follow that encouragement.

[Without formally being part of the Church's magisterium, the famous Regensburg lecture of Benedict XVI (12.9.2006) can certainly be considered as close to it. In that lecture, Benedict speaks of various phases of de-hellenization in the history of occidental thought, which goes hand-in-hand with a loss of metaphysical thinking. This loss amounts to a self-limitation of human reason. The splendour of the western technological-scientific civilization is missing the deep wisdom and has degenerated to a sort of glamour. With respect to the mindset of scientists, Benedict finds quite specific words when speaking about the "modern self-limitation of reason, classically expressed in Kant's "Critiques", but in the meantime further radicalized by the impact of the natural sciences" and of the need to "overcome the self-imposed limitation of reason to the empirically falsifiable".]

(slide 4) 2. Two Seminal Consequences from and for Physics

8. All these considerations might be very nice but are useless, *unless the encouragement is put into practice*. In order to follow the encouragement, a vast variety of experiences must be examined, distinguished and sorted together. That is a tedious work. Let me mention here two experiences relevant for present-day physics, in order to give a taste of what sort of insights ordinary experience can yield. They can be called 'ambivalence' and 'overinterpretation of the double slit experiment that has led to the particle-wave dualism'.

[Let us start by recalling what Physics is. Physics is a planful investigation of a *material thing* by means of *other material things* in order to establish, enhance or confirm a theory. The material thing mentioned first is commonly called the 'object', that mentioned second is called the 'apparatus'. In the very beginning, the word 'planful' refers to some initial knowledge of things gained by experience only. Little by little, the experimenter finds out what he calls 'laws of nature', which often have a mathematical form. These laws enable the experimenter to make predictions and plan future investigations. So physics has two wings, namely experience and experiments, on the one hand, and mathematical laws of nature, on the other. Both are important, and none can stand without the other.]

a) First, the term *ambivalence* refers to that the functions 'object' and 'apparatus' in an experiment are *not predetermined by nature*. Therefore, it is exclusively the experimenter, who determines which is which. In other words, it is the experimenter who eliminates the natural ambivalence according to his purposes and, perhaps, also according to reasons of practicability. Altogether, the practical elimination of the ambivalence by the experimenter lessens the "objectivity" of the mathematical theory and restraints the information which enters that theory.

In order to get a more complete picture of reality, it is necessary to *not eliminate, but to take into account* the ambivalence. This is a philosophical task, and it cannot be excluded that it is the door to some insight into the reason why mathematics is working so well in physics.

(slide 4*) b) The second experience leads to identifying a logical mistake in the interpretation of the result of double slit experiments. Consider this picture [growing result of a double slit experiment]: every single spot is caused by a single particle and contributes to the collective result, but does not constitute it. If from that collective result is taken a measurement (usually interpreted as a "wavelength"), *that measurement cannot be attributed to every single spot resp. particle*. This well-known procedure or interpretation is called *particle-wave dualism*. It is successful, but unfortunately at the expenses of a logical mistake.

(slide 5) Both ambivalence and overinterpretation are surprisingly simple. Perhaps that is a reason why they have passed unnoticed. In any case, because of their simplicity, they lie at the foundations of physical science and might well spark further investigations. In a larger context, both consequences will be published in the near future.

[Conclusions

9. **(i)** The overall-conclusion of this talk is that following the *encouragement* of Catholic theology to trust ordinary experience because of its high cognitive value does yield enrichments of physics. Its foundation is, above all, the doctrine of the possibility of recognizing this world as what the Bible calls 'created'. Therefore, following that encouragement is, in itself, a way of coming closer to God.

(ii) This *encouragement* does not contain an explanation of natural processes, but leaves any explanation to natural human cognitive capacities.]