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YEARS OF SCIENCE AND TECHNOLOGY IN INDIA
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Editor's Note

"It is true that even across the Himalayan barrier India has sent to the west, such gifts as grammar and logic, philosophy and fables, hypnotism and chess, and above all numerals and the decimal system." –by Will Durant. In this magazine, we talk about the various inventions and scientific discoveries by the Indians over the past 75 years that has baffled even the most knowledgeable scientist across the globe. This magazine contains a drop of the ocean of science that the Indians have discovered so we present to you the last edition of volume III.

~Shrivansh Agarwal

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Key scientific and technological milestones

Fareeha Ambreen
Class-12

Our First Prime Minister, Pandit Jawahar Lal Nehru said “Science is not merely an individual’s search for truth; it is something infinitely more than that if it works for the community”.
Today India is an epitome of Scientific and Technological Development and is one of the key
elements for economic growth. Post 15th August 1947, India’s journey has become a great example of an impressive growth story. listed below are just a few to remember the journey- 1957 – 1967- Agriculture Technology- Emergence of green revolution

1958 – DRDO was set up

1970- White revolution

1967-1977- Aryabhatta- India’s first satellite

977-1987- AGNI- India’s first strategic missile

1987-1997- DNA fingerprinting

1997-2007- Pokhran-II nuclear test

2007-2017- Chandrayan- I

2013- MOM (Mars Orbiter mission- Mangalyaan)

2014-Polio Free India

2016- Govt launched Start-up India Programme. By 2021 there are 52000 startups.

2019- Covid 19 Vaccine and drive- By end of 2021 India had supplied over 7 carore Covid-19 Vaccine.

India is amongst few countries to have developed Indigenous nuclear technology, to develop ballistic missile, In the field of space, India has capacity to launch GSLV satellite.

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Stepping into Space

-Shrivansh Agarwal
Class 12

15th August 1947, India's journey has become a great example of an impressive growth story. As claimed by the Indian Brand Equity Foundation, India is among the topmost countries in the world in the field of scientific research and has been positioned as one of the top five nations in the field of space exploration. India also ranks third among the most attractive investment destinations for technology transactions in the world.

The Defence Research and Development Organisation (DRDO) was set up in 1958 to secure the borders of India with more advanced Defence Technology. Since then, DRDO has developed several large programs and essential technology, including aircraft, small and large arms, artillery systems, electronic warfare (EW) systems, tanks, and armored vehicles, sonar systems, command and control systems, and missile systems.

Agni-I was first tested at the Interim Test Range in Chandipur at 7:17 AM on 22 May 1989 and was capable of carrying a conventional payload of 1,000 kg (2,200 lb) or a nuclear warhead. Agni missiles consist of one (short range) or two stages On 11 and 13 May 1998, twenty-four years after Pokhran-I, the Indian Defence Research and Development Organisation (DRDO) and Atomic Energy Commission (AEC) conducted five further nuclear tests, dubbed "Pokhran-II", at the Pokhran range.

ISRO was formed in 1969 with a vision to develop and harness space technology in national development while pursuing planetary exploration and space science research. ISRO replaced its predecessor, INCOSPAR (Indian National Committee for Space Research), established in 1962 by India's first Prime Minister Pt. Jawaharlal Nehru and scientist Vikram Sarabhai, are considered among the founding fathers of the Indian space program.

Chandrayaan-1 was the first Indian lunar probe under the Chandrayaan program which was launched by the Indian Space Research Organisation (ISRO) on October 22, 2008. The mission was a major boost to India's space program, as our country researched and developed its own technology to explore the Moon.

DNA fingerprinting in India came into existence in 1988 when Council of Scientific and Industrial Research–Centre for Cellular and Molecular Biology (CSIR–CCMB) scientists developed the technique and made it available for use, making India the third country to develop its own DNA fingerprinting probe.

India accounted for around 60% of the global cases of polio in 1994. A dedicated campaign to vaccinate every child by the Government enabled us to become polio-free within two decades. India received the 'Polio-free' certification from World Health Organization (WHO) on 27th March 2014.

The Government launched the 'Startup India' program on 16th January 2016 to develop an ecosystem to encourage indigenous scientific, technological and innovative development in India. Since then, the number of Indian startups has increased and is growing. As of July 2021, there are more than 52,000 start-ups in the country, making India one of the largest start-up ecosystems in the world.

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The Journey from Nothing

~Adrika Dey,
Class 7

I am proud to be an Indian
from a country with great achievements
Whether in the field of science, technology or education
We have our own unique recognition.

Being one of the top countries
In the field of science and technologies,
With our missiles being the greatest
And excelling in medicines alike,
India is successfully leading in making vaccines.
The engineers that India constructs
Is something that you cannot disrupt.

It is shocking, how far we have come
From nothing at all to a country full of knowledge.
It doesn't matter if India is not the greatest
But for me India is the best.

Advancement in Biotechnology in India in recent times

-Chinmoy Tamuli
Class 12

Biotechnology is the use and manipulation of the natural properties of an organism or a part of the organism for the benefit of humans. In other words, It is concerned with the application of biological knowledge and techniques related to molecular, cellular, and genetic processes in order to create significantly improved products and services. Biotechnology products and processes have improved living conditions, health care, agricultural output, and livelihood opportunities, among other things. It is an extremely broad sector of study which welcomes students of mathematics, physics, chemistry, informatics, computer science and of course biology alike.

As glorious as it might sound and as ambitious as it might make students, biotechnology has always had a darker side in developing countries, and india topping the list, is definitely the forerunner of the same. The might and benefit of the subject and its aspects are known to few and it is still not given the importance that it deserves.

Pure biotechnology is almost untouched in the country due to lack of research facilities, and due to which people opt for applied biotech which makes the subject lose its essence. This also creates a disparity where biotech students are preferred less compared to Pharma students are because of the applied nature of the fields. It is a very innovative subject and it is still in its infancy in india. But this is due for a massive change in very recent times

We have seen very encouraging growth in the Biotechnology Sector in recent years in india.

This is primarily due to a solid foundation established over several decades, ranging from research and education to translation and product development. Major effort has been made to engage with all stakeholders and provide not only financial assistance but also to bring in important policy changes that are strong enablers and drivers for this ecosystem.

As we enter the next five years, from 2021 to 2025, we have set an ambitious goal of Biotechnology contributing to a "knowledge and innovation driven Bioeconomy." With the sector's current growth trajectory, we are confident that India will be among the top five countries globally and recognised as a Global Biomanufacturing Hub by 2025, with the sector growing exponentially to achieve a $150 billion growth. This will be made possible by a clearly articulated Vision/Mission and Goals, which will be driven by a set of well-defined strategies and a clearly laid out implementation Action plan. This strategy document outlines the plan and emphasises the new initiatives that will be implemented, as well as certain policy changes.

India is ranked third in Asia and among the top 12 biotech destinations in the world. Because of rising economic prosperity, increased health consciousness, and a billion-plus population base, the Indian biotech industry is expected to grow significantly. The industry is currently valued at USD 63 billion in Financial year 2019-20, with a projected increase to USD 150 billion by FY25.

The biotechnology industry in India currently has over 3500 biotech start-ups and is expected to grow to 10,000 by 2024-25. The biotech industry is divided into five major sectors: biopharma, bioservices, bioagri, bioindustrial, and bioinformatics, all of which contribute to the Bioeconomy. Vaccines and recombinant therapeutics are currently driving biotechnology industry growth in India.

The biotechnology sector in india is booming at the speed of light, but it still needs the following aspects to be focused upon for further development:

- Building a strong Research Academic partnership
- Enhancing venture capital for high risk science
- Enhancing R&D expenditure by industry
- Strengthening the link between research and commercialisation
- Ensuring Quality assurance of Indian products as per international standards
- Ensuring Educational curriculum needs to be aligned to prepare students as per industry demands
- Creating and strengthening State-of-the-art research facilities and translational centres

Credits

EDITOR IN CHIEF

Shrivansh Agrawal

EDITORS-IN-DESIGN

Chinmoy Tamuli, Suhani Agarwala

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Fareeha Ambreen

ASSOCIATE EDITORS

Adiella Kharkongor, Prateeti Ghosh

TEACHER IN CHARGE

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PATRON

Dr Amit Jugran

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