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## **Qualities of an Ideal Scientist – An Islamic Perspective**

Scientists are people with several extraordinary qualities. However, these qualities differ among scientists of various disciplines and depend on the nature and type of research a scientist is engaged in. The impact of scientific research is reflected in a society and the entire humanity at large and scientific research can make human life better or even bring a disaster. Thus, it is important to consider various qualities of scientists and their impact on a scientist's research and its consequences. The qualities<sup>2</sup> of an ideal scientist can be divided in three main categories: behavioral or spiritual, mental or intellectual and physical qualities.

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<sup>2</sup> In this article, qualities of a good scientist are mentioned in italics throughout the text. The Arabic words are in brackets [].

## Knowledge and Discovery – An Islamic View

According to the teachings of Islam, knowledge<sup>3</sup> doesn't only mean reading, remembering, analyzing or discovering new facts or even making a new invention based on discovered knowledge. Knowledge is based on piety [*taqwa*]<sup>4</sup> and that the seeker of knowledge should have special characteristics reflected in his pure and godly intentions and thinking, wise words and finally virtuous actions. Knowledge without these characteristics is considered as being of a very low level.<sup>5</sup> Whatever a scientist 'observes', 'discovers' or 'creates' is a sign [*ayah*] of God, a fact already known to God and created by God – being the ultimate source of knowledge<sup>6</sup>. A scientist is thus blessed with opportunity [*toufiq*] by God to seek knowledge, do experiments, analyze data and present result or make discovery.

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<sup>3</sup> In Islamic traditions reported by Prophet and His Ahlul Bayt (as), over 700 traditions have been reported on various aspects of knowledge, seekers of knowledge and benefits of seeking of knowledge.

<sup>4</sup> Surah al-Baqarah, ayah 282: ...and be careful of (your duty) to Allah, Allah teaches you, and Allah knows all things. The basic fact is that human should be careful of his duty towards God, know that it is God in the end who teaches, either directly or indirectly and finally God emphasizes that whatever knowledge a human being acquires is in fact known to God. Please see Tafsir al-Mizan (WOFIS Publishers, 1973) for detailed commentary. Additionally refer to reference no. 3 for detailed explanation as to how piety [*taqwa*] purifies human soul and makes it receptacle of knowledge.

<sup>5</sup> Imam Ali Ibn Abi Talib [as]: That knowledge which remains only on your tongue is very superficial. The intrinsic value of knowledge is that you act upon it. [Nahjul Balagha, saying no. 92] Available online: Al-Islam.Org, Ahlul Bayt Digital Islamic Library Project <<http://www.al-islam.org/nahj/>> (last accessed: 17/06/2011)].

<sup>6</sup> Imam Khomeini [ra], Forty Hadith chapter 24, The Classification of Sciences, pp. 421-434 (Ansariyan Publications, 1999) [available online: Al-Islam.Org, Ahlul Bayt Digital Islamic Library Project <<http://www.al-islam.org/fortyhadith/>> (last accessed: 17/06/2011)].

The difficulties that a scientist faces in the path of acquiring knowledge, and the joy and pleasure of making a discovery or creating new knowledge for the sake of God are special and their reward is reserved only for the elected friends of God. All the mental capabilities and ideas leading to discovery, health and physical strength and the brain used by scientist to acquire knowledge are among the greatest blessings of God. Thus, according to the teachings of Islam, a scientist cannot honestly say ‘my data’, ‘my research paper’, ‘my discovery’ or ‘my invention’. Whatever good things that come in the way of scientist, in any form, are in fact blessings of God and a scientist must realize that even if he doesn’t remember God in his intellectual pursuits, God remembers him and blesses him abundantly with success and so he must thank God all the time for his favors. In the final essence, acquisition of scientific knowledge and making discovery are not the ends, but a means to seek pleasure of God, serve His creatures and are God’s blessing in this world upon a scientist and it is up to him to use these blessings for the sake of God’s pleasure, thankfulness and worship and reduce suffering of human beings or for worldly, selfish and materialistic gains and bring destruction for himself and humankind.

### **Qualities of a Good Scientist**

A scientist should be first a *good human being*. Motivation for his research should be primarily based on alleviating human pain and suffering and seeking pleasure of God and doing his duty. Scientists have different motivations, including, curiosity, love of discovery, winning awards, becoming famous, better financial life, career promotion and finally competing with a colleague or a group. All these motivators potentially make a scientist successful in his career, but these can lead a scientist to fall in an evil trap, do

wrong to himself, his colleagues and society and humanity at large, commit sin and thus, lose divine blessing in his research. A good scientist *prioritizes various motives for research* and keeps his duty towards God and his creatures as the top motivator. His heart feels the pain of suffering of creatures and serves as powerful internal force to go forward. In this way, he is never carried away by short-term materialistic or selfish goals and worldly attractions.

In modern times, a scientist cannot remain isolated and do research alone and so he should be a *good team worker*, be humble in attitude and respect his colleagues and their opinions. Another characteristic is *truthfulness*. Scientific research by itself is discovery of a hidden truth which starts from observation and ends with creation of new knowledge or discovery of a fact which may lead to an invention. Thus, until a scientist develops habit of being truthful all time, he cannot be a good scientist and can make deliberate error in making his observation, doing experiments, data analysis, inference and writing his results in the form of thesis or research publications. A scientist with habit of being untruthful can easily fall prey to plagiarism and scientific misconduct and exaggerate his findings to make short term worldly gain.

*Patience and persistence* are two very important qualities of a good scientist. A scientist has to often deal with failures in his experiments, lack of facilities and funds, uncertainties, unfavorable and hostile environment as many may not believe in his findings. Thus, he should *never give up his quest* and *curiosity* and have *trust in God [tawakkul]* and *seek God's help* in face of uncertainties, difficulties and adversities.

A scientist must have *sharp observation* and he *should be able to see things, phenomena, events and data differently, and with*

*creativity from various aspects* and he should also be able to accurately *quantify observation*. This is the essence of scientific research as the results that a scientist comes up with form the basis of further inference and application of scientific knowledge. A scientist should also be *very responsible* in making observations, doing experiments, and publishing his results. He should consider the impact of his publication before submitting it to a journal or publisher.

*Listening and accepting points of view that are not in agreement with his own or scientific flexibility* is another quality of a good scientist. Often, scientists disagree on a key point, mechanism of action, interpretation of data, have different approach to scientifically pursue a problem or may have disagreements on other scientific issues.

Due to rapid expansion of knowledge, creation of new disciplines at a very past pace, diversity of scientific techniques and communication revolution, often, a scientist is ignorant of many new facts and discoveries, and has to be *courageous and honest* enough to *express his ignorance* in front of others. *Humbleness* is thus another characteristic of a good scientist who *appreciates efforts and superiority of his colleagues*<sup>7</sup> and *accepts what is scientifically proven*, even though it may be against or better than his own views. This humbleness in fact motivates a scientist to always be a good learner.

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<sup>7</sup> Surah Yousuf, ayah 76: ...and above every one possessed of knowledge is the All-knowing one. This is a fact that human beings excel each other in knowledge, in different places and in different times and no one can know everything except God. Thus being humble with others is the best manner a scientist or seeker of knowledge should adopt. Please see Tafsir al-Mizan for details.

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Knowledge and skills of a scientist can often lead another scientist or a colleague to become envious towards him, harm him in various ways and deny his due rights. This can also harm a society because if a talented scientist is not allowed to work and denied facilities and opportunities, society will not be able to enjoy fruits of his intellectual endeavors. Thus, a good scientist *has eyes and mind free from envy, that appreciate knowledge and skills of his colleagues, give their due rights and respect, help and promote those who excel him in knowledge, talents and skills*, even though it may apparently harm his own career.

According to a tradition<sup>8</sup> reported from Imam Ali (as), a researcher or seeker of knowledge should have several diverse characteristics which are summarized in table 1.

Spiritual or Mental	Behavior and Attitude
Good intention	Visiting the learned
Humbleness	Discussion with the learned
Freedom from envy	Refined manners
Higher level of understanding	Tolerance in behavior
Compassionate by heart	Love of elect
Truthfulness by heart	Compassion in behavior
Integrity	Truthfulness in words and action
Piety	Piety in action
Satisfaction	Gentleness
Gnosis of things and matters	Research
Salvation	Faithfulness
Well-being	Softness of speech
Divine guidance	Virtue in action
Virtue	Abstinence from sins

Table 1. Characteristics of Researchers in the view of Imam Ali (as)

<sup>8</sup> Al-Kulayni (d. 941 A.D.), al-Kafi, vol. 1, kitab fadl al-'ilm, bab al-nawadir, hadith no. 3. For detailed explanation of the qualities of seekers of knowledge, please refer to Forty Hadith by Imam Khomeini [ra], chapter 23, The seekers of knowledge, pp. 405-420.

## Ontological Aspects of Qualities

All the intellectual and mental qualities described for a good scientist grow as a scientist pursues his career and makes new discoveries or publishes more scientific papers. As a scientist acquires more knowledge, his capacity to acquire more knowledge increases and his ‘reservoir’ become more spacious, this is opposed to material things where reservoir becomes gradually filled and less spacious as said by Imam Ali (as).<sup>9</sup> Accordingly, progress in a scientist’s intellectual capabilities is reflected in his *ability to go deeper into a topic, know more about less and unknown, comprehend better, make precise and accurate comments, evaluate delicate aspects of knowledge, write more scholarly, do better editing, think laterally, enter into scientific debates with more depth and diversity, develop a general comprehension into broader areas outside his own discipline and guide students more effectively.*

From an ethical and spiritual point of view, during stages of acquisition of knowledge, a scientist may be trapped in a stage [known as stage of knowledge by the gnostics] whereby knowledge becomes his aim and not means. His aim becomes to win intellectual discussions with his like and prove his superiority of knowledge. The scientist also feels pleasure to be called as a ‘scholar’, ‘intellectual’ or a person with knowledge and loves to acquire more knowledge for the sake of worldly gains, promotion, and only for pleasure that he feels in acquiring knowledge and to

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<sup>9</sup> Imam Ali Ibn Abi Talib [as]: Every container gets narrows with what is kept in it, except for the container of knowledge which becomes more spacious. [Nahjul Balagha, saying no. 205]

become famous as a scientist or scholar.<sup>10</sup> It is important that at this stage, the scientist should get out of this state of mind with spiritual exercises and concentrate at his duty towards God and His creatures. Until he comes out of this stage, and enters into stage of acquiring knowledge as a duty towards God again, all his efforts in acquiring scientific knowledge, making discoveries, publications, everything will be for the sake of personal motives, worldly gains and devoid of divinely blessings and the rewards in the Hereafter. Such a scientist will only progress intellectually and get fame, promotion in academia and acquire high worldly status; however, his spiritual and ethical qualities will be lost and replaced by selfish intentions. Additionally, when a scientist is in the beginning stages of acquiring knowledge, he may feel to know a lot about a specific topic or area of research and think that he knows a lot. However, as he grows, his horizon become more wide and high, and gradually finds that he knows very little and there is a lot more to learn in the never ending journey to acquire knowledge. Thus, he gradually *develops a sense of ignorance inside himself and becomes more humble in his attitude. Towards his likes, the people of knowledge and scholars, he develops a special love and respect and socializes with them.* Thus, in order for a scientist to be ‘complete’ and ‘perfect’ in all spheres, he must *pay equal attention to spiritual qualities and self-purification* throughout his career. Accordingly, for a good scientist, it is necessary to have *spiritual qualities, pure godly intentions, and special behavioral aspects* mentioned above [table 1]. He should also progress in depth and purity, become

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<sup>10</sup> Imam Khomeini [ra], Adabus Salat [The Disciplines of Prayer] discourse 1, chapter 2, The stages of the stations of the people of suluk, pp. 13-16 (The Institute for Compilation and Publication of Imām Khomeini’s Works (International Affairs Department), 2002) [available online: Al-Islam.Org, Ahlul Bayt Digital Islamic Library Project <<http://www.al-islam.org/adab/>> (last accessed: 17/06/2011)].



more refined, and acquire higher levels of piety and divine characteristics with his career progression from a junior researcher or student until becoming an established senior scientist, professor or still higher.

### **Good Scientist in the Modern Age**

In the modern age, a scientist has a more challenging task. As opposed to past when a scientist usually had to travel long distances to find a teacher, a scientist in today's world has easy access to scientific knowledge and is faced with information overflow and has to read a lot of literature before coming up with new ideas and innovative approach. Thus, a good scientist should be *a good reader, able to differentiate between various levels and categories of knowledge reported in scientific literature*, should be *able to work with modern technology, internet, necessary softwares*, and should *never be tired to learn new scientific techniques and acquire new expertise*, whenever required to learn in order to pursue his research goals and make a discovery. Additionally, since modern science is essentially multidisciplinary and entails diverse techniques, a good scientist should be a *good team worker and collaborate with other scientists and never be shy of learning from them*. He should *never hide his knowledge and love teaching his students and colleagues and make use of all the tools available* to come up with authentic data and make a discovery necessary for solving a problem –all these in order to ease pain of the creatures of God. This process is hard test for a scientist as he has to *take care of rights of other scientists working with him*. *Faithfulness and loyalty* are two essential qualities of a scientist when working in a team with others. A scientist should never claim knowledge and ideas [either in written or spoken form] or discovery which belongs to others as his own. According to the

Prophet Mohammad (swas), this is regarded as the worst treachery.<sup>11</sup> He must always *give credit to others*, in written and verbally for their intellectual contributions and thank them.

## Conclusion

According to the teachings of Islam, knowledge is a divine light [*noor*] instilled in the heart of a person by God.<sup>12</sup> It illuminates the heart of a scientist and guides him. If combined with faith in God, this light leads a scientist to become successful not only in this world, but hereafter also. A scientist's words and actions reflect this divine light, if his aims are godly. A scientist remains alive after his physical death because of his written words left as a legacy for mankind or his invention which serves humanity to remove their suffering and make their life better. A scientist is constantly in a state of evolution towards more knowledge and higher qualities in all spheres and his quest to see realities of creation, created by God. Every time he makes a new discovery, he, in fact discovers a new name [*ism*] of God, His new attribute [*sifat*] increases his gnosis [*marifat*] of God. He becomes more responsible in his duties towards himself, knowledge he has acquired, his colleagues, students, society and finally God. At every higher level of

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<sup>11</sup> Al-Majlisi (d. 1698 A.D.), Bihar ul-Anwar, vol. 17, p. 67, hadith no. 2. Prophet Muhammad [swas] said: 'Be truthful to each other in the matters of knowledge, because treachery in matters of knowledge is worst than treachery in the matters of material things.'

<sup>12</sup> Ibid., vol. 17, p. 225, hadith no. 17. Imam Ja'far al-Sadiq [as] said: 'Knowledge is not extensive learning. Rather, it is a light that God casts in the heart of whomever He wills. Knowledge is not extensive learning. Rather it is a light that God instills in the heart of anyone He wishes to guide. Therefore, if you wish to acquire knowledge, first seek the reality of servitude inside yourself, and seek knowledge by the way of adhering to it and then ask God to bless you with it so that He blesses you with its understanding.' For explanation of this hadith, please see reference no. 6.

knowledge and discovery, there are new challenges, more complex uncertainties and more severe difficulties waiting for him. A scientist should thus remember God, thank Him for his favors and His tests, and seek His help and never forget his duties towards Him. Finally, a prayer attributed to the Prophet Muhammad [swas] can be a good tool which a scientist can often use to seek divine help: ‘O Allah, show me the things (or facts) as they are.’<sup>13</sup>

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<sup>13</sup> Vide reference no. 8 for explanation and slight variations in the text of prayer.