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cover photo: Qibla indicator from Ottoman period (Turkish and Islamic Arts Museum, Istanbul), lacquered on wood, diameter 31 cm, craftsman Barun al-Mukhtari, 1738 AD

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Editorial

The Moral and Social Features of Scientists

The modern world is the world of science, and more than any other time, human beings benefit from the scientific achievements and, beside it, suffer from the calamities caused by scientific development. In our time, in a chaotic world where the hope for peace, equality and brotherhood is highly weakened, the way science is applied defines its positive or negative influence on human life. Nowadays we observe tragic wars and the damaging effect of the modern means of communication which function against everyone's personal peace and privacy, as concrete examples of these unfair issues.

The way science is applied, mainly depends on the strategic policies of those who own military and economic powers. However, the producers of science may also play a role in this domain. The scientist's motivations influence his/her methodology, subject of research and hence the final outcomes of his/her work.

A survey of the life and the professional, moral and social characteristics of the great men of science can be worth learning and following in this regard. Khwarazmi, the eminent Iranian mathematician of the 9th century who founded algebra, classifies the different types of scientists, in the opening of his treatise on algebra, as follows:

> The learned in times which have passed away, and among nations which have ceased to exist, were constantly employed in writing books on the several departments of science and on the various branches of knowledge, bearing in mind those that were to come after them, and hoping for a reward proportionate to their ability, and trusting that their endeavours would meet with acknowledgment, attention, and remembrance- content as they were even

with a small degree of praise; small, if compared with the pains which they had undergone, and the difficulties which they had encountered in revealing the secrets and obscurities of science.

[There are three types of scholars:]

Some applied themselves to obtain information which was not known before them, and left it to posterity.

Others commented upon the difficulties in the works left by their predecessors, and defined the best method (of study), or rendered the access (to science) easier or placed it more within reach.

Others again discovered mistakes in preceding works, and arranged that which was confused, or adjusted what was irregular, and corrected the faults of their fellow-labourers, without arrogance towards them, or taking pride in what they did themselves.

Eleven centuries later, Albert Einstein, a known figure almost for all, in his lecture on the occasion of Max Planck's 60th birthday (Berlin, 1918), mentions the following categories of the scientists:

In the temple of science are many mansions, and various indeed are they that dwell therein and the motives that have led them thither. Many take to science out of a joyful sense of superior intellectual power; science is their own special sport to which they look for vivid experience and the satisfaction of ambition; many others are to be found in the temple who have offered the products of their brains on this altar for purely utilitarian purposes. Were an angel of the Lord to come and drive all the people belonging to these two categories out of the temple, the assemblage would be seriously depleted, but there would still be some men, of both present and past times, left inside. Our Planck is one of them, and that is why we love him.

I am quite aware that we have just now light-heartedly expelled in imagination many excellent men who are largely, perhaps chiefly, responsible for the building of the temple of science; and in many cases our angel would find it a pretty ticklish job to decide. But of one thing I feel sure: if

> the types we have just expelled were the only types there were, the temple would never have come to be, any more than a forest can grow which consists of nothing but creepers. For these people any sphere of human activity will do, if it comes to a point; whether they become engineers, officers, tradesmen, or scientists depends on circumstances. Now let us have another look at those who have found favor with the angel. Most of them are somewhat odd, uncommunicative, solitary fellows, really less like each other, in spite of these common characteristics, than the hosts of the rejected. What has brought them to the temple? That is a difficult question and no single answer will cover it. To begin with, I believe with Schopenhauer that one of the strongest motives that leads men to art and science is escape from everyday life with its painful crudity and hopeless dreariness, from the fetters of one's own ever shifting desires. A finely tempered nature longs to escape from personal life into the world of objective perception and thought; this desire may be compared with the townsman's irresistible longing to escape from his noisy, cramped surroundings into the silence of high mountains, where the eye ranges freely through the still, pure air and fondly traces out the restful contours apparently built for eternity.

There may be other classifications of scientists as well, based on different criteria, depending on different viewpoints and situations. What we read from Khwarazmi and Einstein is still valid and applicable. But the wounds that the wars, inequality and exploitation have imposed on the human conscience, and the insatiable greed of the owners of military and economic power who exploit the efficient elements of human life including science, necessitates an updated survey and classification. If science is merely applied for a personal comfortable life, and its emotional, moral and social aspects are neglected, the scientist will be no more than means of domination and exploitation, so science will have destructive consequences.

Abstracts of Persian Articles

Plants Taxonomy in Botanical and Medical Works of the Islamic Civilization

Shamameh Mohammadifar

Botany was usually taken as a part of medicine or pharmacology in the Islamic civilization. The Muslim scholars were mainly interested in the medical properties of the plants rather than their apparent characteristics. The adjectives accompanying the plants' names attributing them to mountains, rivers etc., were to some extent similar to modern scientific names of the plants consisting of two words. In this paper the classifications by Dioscorides (which widely influenced the Muslim's works on the subject), Dīnawarī, Rāzī (Rhazes), and Majūsī are described in details.

Mīrzā 'Abd al-Ghaffār Najm al-Dawla

One of the Pioneers of Scientific Modernity in Iran

Seyyed-Amir Sadat-Mousavi

Iranians' awareness of modern sciences is a long story that mostly happened in Qājār dynasty. One of the most effective figures was Mīrzā 'Abd al-Ghaffār Najm al-Dawla who has been supported by the King Nāṣir al-Dīn Shāh. Najm al-Dawla was one of the first graduates of Dār al-funūn school and then became the chief teacher of mathematical sciences in that school. He had an important influence on Iranian scholars through his books about modern astronomy and other modern sciences. We review his scientific biography and his works, and study some of important cases to show his role in the scientific modernity of Iran.

Mīrzā Muḥammad ʿAlī Qāʾinī's *Nihāyat al-īḍāḥ*

Mohammad-Reza Arshi

Mīrzā Muḥammad ʿAlī Qāʾinī (1808-1887) was an Iranian mathematician and astronomer who wrote Persian and Arabic commentaries on the works of his predecessors. In *Nihāyat al-īḍāḥ*, he provides an Arabic commentary on Book IV (on mensuration) of *Miftāḥ al-ḥisāb* (key of arithmetic), the Arabic treatise of Jamshīd Kāshānī (al-Kāshī). In his commentary, Qāʾinī explains the technical terms used by Kāshānī and provides proofs for the propositions presented by him. He also provides 21 interesting drawings of semi-regular solids at the end of his commentary. In present paper, the contents of this treatise are discussed.