SEEKING GOD IN PHYSICS

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Introduction

I was first introduced to the writings of Blessed Josemaría Escrivá when I went to Oxford University in 1979 to study physics. A member of Opus Dei in my college told me about Blessed Josemaría and lent me a copy of *The Way* to read. I was immediately impressed by the direct style and depth of insight of the points, and decided to buy a copy. Ever since that first encounter, I have found the teaching of Blessed Josemaría to be a constant source of inspiration, which has deeply affected my entire life.

The universal appeal of Blessed Josemaría's teaching is indisputable. The rapid expansion of Opus Dei throughout the whole world is well known, and testifies to the profound simplicity of his spirituality, which can inspire people from all different walks in life. The general principles are the same for everyone, and then it is up to each individual to work out how to apply them to their own daily lives. This brief personal testimony is my attempt to explain what his teaching means for me as a physicist.

The scientific enterprise

In the book of Genesis God commands the man and woman to «fill the earth and subdue it» (Gen 1:28). The highest form of this subjugation occurs at the intellectual level, because men and women are created in the image and likeness of God (Gen 1:26-27), and the «image» resides most fully in the rational soul with its intellectual faculties. Therefore the scientific enterprise corresponds to one of the highest aspirations of the human race, because it fulfils the plan of the Creator to subdue the natural world by our intelligence.

In the exercise of this task, scientists inevitably find themselves pulled in two opposing directions. On the one hand, they can discern the divine «image» within themselves, and recognise the Creator in the creation. On the other, they can exult in their own achievements, and proudly assert their independence from God. This dichotomy is clearly seen in two contrasting texts of Scripture. In the Psalms we read:

> *«Thou hast made him little less than God, and dost crown him with glory and honour. Thou hast given him dominion over the works of thy hands»* (Psalm 8:5-6).

However, in the book of Genesis we also see that the realisation that men and women can «be like God» might be the subtle temptation of the devil (Gen 3:5). Scientists therefore have the opportunity to give glory

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to God in carrying out their tasks, but must always be wary of the temptation to overstep the mark, and miss the whole purpose of their endeavours.

The delicate balance between finding or rejecting God through scientific work is particularly acute for physicists. Physics is considered to be the most fundamental of the sciences, and it is also the most precise. The outstanding success of relativity and quantum mechanics on both cosmological and microscopic scales leads many to believe that these theories set the ultimate limits of our present-day scientific knowledge. It does not take much to go one step further and think that physics sets the ultimate limit of all human knowledge. It seems to me that this is why physicists tend to be either strong believers or total atheists. With the exacting minds that the precision of physics engenders, they quickly realise that it does not make sense to sit on the fence, and cast their lot one way or the other. In what follows, I will outline how Blessed Josemaría's influence has been an invaluable help for me to take the first approach, and to seek God through my work as a physicist.

Raising Christ to the summit of all human activities

Blessed Josemaría repeatedly taught us that we must put Christ at the summit of all human activities:

> *«From Saint Paul's teaching we know that we have to renew the world in the spirit of Jesus Christ, that we have to place Our Lord at the summit and heart of all things»*[1].

For me as a physicist, this means that I must learn how to find God in my work and seek to direct the whole of the scientific enterprise towards God. As I have explained above, the work of a scientist, if carried out in a Christian way, readily lends itself to this orientation. Blessed Josemaría used to explain this point by helping us to see our human intelligence as a spark of the divine:

> *«Every now and then, ... some people try to resurrect a supposed incompatibility between faith and science, between human knowledge and divine revelation. But such a misunderstanding could only arise ... from a misunderstanding of the elements of the problem. If the world has come from God, if he has created man in his image and likeness and given him a spark of divine light, the task of our intellect should be to uncover the divine meaning embedded in all things by their nature, even if this can be attained only by dint of hard work. ... The Christian must have a hunger to know. Everything, from the most abstract knowledge to manual techniques, can and should lead to God. ... To work in this way is to pray. To study thus is likewise prayer. Research done with this spirit is prayer too»*[2].

Blessed Josemaría thus tells us that research should draw the scientist closer to God. As Pope John Paul II stated during an address at the University of Sydney in 1986:

> By its very nature, scholarship is ultimately theocentric[3].

[1] *The Forge,* 678. See also *The Forge,* 685, Ephesians 1,10 and Colossians 1, 19-20.

[2] *Christ is passing by,* 10.

[3] John Paul II, Address at the University of Sydney, 26-11-86, published in *l'Osservatore Romano,* English Edition, 9-12-1986.

This is true of all scholarship, but it is particularly apt for physics, where we can perceive the beautiful order of creation that reflects the rational Creator who fashioned it:

> «*The heavens proclaim the glory of God, and the firmament shows forth the work of his hands*». (Psalm 19:2).

The realisation that God is equally present in the vast dimensions of the cosmos and in the counter-intuitive world of sub-atomic particles engenders for me a profound sense of awe. Pope John Paul II stated recently:

> «*Scientists ... stand in wonderment and humility before the created order and feel drawn to the love of the Author of all things*»[4].

This text highlights the importance of humility in the life of a scientist, and naturally leads to the next point I wish to consider, namely Blessed Josemaría's teaching on the virtue of humility.

The importance of humility in the work of a scientist

Humility is essential for all Christians, since they seek to follow a Master who is «meek and humble of heart» (Matt 11:29). Blessed Josemaría's clear teaching on this subject[5], and the exemplary way in which he lived the virtue[6], have helped me to understand its importance in my work as a physicist. Three aspects of the virtue are particularly relevant, as I will explain below.

In the first place, the virtue of humility demands that those who achieve worldly recognition must be careful to avoid making this their main purpose in life. The work of scientists often receives considerable limelight, and this could easily engender an attitude of self-importance which would be counter to the humble spirit of service expected from a Christian. This aspect of humility is apparent in the universality of Opus Dei to which I have already alluded in the introduction. The spirit of Opus Dei can be lived equally by people who hold positions of importance in worldly affairs, and by those who work in total obscurity. Everyone is equal before God, and what really matters is the love of God with which we do the work.

Secondly, the virtue of humility implies that we seek the glory of God in what we do, and not our own human glory. This should not be misunderstood to imply that the human quality of the work does not really matter in the last analysis. Blessed Josemaría would not accept that line of argument. As he explains in one of his homilies on work[7], God expects work of the highest calibre, but for the right reasons[8]. I will develop this point further in section 5 below.

Finally, the virtue touches on the very core of the scientific enterprise, as I have outlined in sections 2

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[4] John Paul II, Address at the Jubilee for men and women from the world of learning, 25-5-2000, published in *l'Osservatore Romano,* English Edition, 31-5-2000.

[5] See, for example, The Way, 589-613; Furrow, 259-289; homilies «Christ triumphs through humility», 24 December 1963 *(Christ is passing by,* 12-21) and «Humility», 6 April 1965 *(Friends of God,* 94-109).

[6] See, for example, C. Cavalleri, *Immersed in God,* Scepter Publishers, Princeton NJ (1996), pp 169-173.

[7] *Friends of God,* 55-72.

[8] See, for example, *The Way,* 334, 340.

and 3. The aspects of the virtue mentioned in the preceding two paragraphs apply to all Christians, but the humility of scientists must go much deeper. Scientists face the challenge of trying to find God in nature, following the doctrine of St. Paul (Romans 1:20):

> For since the creation of the world his invisible attributes are clearly seen –his everlasting power also and divinity– being understood through the things he has made.

This will not be possible unless the scientist adopts a humble attitude towards his own intelligence and the created world in which he lives.

Sanctification of scientific work

The doctrine of sanctification of work was one of the first things that struck me as I read through the points of *The Way*. It was not as though I had not heard about it before. I had received a good Christian education and had been taught from my childhood the importance of offering my work to God. However, with the writings of Blessed Josemaría the whole subject took on new dimensions that were particularly appropriate to my work as a physicist.

It seems to me that the first and most obvious aspect of Blessed Josemaría's teaching on the sanctification of work is the idea of turning the work itself into a prayer:

> *«An hour of study, for a modern apostle, is an hour of prayer»*[9].

When I first read this point, it resolved in a single fell swoop a practical problem that I had been wrestling with. I had been under the impression that if I were really to take my Christian life of prayer seriously, I would have to curtail my professional ambitions and spend long hours in church. On the other hand, if I were to pursue my academic career, I would risk neglecting my spiritual life. The idea of praying through my professional work was like having the cake and eating it.

This beautifully simple idea is, of course, not so easy to put into practice as it sounds at first. It is relatively easy to remember to pray *Ave Marias* while mowing the lawn, but I have yet to find the technique to do this while working through a complicated calculation in quantum theory. Blessed Josemaría's solution is to raise the work itself to a higher level:

> *«Keep struggling so that the Holy Sacrifice of the Altar really becomes the centre and root of your interior life, and so your whole day will turn into an act of worship – an extension of the Mass you have attended and a preparation for the next. Your whole day will then be an act of worship that overflows in aspirations, visits to the Blessed Sacrament and the offering up of your professional work and your family life»*[10].

Thus by uniting our own work with the offertory gifts in the Mass which represent the «work of human hands»[11], the work acquires a divine dimension, no matter how insignificant it may be. Herein lies the secret of *«making heroic verse out of the prose of each day»*[12].

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[9] *The Way*, 335.

[10] *The Forge*, 69.

[11] Roman Missal, Liturgy of the Eucharist, prayers over the gifts.

[12] Homily «Passionately Loving the World» 8-10-1967, published in *In love with the Church*, Scepter (1989), no. 54.

With this background, we can begin to appreciate what Blessed Josemaría means when he teaches us that we must be *«contemplative souls in the midst of the world»*[13]. In the first place, this means the same for me, a research physicist and university lecturer, as it does for any other person. We must seek God in what we do, offering our work to Him, and finding Him in prayer throughout the day. We will then find frequent opportunities to show our love for God by practising the Christian virtues in the countless little things of our daily existence.

Each person then has to find their own way to put the general principles into practice. For me as a university teacher, I can think of Jesus teaching the crowds while I deliver my lectures. As a laser physicist, I can try to remember Jesus' words «I am the light of the world» (John: 9.5) as I direct the beams of light around the laboratory. And at the deeper level, I can praise God for the beauty and rationality of His creation, as I have already explained above.

It has been a great joy to discover that my scientific work is precisely the place where I live out my Christian vocation and find God! This higher motivation inspires me to undertake my work with renewed vigour, even when it is laborious. The following point from *The Way* is particularly relevant in this context:

> *«You ask me: why that wooden Cross? –And I copy from a letter: "As I look up from the microscope, my sight comes to rest on the cross– black and empty. That Cross without its Crucified is a symbol. It has a meaning which others cannot see. And though I am tired out and on this point of abandoning the job, I once again bring my eyes to the lens and continue: for the lonely Cross is calling for a pair of shoulders to bear it"»*[14].

Blessed Josemaría thus teaches us that even though the true value of our actions is supernatural and not human, the supernatural value itself depends on the human quality of the work. The Christian should therefore be noted for his or her professional competence and commitment. This will then be an eloquent Christian witness, which forms the basis for a coherent apostolate, as I will now explain.

Apostolate through physics

I have already alluded to the fact that scientists tend to be polarised in their attitudes towards God. As the Pope John Paul II states it:

> *«A widespread notion exists that scientists are generally agnostics and that science leads one away from God»*[15].

The statistics are actually worse than the Pope implies. A recent survey showed that 72% of leading scientists are outright atheists, with only 21% claiming to be agnostic, and just 7% who believe in God[16].

[13] *Furrow,* 497.

[14] *The Way,* 277.

[15] John Paul II, General Audience, 17-7-1985, published in *God, Father and Creator,* Pauline Books and Media, Boston MA (1996).

[16] E.J. Larson and L. Witham, Nature (London), *394,* 313 (1998).

This point really came home to me a short time after my first encounter with *The Way* in the autumn of 1979. In the spring term of 1980, I attended the Wolfson Lectures on «The nature of matter»[17]. Among the lecturers was Abdus Salam, who had been awarded the Nobel Prize only a few months previously. After his lecture on the «Unification of Forces», one of my friends commented that Salam was unusual among prominent physicists in that he believed in God. He then further pointed out that Salam was a Muslim. This fact really struck me. I wondered why it should be that none of the world's top physicists were Christians.

I have subsequently discovered that the impression given by that conversation was somewhat distorted. If anything, I think it is more common to find believers among physicists than among other types of scientists. This has certainly been my own experience. Moreover, there have been a number of recent indications which might imply that the tide is perhaps turning away from the atheistic approach. A few examples might serve to illustrate this point.

Newsweek magazine recently published a lengthy article entitled «Science finds God». Among other things, it mentioned that the father-figure of my own field, Charles Townes, who won the Nobel Prize in 1964 for his pioneering work on laser physics, is a committed Christian[18]. *Physics World*, the magazine for members of the Institute of Physics, has run several recent articles that touch on the subject of science and religion[19]. In one of these, it reported that the Templeton Prize, which is awarded annually for «outstanding originality in advancing the world's understanding of God or spirituality», has been won by physicists three times in the past six years[20]. The official internet site of the Jefferson Laboratory in the United States reports that «in the past decade, an increasing number of physicists have come to believe that there is compelling evidence that an intelligent designer created the universe»[21]. Finally, at the recent conference on «Physics for the 21st Century» organised as part of the Jubilee of Universities at the Vatican, no less than five Nobel Laureates were among the speakers[22].

Despite this, the prevailing impression remains that science and Christian faith are incompatible. This puts a heavy responsibility on scientists who are believers to present a credible witness to their faith. Blessed Josemaría has helped me to see the defence of Christian truth through my work as an integral part of my Christian vocation. At about the same time as I was attending the Wolfson Lectures in 1980, I was reading the following point from *The Way* for the first time:

> *«Formerly, since human knowledge –science– was very limited, it seemed quite feasible for a single*

[17] The Wolfson Lectures are an endowed series on cutting-edge topics in science. The particular lectures I attended are published in *The Nature of Matter* (ed. J. Mulvey), The Clarendon Press, Oxford (1981).

[18] Sharon Begley, *Newsweek* Magazine, 27 July 1998, pp. 44-49.

[19] *Physics World*, November 1999, pp 27-31: «Isidor Issac Rabi: walking the path of God» by J. S. Rigden; December 1999, pp 69-70 : «A brief history of physics and religion» by E. Cartlidge; June 2000, pp 10-11: «Religious physicist with faith in science» by M. Durrani.

[20] *Ibid.*, article by M. Durrani.

[21] http://www.jlab.org/news/articles/1999/universe.htm.

[22] The conference program is listed at http://billie.roma2.infn.it/phys21/welcome.html.

learned individual to undertake the defence and vindication of our holy Faith. Today, with the extension and the intensity of modern science, the apologists have to divide the work among themselves, if they want to defend the Church scientifically in all fields. You ... cannot shirk this responsibility»[23].

My scientific work can thus be an opportunity to lead others to Christ through a well thought-out response to secularist tendencies. This also provides yet another reason why the quality of the work should be as good as possible:

> *«There are no excuses for those who could be scholars and are not»*[24].

Blessed Josemaría's teaching on Christian apostolate through work has wider perspectives that go beyond the scholarly defence of Christian principles. He reminds us that everyone is called to carry out apostolate as a result of his or her baptismal vocation. This is usually done by encouraging friends and colleagues to lead a more Christian life through the normal channels of conversation and social interchange. The following point from *Furrow* obviously has special significance for me as a physicist, but the principle it enunciates, namely helping others through our work, is universally applicable:

> *«I understand perfectly when you write to me about your apostolate: "I am going to pray for three hours, studying Physics. It will be a bombardment so that another position, which is on the other side of the library table, falls – you have met him already when he came round here." I remember how happy you were when you heard me say that prayer and work can easily go together»*[25].

Conclusion: unity of life

This point brings me to the natural conclusion of my testimony. I have described how Blessed Josemaría teaches us to seek God in our everyday lives, and have given a few examples of how I try to this in my work as a physicist. I have also explained how the desire to give glory to God in everything I do leads me to try to carry out a Christian apostolate through my work. In so doing, I have quoted a point from *Furrow* that links work, prayer and apostolate. This perhaps is the profound beauty of Blessed Josemaría's teaching: Christ calls us to imitate Him every day, in everything we do. Blessed Josemaría teaches us how to live this simple but challenging unity of life in practical ways. As he puts it in *The Way*:

> *«How I wish your bearing and conversation were such that, on seeing or hearing you, people would say: This man reads the life of Jesus Christ»*[26].

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[23] *The Way*, 338.
[24] *The Way*, 332.
[25] *Furrow*, 471.
[26] *The Way*, 2.