Islamic Scientists' Attention To The Experimental Methods

Europe was proud to have introduced the experimental method and presented itself as the founder of this method. However, the history of science has shown that Europe is indebted to Muslim scientists for this honour. Muslims were the first scientists to develop and apply this method.

After translating and publishing books on different subjects, the Muslims realised that experimentation and observation was a much better method of discovering the facts.

Humble, in his book *The World*, which was translated into several languages, after explaining that the lightest scientific progress in the history of man has been due to his personal experience, explained that experimental methods were first pioneered by Muslims.

Moshiyo Sayid Helu wrote that an important aspect of the teachings of Baghdad University was the way of reasoning which was generally based on scientific principles, and correct observations of events and happenings with reasons confirming the results of experiments. He said this was a procedure which has led present day scientists to great discoveries and inventions. For the Muslims in the Middle Ages, the application of this method was dear.

The proof of what we say is the initiative of the Muslims in chemistry, physics and so on. For example in chemistry aqua-regia;[1] alcohol and sulphur were, discovered. These very Muslims' discoveries which paved the way for research by scientists like La Voisier, Jabir, the great Muslim chemist who lived in the latter part of the 8th century, wrote several articles about chemical mixtures that were not clear before him, such as aqua-regia which was a very important factor in chemistry.

From what he has written, it can be concluded that Jabir knew the properties of gases and he explained that when gases combine with other substances they loose their shape and properties and, in fact, change from one form to another. He discovered the two forms of chemical reactions. He realized in a reaction the substances may undergo either a physical change, which is reversible to the original

substances or a chemical change, which is irreversible to the original substances on separation.

Muslims And Other Sciences

It was mentioned earlier that Islam brought about a revolution in different aspects of people's lives by laying the foundation of a great scientific revolution. This was followed by the establishment of numerous schools, colleges and universities which attracted many scientists and researchers, who wrote valuable books and papers.

But as one must work hard in order to reach the top, civilized nations too, before rising to greatness, passed through different stages. In the history of civilization, a nation has never been able, or perhaps it is impossible for a nation, to jump from a primitive way of life to a progressive one. Each nation which has become powerful in the world was once the puppet of another nation. For instance, if Greece, with its magnificence and greatness is known as the centre of science and philosophy, it should be remembered that Greece had been the student of Egypt, and that the foundation of its philosophy was, to some extent taken from the Egyptians.

Romans, too, with all their fame were once scientifically dominated by the Greeks and they only contributed a little to what they had learned from them. Therefore it would not be surprising if in the history of Islamic civilization we saw that at the time of gaining other sciences and industries the Caliphs of Ummayyad and Abbasid invited Iranian, Greek or Indian scientists to come to Islamic countries to teach. They also made efforts to translate books from Pahlavi, Syriac and Greek into Arabic (the official language of Muslims) in order to improve and have better insights into other nations' cultures and sciences.

The Advantage of Muslims To Greeks and Romans Sociological surveys in the history of nations have shown that Muslims held a superior position in terms of talents and administration. Although the Greeks took the initiative in philosophy and some sciences, yet they were very weak in establishing order and legislation. Most of the time they were living in Feudal systems and spent their forces in civil wars and internal conflicts.

On the contrary, Romans were very strong in legislation and establishing government, but they didn't take any initiative in researching sciences and philosophy and they didn't add anything to what they had already taken from the Greeks. The strong points of these two nations can be clearly seen in the Muslims because Muslims, like the Greeks, were very powerful in science and philosophy. They not only made use of these two valuable assets of the Greeks but enriched these with logic and the narrations of Iranians and Indians and established new legislation laws together with much progress in the study of grammar, syntax, theology, narration and research in natural sciences. All this gave the Muslims greater superiority in establishing an even stronger government than the Romans.

When the Muslims established governments and ruled the countries under their domination, they

legislated laws derived from Islamic revelations which were spread throughout much of the world.

The Muslims' motivation in studying and learning foreign sciences originally came from the very emphasis and encouragement that the Holy Qur'an and the Prophet of Islam had prescribed about sciences. They knew the Prophet had repeatedly stated that wisdom and knowledge are the properties that a believer is always in search of wherever he hears a knowledgeable word he learns and he would not pay attention to where or whom it is from.

Until the end of the first Islamic century and into the beginning of the second century, that is, throughout the reigns of the First Caliphs and the Umayyad Caliphs in different regions of the country, the Muslims were busy with their conquests and, as a result, they didn't have many opportunities to pay attention to their jobs, important religious issues and government. Yet from the time that the Iranians and Iraqi people and some Asians and other nearby nations established relations and began mixing with the Muslims, they gradually entered the fields of administration and social work.

General needs, such as the need to learn about medicine and mathematics, also prompted the Muslims to pay attention to other nations' sciences.

The First Translated Book

The first translation of foreign science to Arabic was completed by Khalid Ibn Yazid Ibn Mu'awiyya, who was known as the wise man of Al-e-Marwan, or "Hakim Al-e- Marwan."

After the death of his brother, Khalid was thinking was known as the wise man of Al-e-Marwan, the son of Hakim, defeated him and the Caliphate of the family of Abu Sofyan was transferred to the family of Marwan Ibn Hakam.

Disappointed at not becoming caliph, Khalid pursued his education and it was a pity to realise that the other members of this old family, to be rulers did not use their talents in other areas, such as sciences, from the beginning. In any case, at that time, chemistry was a very popular course in secondary schools. Khalid brought a group of graduates from a school to Damascus in order to learn about chemistry from them one of the students was known to be a Syriac or a Roman named either Marianusor Maryanus, who taught chemistry to Khalid and also wrote a book for him.

When Khalid gained some knowledge of chemistry, he decided to translate chemistry books. Together with another man called Stephen, they translated the first translated book in chemistry and called it *Kimiya* (chemistry or alchemy).

Ibn Nadeem, in a book called Al-Fehrest wrote that the first person whose books on chemistry , astronomy and medicine were translated by him, was Khalid Ibn Yazid. Some of the books credited to him include *Al-Sahifatul Kabira, Al-Sahifatul-Saghira, and Wasitatuila-Abnibi-f-San'a*.

Ibn Khalkan has also narrated that, Khalid was a master in chemistry and had translated books related to chemistry and medicine.

The author of a book called *Kashfal Dhanoon* says that Khalid Ibn Yazid was the first person among the Muslims to teach chemistry and had written a book on this subject. However, some researchers, including Ibn Khaldun and western researchers, have doubts about this matter and refute these assertions. They even claim that the fast chemistry book translated from Latin to Arabic in the year 1182, was actually done by someone called Robert Castansis years before the time of Khalid (who died in the year 85 after Hijra), and not Maryanus.

If we disregard the fast book which has been attributed to the time of Khalid Ibn Yazid in chemistry, the first book which was translated from Greek to Arabic was a book called *Arze Miftahun Nujun*, which concerns the principles of astronomy, and has been attributed to a man named Hermes. A review of this book was published in November 1909, and in this book it was clearly indicated that the translation was done (in the Arabic month of Zil-Qadah) in the year 125 A.H.

1. A mixture of nitric and hydrochloric acid that dissolves gold or platinum.
