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**Abstract-** Indian civilization, one of the oldest civilizations in the world, has a strong tradition of science and technology. Ancient India was a land of sages and seers as well as a land of scholars and scientists. Aryabhatta, Brahmagupta, Nagarjuna are some name of well-known scientists of ancient India. Research has shown that from making the best steel in the world to teaching the world to count, India was actively contributing to the field of science and technology. Centuries long before modern age, many theories and techniques created and strengthened the fundamentals of modern science and technology.

## **1. INTRODUCTION**

There are lot of inventions and discoveries from ancient time which Indian scientists gave to the world. Here is a list of 12 contributions, made by ancient Indians to the world of science and technology, that will make all of us, feel proud to be an Indian.

### **1.1 Theory of Gravity**

India's contribution to the subject of gravity began with **VARAHMIHIR** (505-587AD), a Hindu astronomer and mathematician who thought of the idea of gravity but did not give it a specific name or meaning. **secondary BRAHMAGUPTA** (598-670 AD) who was also astrologer and mathematician, held the view that the earth was spherical and that it attracts things. Later **BHASKARACHARYA** also proved the idea of gravity of both scientists. So Indian scientist found the law of gravity centuries before **NEWTON**.

### **1.2 The Invention of Zero**

Zero is one of the most important invention of all time mathematician **Aryabhatta** was the first person to create a symbol for zero and it was through his efforts that mathematical operations like addition and subtraction started using the digit zero. The concept of zero and its integration into the place value system also enabled one to write numbers, no matter how large, by using only 10 symbols.

### **1.3 The Decimal System**

India gave the ingenious method of expressing all numbers by means of 10 symbols – The Decimal System. Each symbol received a value of position as well as an absolute value. Due to the simplicity of the decimal notation which facilitated calculation, this system made the usage of arithmetic in practical invention much faster and easier.

### **1.4 Numeral Notation**

Near 500BC Indians formed a system of different symbols for every number 1 to 9. First Arabs adopted this numerical system and they called it the Hind numerals. This formation of numerical was adopted by western world after some centuries, and they called it Arabic numerals. Indian numerical notation reached to world through Arab traders.

### **1.5 Binary Number System**

The Indian scholar Pingala (2<sup>nd</sup> century BC.) developed a binary system for describing prosody, in his book Chandashastra. Binary number is the basic language in which computer programs are written. Pingala used binary in the form of short and long syllables making it similar to Morse code. They were known as Laghu (Light) and Guru (Heavy) syllables. In later centuries German mathematician **GottfriedLeibniz** discovered binary numbers in 1695.

### **1.6 Ruler Measurement**

In ancient India, in Harappa civilization there are the evidences of ruler or liner measurement made from ivory and shells. Ancient bricks found at the excavation sites have dimensions that correspond to the unit of these rulers. Uniform units of length were used in the planning of towns such as Lothal, Surkotada, Kalibanga, Dolavira, Harrapa and

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Mohenjo-Daro. This measurement system reached Persia and central Asia in a modified way.

### 1.7 Invention of Atomic Theory

**KANAD**– The notable Indian scientist known for developing the foundation of an atomistic approach to physics and philosophy in his Sanskrit book – **VAISEVIK SUTRA**. He speculated the existence of Anu or a small indestructible particle much like an atom. He also stated that Anu can have two states – absolute rest and a state of motion. KANAD explained the theory of Atom centuries before English chemist **JOHN DALTON**.

### 1.8 The Heliocentric Theory

**ARYABHATT**– The most important scientist of ancient India correctly propounded that the earth is round, rotates on its own axis and revolves around the Sun in his heliocentric theory. He also made predictions about the Solar and Lunar eclipses, duration of the day as well as the distance between the earth and the moon. Aryabhatta described all these in his book **ARYABHATIYA**. Later in 16<sup>th</sup> century mathematician **NICOLUS COPERNICUS** presented the mathematical model of heliocentric system.

### 1.9 Wootz Steel

Wootz steel is a crucible steel characterized by a pattern of bands that was known in the ancient world by many different names such as UKKU, HINDWANI, and ceric iron. This steel was used to make the swords. Pioneering steel alloy matrix developed in India. The crucible steel production process started in the 6<sup>th</sup> century BC in Tamilnadu. In Tamil CHOLE dynasty producing finest steel in the world and exports it to Roman, Egyptians etc.

### 1.10 Plastic Surgery

**SUSHRUTA** was the first plastic surgeon of the world, he explained techniques of plastic surgery in his Book **SUSHRUTA SAMHITA**. Sushruta developed surgical techniques for reconstructing Nose, earlobes and genitalia. His book mentions various illnesses, plants, preparations and cures along with complex techniques of a surgery. Sushruta also commented on diabetes. His book also translated into Arabic in 8<sup>th</sup> Century and in English in 1907 in Calcutta by **KAVIRAJ KUNJALAL BHISHAGRATNA**.

### 1.11 Cataract Surgery

**SUSHRUTA** was the father of surgery so first cataract surgery is said to have been performed by the ancient physician Sushruta in 6<sup>th</sup> century BC. To remove the cataract from the eyes, he used a curved needle -Jabamukhi Salaka to loosen the lens and push the cataract out of the field of vision. The eye would then be bandaged for a few days till it healed completely. Sushruta surgical work were later translated to Arabic language and through the Arabs his works were introduced to the west.

### 1.12 Ayurveda in India

Ayurveda is a 5000-year-old system of natural healing that has its original in the Vedic culture of India. There are 3 types of Ayurveda body types- Kaph, Pitta, Vat. Ayurveda is a herbal cure for diseases through medicinal plants. **CHARAK** was known as the father of Indian medicine. His book Charak samhita was the important book on ancient science and Ayurveda.

Charak was the first physician to present the concept of digestion, metabolism and immunity in his book. Charak's ancient manual on preventive medicine remained a standard work on the subject for 2 millennia and was translated into many foreign languages, including Arabic and Latin. Charak's disciple Vagbhata wrote Ashtang Hridayam on Ayurveda. According to Vagbhata 85% of diseases can be cured without a doctor.

## 2. LITERATURE REVIEW

- Debiprasad Chattopadhyay explained the ancient Indian Ayurveda system in his book. He explained surgical operations, external application of alkalize etc on the basis of Charak samhita and Sushruta samhita's text.
- B Datta and A N Singh described ancient Indian math development in his book.

- Dr. Vinod bihari Satyapathy explained development of astronomy, mathematics, engineering and medicine in ancient India.
- Amartya kumar datta explained the Aryabhata's heliocentric theory in his research paper (2006).

### 2.1 Research Gap

This research shows the amazing work by ancient Indian scientist for which they didn't get the credit because in later centuries other modern scientist patent these researches by their name.

### 2.2 Objectives of the Study of This Topic

Through this research paper people will be able to:-

- Know the development of astronomy, mathematics and engineering in ancient India.
- Identify the evolution and growth of medicine in ancient India.
- Throw lights on the sphere of science in which ancient India excelled.

### 3. METHODOLOGY

This study is based on secondary data which has been arranged from other research work and books on related topic.

### 4. FINDINGS

After research on this topic we will find out that ancient India have lot of scholars and scientist who discovered lot of important theories before scientist of modern world, but they didn't get the credit and fame in the Field.

### 5. CONCLUSION

From beginning India has been a scientific country. Vedic Ayurveda was a natural healing of diseases through herbal plants and still very effective way in the world of medicine. Vedic Hindus take special interest in two particular branches of mathematics – Geometry and Astronomy. Vedang jyotish was the main source of ancient Indian mathematics. BRAHMAGUPTA, VARAHMIHIR and KANAD are the few famous scientists flourished during ancient time in India.

Achievements of Indian people in the field of engineering begin in the Protohistoric time. Indians knew the laws of gravity, about cataract surgery, about plastic surgery, about heliocentric system, binary numbers, decimal numbers, theory of Atoms, centuries before modern world come to know about it. So, India has a glorious past in the field of science and technologies.

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