



10

OUR OLD INDIAN SCIENTISTS

India has a very old history. We are leading the world in science, philosophy, literature, astronomy, architecture etc. since ages. Do you know that zero (0) was discovered in India. Maharshi Kanav contributed in telling world about atoms and nucleus. Ayurveda - a branch of medicine was given by India, you can see Indian architecture and monuments in every corner of India. Do you know that the age of earth according to Indian vedic scriptures is 3-4 billion years which is equal to the real age of earth.

Many techniques have been developed in chemical industries. One of the finest example is the iron statue near qutab minar which is still rust free. The most important point is that the architects developed this technique without any laboratory.

We will try and learn about some of the scientist of ancient India and their contribution in this lesson.



Notes

**OBJECTIVES**

After learning this lesson, you will be able to:

- Tell the contribution of Indian scientist in the field of mathematics
- Describe the contribution of Indian physicians in the field of medicine
- Explain the contribution of Indian astronomers in the field of astronomy and
- Describe the contribution of Indian scientists in the other fields of science

10.1 INDIAN SCIENTISTS IN THE FIELD OF MATHEMATICS

Indian mathematicians had an edge in the field of mathematics.

Aryabhatta

We are familiar with Aryabhata's zero today. But do you know

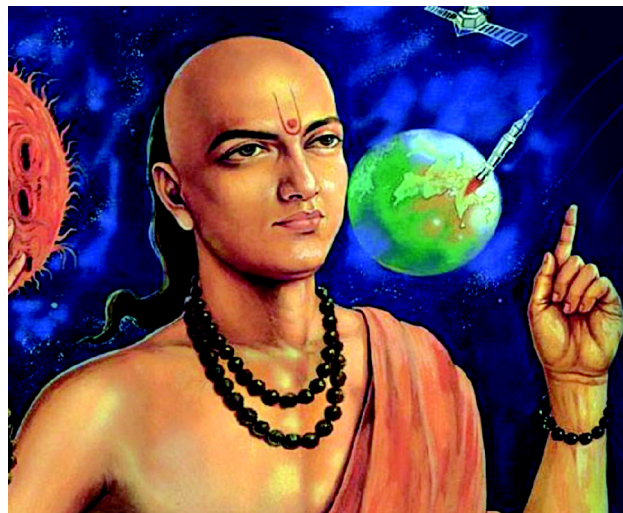


Fig. 10.1 Aryabhatta

that '0' was discovered in India. Great mathematician Aryabhata discovered zero for counting. Aryabhata was a great mathematician and astronomer of 5th century. He wrote 'Aryabhatiya' at an age of less than 23 years. This book is a book of mathematics, he also wrote about the use of decimals in this book. He said that 0 is not a number but a sign. 0 is used to calculate the distance between earth and moon.



Notes

Bodhayan

He was also a famous Indian mathematician. He lived around 7-8 century b.c. He first told the value of pi. He also wrote a book called Shalav Sutra before Pythagoras theorem was written.

Bhaskaracharya

He is a famous mathematician of 12th century. He is also known



Fig. 10.2 Bhaskaracharya



as bhaskar 2. He was born in bijapur, Karnataka in 1114 A.D. Sidhant Shiromani is a famous book by him. He used chakrvata vidhi or compounded form for the first time; the western countries came to know about his contribution in 19th century. James Taylor translated the first part of his novel, lilavati into English.

He learnt maths and astronomy by his father who was a teacher at observatories in Ujjain. He died in 1185. A satellite Bhaskar II was launched on 20 November 1981 on his name by Indian space research organization.

Acharya Pingal

A chief name for maths in ancient India was Acharya Pingal. He lived between 2-3 century b.c.; his famous book is chand shastra, also known as pingal sutra. He contributed in binary number system. He is the propounder of binary digits. Acharya pingal used 'laghu' and 'guru' words which later became the basis for the discovery of zero. It is believed that pingal used the word shunya which meant 0.

Brahmgupt

He was a famous mathematician and astrologer in 7th century, his birth place is now in Rajasthan. He was also known as Milacharya. He was the first one to use zero as a number he used many mathematical methods. One of them is the multiplication method and use of place value in the same what as it is used now. He has also written a famous book bhrahmsfut sidhantika. Brahmgupta is credited to spread Indian mathematical knowledge

to the world. His first book went to the centre of education established by khalifa of Baghdad this the astrology and maths of India went to Arab and then Europe.



Notes



INTEXT QUESTIONS 10.1

1. Who discovered zero?
2. What is the name of the book written by Aryabhata ?
3. Who wrote shalav sutra?
4. Who has written siddhant shiromani?
5. Who is known as the propounder of binary number?

10.2 ANCIENT PHYSICIANS OF INDIA

Ayurveda is the gift from India to the world. Do you know that ayurveda is known as the oldest medicine system of the world. If we understand the literal meaning of ayurveda, it is the science of life. Our ayurveda is around 5000 years old. Earlier leaning was based on speaking but some of the famous physicians which are now valuable to us. Let us know about some of the great physicians of ayurveda.

Acharya Charak

He is known as the founder of ayurveda. He was the physician of King Kanishka. He studied diseases, their causes and treatment



Fig. 10.3 Acharya Charak

in detail. He collected all his views in book charak samhita which is one of the ancient and authentic book of ayurveda. Around 2000 medicines have been written by him and tells us about diseases of many organs and their treatment. Acharya Charak believed to remove the cause of diseases. He said prevention is better than cure. He believed that a physician needs to have knowledge and understanding of diseases to treat the patient.

Charak is the first physician who talked on digestion, immunity power and excretion. He also believed that there are three areas of human body - cough, air and bile. If there is imbalance in it then human falls ill. The foundation of today's ayurvedic medical system was laid by Acharya Charak.

Acharya Sushrat

He is also a famous Indian physician. His contribution is in the field of surgery. He studied a dead human body to see the body structure or anatomy of human body. His famous contribution is shustra sanhita. He is known as the father of surgery because it is believed that the first surgery of the world was done by him.



Notes

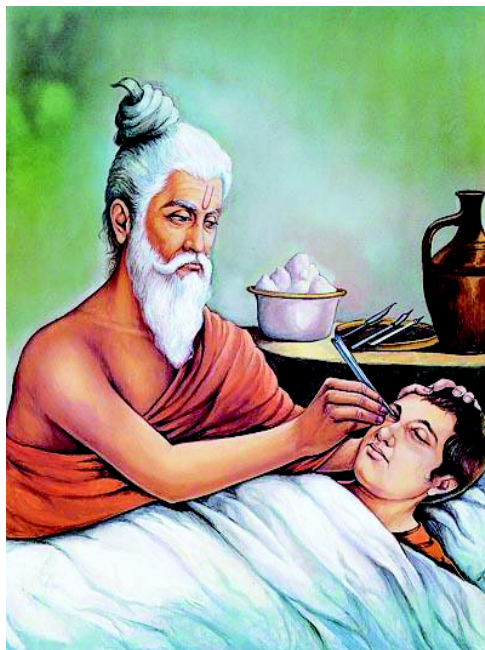


Fig. 10.4 Acharya Sushrat

Sushrita sanhita is the pool of knowledge. It tells us about 1100 diseases. This book gives us knowledge about 760 plants and herbs usage. Most of these herbs are used by us in our kitchen. This book tells us about 191 tools used in surgery by sushrut. You will be surprised to know that the procedure told by shushrut is similar to modern medicine policy.



Maharshi Chawan

Maharishi Chawan is a famous vedic time Indian saint, it is believed that that they made medicines for being healthy and increasing immunity power. He is said to have made chawanprash.

Maharisi Patanjali

He is one of the reputed names of Indian medicine system. He is known as the father of yog knowledge. He has written yog suytra which s the base of yoga. There are 106 yog sutras in yog; maharishi patanjali learnt about yoga in basic Vedas. He made mental and physical health important for yoga there are six parts of it. Hath yog is important for physical health and raj yog for mental health. yog increases immunity power and eradicates diseases from bodies and emphasizes on good health.



Fig. 10.5 Maharisi Patanjali

He systematized the yos sutra which was in bits and pieces, he also wrote a book related to medicines called patanjali tantra. He has also written a book mahabhasya based on Panini's Asthyogi. Whatever yog we see today, it started because of Maharishi Patanjali.



Notes



INTEXT QUESTIONS 1.1

1. Who is the father of ayurveda?
2. Charak was the rajvaidya of which ruler?
3. Who did the first surgery of the world?
4. Write the name of 2 books written by Maharishi Patanjali?
5. How many diseases are being mentioned in Shushrut Sanhita?

10.3 ASTRONOMY

There is a deep relation between maths and astronomy. This relation was propounded in the area of astronomy. Most of them have worked in the field of astronomy. Let us learn something about the famous astronomer and their contribution.

Aryabhata

You have read about Aryabhata before. Astronomer is the person who studies planets and galaxies. Aryabhata was also an astronomer, earlier, it was believed that our earth is fixed at one place. Aryabhata was the first person to tell that earth is round and constantly moves on its axis. He also contributed in



eradicating superstitions. He said that solar and lunar eclipse does not happen because of devils named rahu (Saturn) and ketu (Neptune). He said that it happens due to scientific reason.

India's first man made satellite was named Aryabhata at his name. he studied in famous observatories at Nalanda. The main objective of studying astronomy was to make correct calendar on panchang, identify the correct season for crops etc. this will help people in learning about farming.

Aryabhata contributed in this area.

Bhaskaracharya

You have already read about his contribution in the area of maths. He was influenced by the astronomical calculation of Brahmgupt. He also did many astrological calculations. Bhaskaracharya calculated accurate time of a year, that is, the time taken by earth to complete a revolution of sun. His book sidhant Shiromani had many points related to astronomy. The first part of this book deals with the distance of planets, solar eclipse, lunar eclipse, phases of moon etc. the other part of the book is related to astronomy. He has written about space, movement of planets, phases and its calculation etc in this book.

Varah Mihir

He is also a famous astronomer from India. He lived around 5-6 century. He was born in Avanti kingdom (now Madhya Pradesh). He studied in ujjain and started working here the two



famous books written by h, are panch sidhantika and vrahat sanhita, these are five parts of panch sidhantika:

1. surya sidhant
2. vashisha sidhant
3. pasalis sidhant
4. romama sidhant and
5. pitamah sidhant

The other book Vrahat sanhita is an encyclopedia. He has written about many subjects like the speed of planets, eclipse, rain etc in this book.

10.4 contributions in other field of science

There was much progress in the field of chemistry, physics and agriculture in earlier times. Let us learn about some of the great scientists who worked in this regard.

Kanad

He is a famous scientist from 6th century. He is an important scientist of vaiihekish sabha, a branch of Indian ancient philosophy. It is said that he was given name Kanad because he used to talk about kan or particles in his childhood. His sutra is known as Kanad sutra in vaishekh sutra, he was the first person to talk about molecule or anu. He believed that the smallest unit of physical world is nucleus of molecule which we cannot see from our naked eyes. Molecules cannot be divided or destroyed.



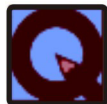
He believed that the work is made up of these molecules. Therefore, they can be divided. But the smallest unit is nucleus which cannot be divided. This principle of maharishi kanad matches with the present principle of molecule or nucleus.

Nagarjun

He was a famous metal scientist of 10-11 century. He was born in Dahak, Gujrat. He worked in the field of melting metals and making new metals. He also tried to transform metals into gold. Although he was not successful but he was able to make metal having golden luster. He also wrote a book called Rasratnakar. He wrote about the purification of metals like gold, silver, tin, copper in his book.

Varah Mihir

Varah mihir's contribution is also found in astronomy. He has also worked in the fields of earth science, geology and environment. He was the first person to tell that termites and underground plants are the presence of life, he has also written about earthquakes and its cases. He has also tried to join the effects of planets, of earthquake, movement beneath the ocean, underground water and behavior of animals.



INTEXT QUESTIONS 10.3

1. Who has influenced Bhaskarcharya's astrological calculations?
2. Where was Varah mihir born?



3. Who has written panch sidhantika?
4. kanad was the scholar of which branch of ancient Indian philosophy?
5. Who tried to make lustrous material of golden colour?



TERMINAL QUESTIONS

1. Describe the contribution of Aryabhata in science?
2. Write the names of any two scholars who contributed in the field of maths?
3. Briefly write the contribution of following scholars in the field of medicine-
 - a. charak
 - b. sushruta
4. Describe the contribution of Indian scholars in the field of astronomy?
5. kanad laid the foundation of molecular science. Validate.



ANSWERS TO INTEXT QUESTIONS

10.1

1. aryabhata
2. aryabhata
3. bodhayan

CLASS-V



Notes

4. bhaskarcharya
5. pingal

10.2

1. charak
2. king kanishka
3. charak
4. yog sutra or patanjali tretra
5. 1100

10.3

1. brahmsutra
2. Avanti kingdom
3. varah mihir
4. vaishekh philosophy
5. nagarjun

