Faith and Fascination[1]

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1 Introduction

This article about the interaction between science and religion will appear in a book celebrating the 10th anniversary of the "Vatican Observatory Summer School for Observational Astronomy and Astrophysics". The school is held every two years in the Papal Palace in Castel Gandolfo near Rome. Three senior scientists plus the Observatory staff teach roughly 25 students from many different countries for one month.

When writing about the Vatican Observatory Summer School, one would think the central theme would be "science and religion". Well, it is not. Even though we were studying in the heart of the papal palace in Castel Gandolfo, and even though we were surrounded by Jesuits, religion was apparently not an issue. However, in retrospect I think that the concept of this Summer School achieved something remarkable. When 25 students from almost as many different countries, work together, play together, talk together for one month in this setting, it may not have led to instant conversions, but it taught us something about how a community of so different talents, nationalities, and interests can work together in peace and harmony – most of the time. So, without the gospel of peace being preached, it was put into action, and it was experienced at work.

Just the presence of the Vatican Observatory and its Jesuit staff, however, was a constant reminder of the fact that science is just one part of the world. And when you realize that this staff had been actively involved in reopening the case against Galileo, you know that you are standing on historical ground. Indeed, the interaction between science and religion has a long history in which every scientist will have a part on one side or the other. I consider myself fortunate that, as a protestant/evangelical Christian and an astronomer, I find myself on both sides of the aisle. Hence, I want to take the opportunity to describe in this paper, why I believe religion has a lot to give to science and

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especially to astronomy. There are two points I want to elaborate (three points would make a sermon). First, I want to suggest that the driving forces for both, astronomy and religion, are the same: fascination for the infinite and the incomprehensible and the quest to know where we belong to. Secondly, I want to warn that science without religion, although celebrated as a liberation by some, has its dangers, especially when science claims to have the monopoly on truth.

2 Fascination – the common root

Recently we published HST images of a Seyfert galaxy which showed spectacular strands of emission-line gas forming a figure eight on one side. I was quite pleased with the results and the pictures looked really neat, but while writing this article I started to think about it: a "figure eight" – this sounds like Sesame Street on children's TV ("this Galaxy was brought to you by NASA and the Number 8"). Yes, we love to describe astronomical objects in simple, figurative terms ("Pistol", "Sickle", "Tornado", "Sombrero", just to name a few galactic and extragalactic names). We publish and discuss nice, little pictures of objects which in reality are larger than anything we can imagine. In my mind the huge emission-line region of a distant galaxy is probably not very different from a little lady-bug. In this respect we are not different from the first astronomers (or better astrologers?) who projected funny drawings onto the sky. Moreover, many astronomers have their "pet-objects" (mine is Sgr A* of course) which they love and cherish. This all allows us to relate to the objects we talk about, it makes us believe we understand and know these gigantic structures, just like we know our pets. It makes us feel that they belong to us, that we control them like the objects that surround us and form *our* world. How arrogant of us! What we consider our little toys, are objects so large and so far away, that we are nothing more than an infinitesimally small perturbation. We cannot look at these objects as an engineer looks at an engine he designed, because we will never touch them, we will never change them, we will never conquer them. We can only watch and wonder.[1] Sure, we know that, but do we really know that?

History, and the history of science in particular has taught us that the human spirit will eventually overcome every problem and we will boldly go where no one has gone before. We have learned to fly, we have landed on the moon, we have (very quickly) ignited the solar fire, and we have commanded elementary particles and captured single protons. Do we understand that we never will fill the vastness of the universe? Do we understand that there are places where we never will and never should be the masters? God gave us the earth, the universe belongs to him. I believe the understanding of this basic limitation makes

[1] This reminded a friend of mine of a fellow astronomer who talked to a bunch of engineers and got asked the question: "Since the stars are so far away and we can't fix them, what is the point of studying them?"

astronomy different from any other science and once in a while we should make sure that we still have the right attitude towards the objects of our research. It is probably necessary to reduce the universe to a few numbers and instructive sketches to do our work, but what drives astronomy is the fascination of the nightly promenader who looks into the sky and wonders and asks questions we can never fully answer. If we take away that simple fascination we would also take away one of the foundations astronomy is based upon.

In this ultimate motivation that drives astronomy, religion and science start to touch each other. As a child I spent sleepless nights thinking about some old questions which we probably all had: Is the universe infinite? If not, what is beyond the universe? How did it start and who started it? Is there a God and what am I compared to all this? As it used to be for many centuries, in my childish mind the questions about God and about the world that surrounded me were not separated. Those questions were not fighting against each other, instead, they were stimulating each other and producing a burning desire for answers. This fire cannot burn forever and these questions will stop eventually. The fire will get almost extinguished by every-days duties, by disappointment, disillusion, fear of the future, and the desire to be more successful. But I am convinced a few sparks of this fire are still glowing in the darkness of any soul, even in those of scientists, and in a few special moments it can light up again. Maybe that is even what we are living and striving for — to feel the fascination and the wonder for the creation that surrounds us in its full power, just one more time.

I still do find this fascination in looking up to the stars, I find it when I make a scientific discovery I was seeking for a long time, and I found this fascination when I discovered for the first time that God is real. Whether I discover the Creator or his creation does not make such a big difference in the way I experience it.

Am I a fool, talking about astronomy in such an emotional way? Perhaps, but then I am not the only fool. I meet quite a few astronomers – many more than I first thought – who feel religious in one way or another. There are some like me, who believe that the Bible is God's word, where real people describe their real experiences with God, and who believe in the death and resurrection of Jesus Christ, as the ultimate love, hope, and purpose in this world. However, I also meet others, who have spent quite some time thinking about God, developing their own religious beliefs. They do not want to identify themselves with traditional religions, and are afraid of the possibly harmful reactions of fellow scientists to their ideas. Others are still asking. Apparently knowing that they are missing something, they were just curious. They keep a "friendly contact" with religion and once in while think about theological questions but have never found a chance to dig deeper. Of course I also meet those who apparently are not interested, and those who outrightly oppose any religious thoughts, those who give young astronomers the impression that the scientific honor code requires one to abstain from having faith in anything.

I do not object that someone objects to me, my ideas, and my faith, but I strongly object when anyone tries to impose an ideological straitjacket on science and scientists. Of course, the presentation and discussion of any finding should follow commonly accepted scientific rules, but just because a scientific paper should be free of feelings, emotions, and beliefs, this does not mean that science, should dictate my personal feelings, emotions, and beliefs. Not every question in life can be answered scientifically. Science has to recognize and accept this limitation, otherwise, science itself turns into a scientific religion – this would not only be an oxymoron, it would also be dangerous.

3 The danger of science without religion

The often suggested image of ourselves that emerges from such a purely scientific world-view is that we are just an ensemble of protons and electrons; we are nothing but a very efficient computer. This conclusion which some scientists promote, is, of course, the result of a circular argument. Modern science is based on the exclusion of anything which is not measurable, repeatable, and quantifyable (something a few modern cosmologies tend to forget), and hence the only things scientists will ever find are those which are measurable, repeatable, and quantifyable. As scientists we have *ab initio* defined the world to be that way, yet, some misuse this as a conclusion and claim that their restricted world is the whole world. That is the moment where science turns into religion (sometimes called "scientism") and scientists can turn into zealots.

Marvin Minsky, a Professor at MIT, for example, may be one of the more extreme proponents of this scientific religion. In an article in the *Scientific American* (October 1994), he preached his vision that "in the end, we will find ways to replace every part of the body and brain and thus repair all the defects and injuries that make our lives so brief" (p. 111). He basically dreamed of the final evolutionary step from humans to computers — our mind-children. He went on to say that "we must change our ideas about making additional children. Individuals now are conceived by chance. Someday, instead, they could be 'composed' in accord with considered desires and designs" (p. 113) and he asked "How many people should occupy the earth? What sorts of people should they be?". Humans turned roboters, and designing of children? Minsky was apparently carried away by his own success in creating "artificial intelligence". His scenario, if considered with all its consequences, sounds like a bad movie, where a genius with mad-scientist-disease tries to create his own, brave new world (thank God, we have James Bond and Captain Piccard!).

Certainly, as a Christian and a German, who is very aware of his nation's recent history, I may be more sensitive to some issues, especially if it comes to creating a new and better race, but can we really afford to let scientists like Minsky define humanity? I am convinced the consequences would be terrifying. I remember very well one late-night conversation with one astronomer and

Minsky follower, who believed that he himself and every other human being is nothing but a machine — a walking computer. "So what do you do if the computer is broken or outdated?" was my question, and sure enough, the logical answer was, "Throw them away!". Maybe it is consistent with this philosophy to throw those away who some consider not fit for life, but I categorically deny anybody's right to play God himself. What kind of society would we have to live in, if it were shaped by prophets-turned scientists who do not know where their limits are? Fascination may be an important driving force of science, but if it runs out of control it could take us hostage.

4 Personal conclusion

I believe the best recipe to prevent us from being carried away by our own glory and megalomania is to stand in awe before the majesty of the universe and to humble ourselves before the One who created it. Christianity gives me the necessary, ethical guidelines for my work, as well as the values I will not find by looking into the sky. Faith fills my personal needs and takes away some of the anxiety, cynicism, and arrogance that often control us more than reason. Sure, there is a constant battle between my ideals and the way I actually behave (it is sometimes so difficult not to to talk in a derogatory manner about certain colleagues, isn't it?), but just as a good peer-review can improve a scientific paper substantially, an occasional "superior-review" of our lives can have a very positive effect on ourselves.

Therefore, being a Christian and an astronomer is to me a wonderful combination and not a problem. Discovering God is always the discovery of a lifetime; after that, anything else we find is just an interesting extra, since we are only rediscovering what He already knows. Reading the Bible and communing with God is to me as exciting as looking through a telescope, because it opens a window to a world the telescope cannot see. For me this is a very productive and natural way to deal with the curiosity and fascination that is still inside me, it has a place in God — the place where I think it belongs, and the place where it is kept alive.

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