

ALGEBRA AND ALGORITHMS : A NEW STAGE IN THE DEVELOPMENT OF MATHEMATICAL SCIENCE.

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Abstract : In the 11th century, the Arab mathematical foundation was one of the strongest in the world. The Muslim Mathematician had invented geometrical algebra and had taken it to advanced level, capable of solving third and fourth degree equations. The world witnessed a new stage in the development of Mathematical sciences driven by the numerous translated works from Arabic into European languages.

Key Words :- Geometrical Algebra, Arithmetic, Mathematics

Introduction : Al-khwarizmi was very influential with his methods on arithmetic and algebra which were translated into much of southern Europe. Again the translations become popular as algorismi – a term which is derived from the name of Al-khwarizmi. Not all went smoothly none the less. The Arabic numerals introduced by Al-khwarizmi, like much of new mathematics, were not welcomed whole heartedly. In fact in the year 1299, there was a law in the commercial centre of Florence (Italy) for bidding the use of such numerals. Initially, only universities dered use them, but later they become popular with merchants and eventually became commouly used.

In time, Europe realised the great potential value of Arab mathematical contributions and put into popular use all that seemed practicle. The sciences with mathematics as their essence, flourished and developed into the discipline we know today.

None would have been the same though, had it not been for that book on restoration, or had the zero not been invented, or had the Arabic numerals not made their way to Europe. That fondness of science which inspired an early Arab mathematician to propose calculating by al-jabra and al-muqabala did much to make the world run as we know it today.

The 10th millennium saw Muslim mathematical study concentrated in three main sub-disciplines. There were the on going progress in algebra, the development of arithmetic al gorithus, and the increasing complexity in geometry. In addition, the introduction of the Zero was destined to revolutionize mathematics as it allowed for key

innovations. It was proposed by Mohammad Bin Ahmad in 967 AD. Zero arrived in the west much later, in 13th century.

In the field of mathematics the number zero (0) and the decimal system was introduced to Europe, which became the basis for the scientific revaluation. The Arabic numerals were also transferred to Europe, this made mathematical tasks much easier, problems that took days to solve, could now be solved in minutes.

The work of Al-khwarizmin (his latin name was Algorismus) were translated into Latin. Al-khwarizmi (Algorismus) from whom the mathematical term Algorithm was derived, wrote Sindh Ind., a compilation of astronomical tables. He, mor importantly, laid the ground work for algebra and found methods to dial with complex mathematical problems. Such as square roots and complex fractions. He conducted numerous experiments, measured the hight of the earth's atmosphere and discovered the principle of the magnifying lens.

Many of his books were translated into European languages. Trigonometric work by Al Kirmani of Toledo was translated into Latin (From which we get the sine and cosine functions) along with the Greak Knowledge of Geometry by Euclid. Along with mathematics, massed of other knowledge in the field of physical sciences was transferred.

Hight Technology :- The high technology in world of 1000 CE included paper, the printing press, the crossbow gunpowder, the iron-chain suspension bridge, the kite, the magnetic compass, the wheelbarrow and the rotary fan. A millennium ago these items were used extensively in china and wens practically unknown else where in the world. Globalization spread them across the world.

A Similar movement occurred in the Eastern infulence western mathematics. The decimal system emerged and became well developed in India between the 2nd and 6th conturies. It was used by Arab mathematician soon there after.

These mathematical innovations reached Europe mainly in the last quarter of the 10th century and began having an impact in the early years of the last millennium. Playing and important part in the scientific revolution that helped to transform Europe.

From East to Europe :

The agents of globalisation are neither European nor exclusively western. Her they are necessarily linked to western dominanee. Indeed, Europe would have been a lot proper economically, culturally and scientifically had it resisted and globalization of mathematies, science and technology at that time.

The present scenario is in the reverse form (from west to East). To reject the globalization of science and technology because it represents western influence and imperialism would not only amount to overlooking global contributions drawn from many different parts of the world, that life solidly behind so-called western science and technology, but would also be quite a daft practical decision, given the extent to which the whole world can benefit from the process.

Breaking boundaries :

The renaissance, the enlightenment and the industrial revolution were great achievements and they occurred mainly in Europe and later in USA. Yet many of these developments draw on the experience of the rest of the world, rather than being confined within the boundaries of a discrete western civilization.

Our global civilization is a world heritage, not just a collection of disparate local cultures. When a modern mathematician in Boston-USA invokes an algorithm to solve a difficult computational problem. They are not aware that they are helping to commemorate the Arab mathematician Mohammad Ibn-al-Khwarizmi, who flourished in the first half of the 9th century (The word algorithm is derived from the name al-khwarizmi).

The Square root of math it self :

There is a chain of intellectual relation that link western mathematics and science to a collection of distinctly non-western practitioners, of whom al-khwarizmi was one (The term algebra is derived from the title of his famous book, Al-Jabr-wa-al-Muqabilah)

Indeed, al-khwarizmi is one of many non-western contributors whose work influenced the European renaissance and later the enlightenment and the industrial revolution. The west must get full credit for the remarkable achievements that occurred in Europe and Europeanized America. But the idea of an immaculate western conception is an imaginative fantasy.

Modern prosperity, with all its improvement in welfare, has been delivered to humanity by science and technology. In the last two centuries, especially, science has delivered better lives for people. Longer lives and for larger populations. The key to unlocking the source of the benefits was scientific method, the relentless search for truth through observation, theorizing and experimentation. In the 13th century the Muslim world, with its development of the culture of Philosophy, science, mathematics, astronomy, physics, chemistry and medicine, led the world. The Muslim world once possessed in its hands the key to the future prosperity that technology could deliver. Not only that, but with the intention of double entry book keeping, it possessed in its hand the blueprint of the plans for the modern corporation. Eventually, after several hundred years,

Europe was able to absorb this knowledge and overthrow the dark constraint of its own religion to unlock the mysteries of science and discover the path to prosperity. If the Muslim world had been able to continue on the holy Qur'anic commands on scientific research, the cause of human progress would have been advanced by about five hundred years.

Conclusion :

In conclusion algebra and algorithm are enabling the building of computers, and the industry would not exist without the contributions of Muslim mathematician like Al-Khwarizmi.

When censors threatened to wipe out knowledge from past civilisations, this civilisation kept the knowledge alive and passed it on others. It was leadership that harnessed the full capabilities of a very diverse population in the world.

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