

# Inventions that changed the world



**CREATIONS**  
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**M**Y sons brought my attention to the fact that the greatest creations have been technological, for they have changed the world, especially lifestyles. Imagine the discomfort of no fan in this heat or no newspaper with your morning cup of coffee; in fact, no cup itself.

Today we pick up a telephone to talk nonchalantly across the world, as if it were the most natural thing. But this was not the case even a few years ago.

The ancient world took no notice of the inventor, so the inventor of the greatest of them all — the wheel — remains unhonoured and unsung. How did he chance upon it? And what did he use it for?

The earliest wheel discovered so far is a potter's wheel: by 3500 BC, ancient Mesopotamians were making pots on simple turntables. The first record of a chariot wheel comes from a 3200 BC picture, also from Mesopotamia.

But the lack of archaeological evidence does not mean that it did not exist elsewhere earlier. Pottery gave people a great advantage: not only could they store food and water, they could carry it with them as they moved from place to place. The way people lived and travelled was changed forever.

Later, the wheel was used to give speed and advantage in war. The archers of the Hyksos, nomadic desert tribesmen, overran Egypt's Middle Kingdom in their fast and light chariots in 1700 BC. From the chariot it went to the car, tram, bus and even aeroplane.

But it was also used for domestic purposes: water mills were first described by the Greeks in 100 BC. They were used for drawing water, grinding corn and remained, for over 1000 years, our principal source of mechanical power.

The need for water adapted the wheel in different countries. In India, water was, and continues to be, drawn from the well by means of a pulley, an adaptation of the wheel. The water mill disappeared with the advent of the steam engine, but the principle continued into the generation of hydro electric power.

Another great invention was the windmill. Contrary to popular belief that Don Quixote discovered the windmill, or that it was invented in Holland, it first appeared in seventh century Persia, inspired by wind-driven Buddhist prayer wheels. It was first mentioned in Europe in 1180.

In the nineteenth century the Americans discovered that it could also pump water, and was sold in thousands to the new settlers in the West. In the 1920s, Marcellus Jacobs of Montana, USA, adapted it to generate electricity. The idea is simple: facing the wind, the blades are rotated by the wind, creating energy.

The energy crisis of the 1970s renewed interest in the windmill, a cheaper source that uses a freely available and renewable resource.

Contemporary development started with the steam engine, which was first invented by Hero of Alexandria in AD 100. Several versions appeared in the seventeenth century, but it was James Watt's steam engine of 1777 that was to revolutionize the world and herald the industrial revolution. The steam engine was used in mining, as a source of power for factories and to move the steam locomotive.

As I sweat through the heat and humidity of Chennai, my thought



turns to the greatest discovery of them all — electricity. It rotates the blades of the fan above me, which both cools the room and dries off the sweat; it powers the air conditioner.

There are several claimants to the honour of inventing the electric lamp: Joseph Swan of Britain and Thomas Edison of USA, besides a Scottish schoolmaster and a German chemist. But Edison's bulb burnt for over thirteen hours in 1879, ten months after Swan had shown his lamp at a lecture at the Newcastle

Chemical Society in 1878. Swan took the first patent for a filament lamp in 1845. After being at loggerheads, the two joined forces to set up the Edison and Swan Electric Light Company to manufacture light bulbs. In 1908 tungsten was introduced for bulbs. The rest is history.

The twentieth century has seen a plethora of inventions. The desire to travel over long distances in a short time resulted in the motorcar and the aeroplane, two great inventions of our century. The first cars had appeared by the end of the nineteenth century, while in 1903, Orville Wright made the first powered, controlled and sustained flight that was to herald modern aviation. It developed into jet planes and today the farthest places have come next door.

The wireless radio and TV, the telephone and fax machine, the computer and internet are among the many wonderful inventions of our times. Each has made the world smaller, a better workplace and a more comfortable one.

But have you noticed that none of these were invented by Indians? China invented the printing machine, Egypt paper, Mesopotamia writing, and so on. Why have Indians lagged behind?

Ancient India can boast of some technological marvels, such as the drainage system of the Harappan cities, the fantastic rock-cut caves of western India and the Brihadishvara temple at Thanjavur, which presupposes a knowledge of physics and the use of levers to lift the 80 tonne cupola to a height of 59.82 metres.

But these span four thousand years, and nobody has hailed Indians as great scientists or engineers. The reason for this probably lies in the fact that India was basically an agrarian society. Technology develops in urban conglomerations, where people live in tightly packed communities, are influenced by new ideas, and want to live a better life.

The period of technological development was the twentieth century, and this is the period when we slackened. Mahatma Gandhi made a virtue out of simple living. Unfortunately, this meant that there was a level of satisfaction with life as it was, with no desire to explore or improve lifestyles.

In the post-Independence period India imported a lot of obsolete technology from the Soviet Union and the Communist world. The inventions of the western world were practically regarded as evil in the outdated Nehruvian world. As a result, we contributed nothing to the great age of development, the twentieth century.

It was only after the opening up of India and the re-establishment of the market economy in the '90s that Indians have come out of their stupor to contribute to the world. Look at what our young people are doing in the fields of software development and bio-technology.

Recently, I was at an international conference organized at Delhi on Information and Communication Technology and the Environment. There, Dr Vinay Deshpande of MAIT presented the Simputer, a simple, hand-held computer suitable for the rugged hot and dusty conditions of

rural India. It is an amazing development and I can see it revolutionizing computer technology. My laptop felt heavy and oversized after that.

And what a lot is being done in our country today. The Geographical Information Systems of the National Remote Sensing Authority (NRSA) has mapped water availability, land use and weather patterns, among so many other services. Karnataka's Bhoomi programme has computerized soil types all over the state.

Andhra Pradesh's remotest rural farmer can access the markets, the weather and plan his day! Hollywood cartoons are coming out of Chennai and Hyderabad. It makes one proud to be an Indian.

I despair when I see critics of our contemporary, developing nation yearn for outdated Soviet-style systems. We have to break out of our mouldy past and keep up with the world. The 1960s, '70s and '80s saw the best and brightest of our young people leaving the country.

With the fall of the Soviet Union and the worldwide failure of communism as an economic model, new opportunities have opened up for young people. Many are returning home, taking India into the new century. If only we could also break out of the fetters of caste and religious affiliations, India would be able to keep up with the world.

I began with the subject of technology. Technology has improved lifestyles and made the world a more exciting place. It is powered by curiosity, the desire to do something unique and different. In 400 BC, the Chinese invented the kite. In 1849, Sir George Cayley converted the kite into a glider.

He recognized the principles of lift, thrust and control which were to inspire later enthusiasts such as William Henson and Otto Lilienthal to develop the science of aerodynamics, with which the Wright Brothers propelled the Flyer.

It is the spirit of inquiry, adventure and experimentation that we must develop in our young people if we are to contribute to technological development. They also need opportunities, which parents and employers must provide. Today's world is dynamic and challenging, not a sinecure for a static society.

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