Arnold Benz, ***Astrophysics and Creation: Perceiving the Universe through Science and Participation***, The Crossroad Publishing Company, 2017, pp.144. ISBN-10: 0824522133 (pbk), $16,95; ISBN-13: 978-0824522131 (hbk) $19,95.

You too may have received a number of books from their authors, some being scientists eager to have an 'expert' affirm how their experience of science has strengthened, even proved their faith. This book is different. As it develops its thesis of participatory perceptions, it contains abundant 'reasoned inquiry', while always leaving the exactly appropriate room for 'wonder' [p. 19]. That is a difficult balance to maintain, but as I read the book during a return train journey from Rome to Reggio Emilia, where the 19th century Jesuit-scientist Angelo Secchi was born and raised, I became convinced that Professor Benz had achieved it.

Benz is well-known to participants in the conferences of ESSSAT. His pleasant manner and balanced, expert views are very evident in this book, as is his ability to tell a compelling story. In the Prologue, he recounts how a night under the stars in the Sahara, when he was a year out of high school, brought the sky alive to him. It was a sky that promised both increasing scientific knowledge and deepening amazement.

In the first of three parts of the book, "Amazing Formation", Benz outlines what current astrophysics is telling us about the formation of the universe. He keeps the 'puzzles' – what we do not yet understand – before us and, for instance, writes of the 'comet hypothesis' as a tentative explanation of how water came back to the Earth after the young Sun's radiation had expelled it from the inner solar system. There is a lot that is uncertain, including the role of comets. But Benz carefully avoids putting the concept of God into those 'gaps' of knowledge. He prefers, for example, that "[t]he Big Bang is like a horizon in time, a boundary beyond which we will likely never be able to look" [p. 50]. In this, he follows both Richard Feynman and, though not mentioned, Georges Lemaître. Toward the end of this first part, Benz uses the classic poem in *Leaves of Grass* that tells of Walt Whitman's reaction on hearing "the learn'd astronomer". The poem contrasts the objective, scientific approach of the astronomer to the personal, transcendent experience of those gazing at the night sky. Both approaches are valid, but the truth found in one is not to be confused with that found in the other. 'Physico-theologists', who explain how God arranged everything, are not welcome, and 'creation of the universe' is not a scientific topic.

Part II, "Dissolution and Horror", is refreshingly realistic, unlike those who are simply amazed by it all. The universe, including the solar system, is born only to decay eventually. The decay is a complement to becoming, thanks to

the second law of thermodynamics. While there have been awfully lucky events, such as the off-centre strike by the small planet 'Theia' on the Earth, thus making the Moon, in contrast Venus and Mars are clearly examples of 'bad planning'. Benz's conclusion is that life is a risk [p. 87-9], but such risks also bring chances, and so ultimately "[t]he universe…is an adventure".

Where does religion fit into that adventure? For Benz, it is not another level of explanation, like the higher, all-subsuming discipline that we find in quantum mechanics, but a different, qualitative perception of reality. "Different kinds of perceptions together constitute our window onto reality" [p. 98]. Here we come to the nub of Benz's thesis. These different kinds of perceptions must not be limited to those of science, which of themselves give an incomplete grasp of reality. Experiences such as come through art, religion, love, and grief, are all valid 'participatory perceptions' which bring personal involvement into the arena of experiences. Participatory perceptions are not part of science since they are on a different 'plane', but they are essential for completing our whole human perception of reality in its true depth. These participatory perceptions are not purely subjective since they are primed by objective phenomena [p. 104] – and conversely, I would add that science is not purely objective. While science cannot prove God exists, it can enhance our participatory perception of what lies beyond the material universe.

Before starting the third part of his book, Benz reviews three progressive forms of interpretation: *explaining and modelling*, successfully achieved by the scientific method; *comprehending*, something discussed but not published professionally; and *construing* or interpreting, something for late-night musings and popular books. This construing opens up the final part, "Interpretation as Creation", which is Benz's own personal interpretation of where his science leads him in understanding creation. Under the heading of part III fall chapters on "What Could Creation Mean Today?", "God in the Universe", "Longing for Meaning", and "Space and Time – Surprised by Creation". Many topics are dealt with in this last part of the book, and it can be moving to follow the author's quest for integration of his science and of 'the different plane' of perception. It will also be where the reader will find differences with their own interpretation, maybe just in nuances. The difficulty is always in keeping the planes of perception distinct while remaining relevant to each other. For instance, to write of a "Creative Principle" as "a fundamental property of matter that also shows up in chemistry and biology, as well as in human society" [p. 129] is dangerously close to becoming an unhelpful mix of planes. Pierre Teilhard de Chardin is among those who worked hard to achieve clarity in such statements, so it is not an easy task. But there is much in part III that is inspiring, including a concluding interpretation that the universe and life are gifts from a gracious hand.

The Epilogue suitably brings us back to the night sky, this time seen by Benz from outside the James Clerk Maxwell Telescope, which at 4092 meters above sea level is close to the top of Mauna Kea in Hawaii. Again, it is a beautifully told story of the fascination that astronomy as science still brings him, and how his participation in that understanding make the stars glint even more brightly than his oxygen-deprived eyes at that altitude would allow. The power of such an experience is to connect one all the more firmly with the cosmos, immense yet large enough in extent and time to have fostered one's own presence in it – and even to connect one to that gracious hand behind it all.

I do recommend this book to ESSSAT members, even while it is aimed at a popular audience. It makes a stimulating read in a length that is perfect to enjoy on a relatively short journey.

Christopher Corbally
Vatican Observatory

* * *

Henry P. Stapp, ***Mindful Universe: Quantum mechanics and the participating observer*****,** The Frontier collection, Springer Verlag, Berlin, Heidelberg and New York, 2014, 2nd ed., pp. 228. ISBN 978-3642444081 (Pbk) €32.02 (Amazon)

The book's author, Henry P. Stapp, is a physicist who has contended for the significance of Quantum Mechanics to cognizance and freewill. This work establishes the framework for a science-based way to deal with the subjects of awareness, freewill and so forth. It is additionally a fascinating treatment of the convergence of consciousness studies and quantum theory.

Stapp has authored two other relevant books: *Mind, matter and quantum mechanics* (3rd ed. 2009), and *Quantum theory and free will: how mental intentions translate into bodily actions* (2017). He worked closely with Werner Heisenberg, Wolfgang Pauli and John Wheeler. The second edition of this book contains two new chapters investigating the role of quantum phenomena in the problem of free will and in the placebo effect.

I will not do a chapter-wise analysis of this book; rather, I will try to indicate the main themes presented throughout the work. The central question of the book – the aim of the book as explained by Stapp – is to describe the development of the revised conceptualization of the connection between our minds and our brains, and the consequent revision of the role of human