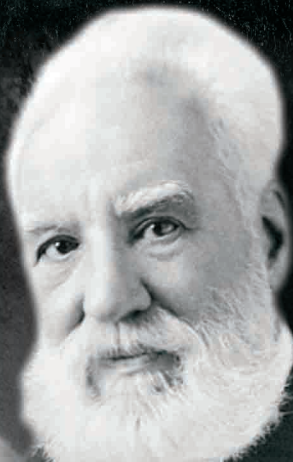
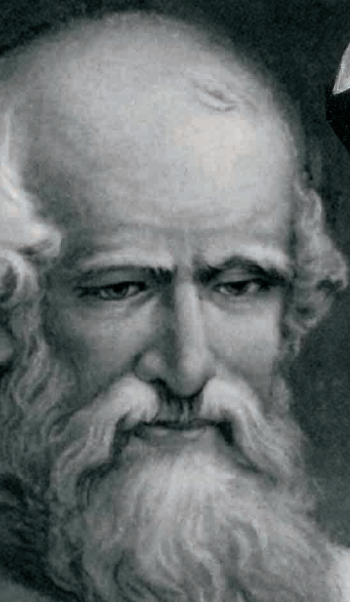
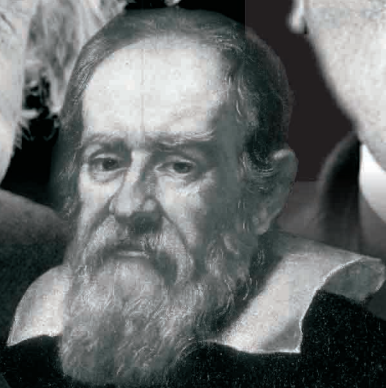
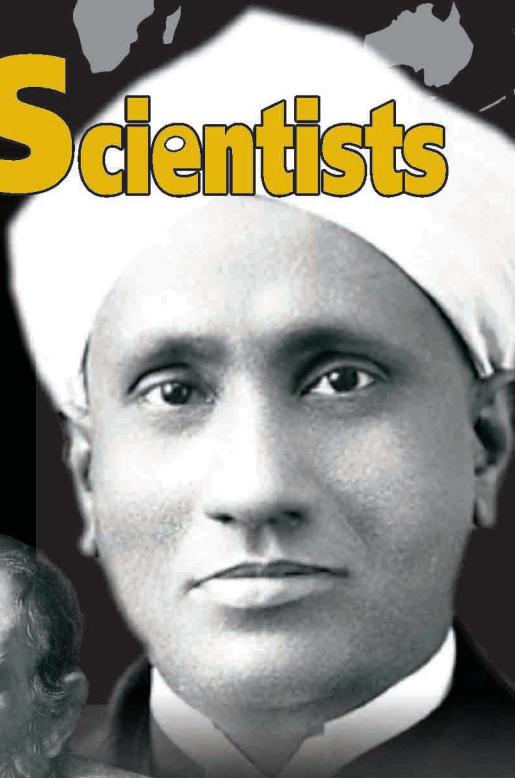
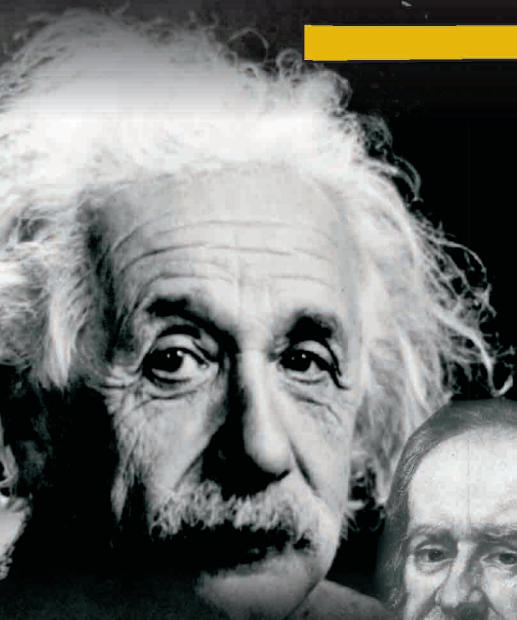


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Publisher's Note

It has been a great pleasure for V&S Publishers to publish a number of books, which have eventually become **Best-Sellers** in the *71 Series*, such as *71 Science Experiments*, *71+10 New Science Projects*, *71 + 10 New Science Projects Junior*, *71+10 New Science Activities*, *71+10 Magic Tricks for Children*, etc. This book **71 Famous Scientists** is an addition to this exclusive series widely appreciated by our esteemed readers.

It contains about *71 world-renowned Scientists from across the globe*, their brief life histories, contributions to the Scientific World including the books, journals and magazines that they have published, Awards and Honours received by them and any significant incidents that have changed the course of their lives. The book includes prominent names like, Sir Albert Einstein, Alessandro Volta, Alexander Fleming, Alexander Graham Bell, Alfred Nobel, Amedeo Avogadro, Anders Celsius, Andre Marie Ampere, Antonie van Leeuwenhoek and many such notable personalities.

The book has been written especially for the *school students of the age group, 10-18 years*, but can be read by readers of all ages, who love Science and its amazing and fascinating World full of outstanding Inventions and Discoveries that have almost changed or rather transformed the human society and even our very existence!

So Dear Readers, grab the book at the earliest for it will educate and interest one and all.

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Alan Turing



1912 - 1954

Alan Turing was a man before his time. This brilliant English code-breaker helped turn the tide of a major World War II battle, and was arguably one of the fathers of the entire field of computer science. He was a Renaissance man who studied and made contributions to the philosophical study of the nature of intelligence, to biology and to physics. His biography reveals that he was also the victim of anti-homosexual attitudes and laws, losing his security clearance and resorting to suicide two years later.

Born right before the start of World War I, and raised in England by his Indian civil service parents, Turing studied *quantum mechanics*, a very new field, probability, and logic theory at King's College, Cambridge, and was elected a Fellow. His paper-based theoretical model for the Turing Machine, an automatic computational design, proof of the theorem that automatic computation cannot solve all mathematical problems is called the *Turing Machine*, and contributed significantly to the *computational theory*. He continued his studies at Princeton in *algebra* and *number theory*.

In the years leading up to open hostilities in World War II, he was secretly working in government crypto-analysis. When England entered the war, he took on the full-time task of deconstructing the operation of the German Enigma machine. This cipher generator of immense complexity allowed the Germans to create apparently unbreakable codes. Turing embraced this cryptography challenge, creating a decryption machine specifically aimed at Enigma, named the Bombe. Enigma's unraveling was a several year process that achieved success in 1942. Information gleaned from decoded German messages permitted the Allies to anticipate U-Boat deployment, thereby winning the battle of the Atlantic.

In cooperative US/UK cryptographic efforts in the latter years of the war, Turing was lead consultant. At war's end, he joined the National

Physical Laboratory to try to invent a digital computer, or thinking machine. To that end, he studied neural nets and tried to define artificial intelligence. Disappointed by the reception his ideas received at the NPL, he moved to Manchester University, in England's gritty industrial region. His department unveiled the first practical mathematical computer in 1949.

One triumph followed another. In 1950, he developed Turing Test for machine intelligence assessment: In brief, if an observer cannot tell whether they are interacting with human or machine, the machine is intelligent.

As always a polymath, he also did work on non-linear growth in biological systems, and physics, that promised to bear fruit.

However, a bio of Alan Turing is not complete without addressing the facts of his personal life. According to 1952 legal charges, he became involved with what was termed 'a bit of rough trade'. In other words, he had a short term sexual liaison with a laborer who was down on his luck financially. The scandal of this British national intellectual treasure, a Fellow of the Royal Society, innovator in a whole new discipline of study, and the savior of the navy, being revealed as a homosexual, was immense. The humiliating trial ruined his career and his life. He was stripped of his security clearance, because at that time it was believed that a homosexual was vulnerable to blackmail and enemy subversion.

This punishment effectively cut off from the work that he had pioneered. *He poisoned himself in 1954, leaving behind much intriguing unfinished work in physics and biology.*



Albert Abraham Michelson



1852 - 1931

The nineteenth century physicist, Albert Abraham Michelson, was the *first American to be awarded a Nobel Prize in Physics*. He became famous for his establishment of the *speed of light as a fundamental constant and other spectroscopic and metrological investigations*. He had a memorable career that included teaching and research positions at the Naval Academy, the Case School of Applied Science, Clark University, and the University of Chicago.

Born to a Jewish family on December 19, 1852 Strzelno, Provinz Posen in the Kingdom of Prussia, Michelson was brought to America when he was only two years old. He was brought up in the rough mining towns of Murphy's Camp, California and Virginia City, Nevada, where his father was a trader. He completed his high school education in San Francisco and later in 1869 he went to Annapolis as an appointee of President U.S. Grant.

During his four years at the Naval Academy, Michelson did extremely well in optics, heat and climatology as well as drawing. He graduated in 1873. Two years later, he was appointed an instructor in physics and chemistry. After resigning from the post in 1880, he spent two years studying in Universities of Berlin and Heidelberg, and the Collège de France and École Polytechnique in Paris. He developed a great interest in science and the problem of measuring the speed of light in particular.

He was then employed as a professor of physics at the Case School of Applied Science at Cleveland, Ohio. Later in 1889 he moved to Clark University as professor of physics, and after three years he was invited to head the department of physics at the new University of Chicago, a position which he held until 1931.

In 1899, he married Edna Stanton and they had one son and three daughters.

During his stay at Annapolis, he carried out his first experiments on the speed of light. With his simple device, made up essentially of two plane mirrors, one fixed and one revolving at the rate of about 130 turns per second from which light was to be reflected, Michelson was successful in obtaining a measure closer than any that had been obtained to the presently accepted figure — 186,508 miles per second.

Michelson executed his most successful experiment at Cleveland in cooperation with the chemist Edward W. Morley. Light waves were considered as ripples of the aether which occupied all space. If a light source were moving through the aether, the pace of the light would be different for each direction in which it was discharged. In the Michelson-Morley experiment two beams of light, passed out and reflected back at right angles to each other, took equal amount of time. Thus the concept of stationary ether had to be discarded.

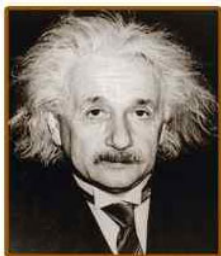
Michelson is also known for the measurement of the diameter of super-giant star, Betelgeuse, using astronomical interferometer with his colleague Francis G. Pease.

In 1907, Michelson was awarded a Nobel Prize in Physics “for his optical precision instruments and the spectroscopic and metrological investigations carried out with their aid”. During the same year he also won the Copley Medal, the Henry Draper Medal in 1916, and the Gold Medal of the Royal Astronomical Society in 1923. Moreover, a crater on the Moon is also named after him.

Michelson died on May 9, 1931, while he was working on a more refined measurement of the velocity of light in Pasadena, California.



Albert Einstein



1879 - 1955

Albert Einstein was born in Germany. He was a great physicist from America and a Nobel laureate. Einstein gained worldwide fame as he created extraordinary theories related to relativity and for his suggestions and premises that are related to the light's particle nature. Einstein is one of the most renowned physicists of the twentieth century.

Einstein was born on 14th March, 1879 in Ulm, Germany. He spent his teenage years in Munich with his family. He and his family had an electronic equipment store. Einstein was not talkative in his childhood, and till the age of three, he didn't talk much. But as a teenager, he had great interest in nature and had aptitude to comprehend tricky and complicated theories of arithmetic. Einstein knew geometry when he was 12 years old.

Einstein *loved to be creative and innovative*, therefore he loathed the boring and non-creative spirit in his school at Munich. *Einstein left his school at the age of 15, as his family left Germany due to constant failure in their business.* His family went to Milan and Einstein spent a year with them. It was then that he decided that, in order to survive, he has to create his own way out. He studied his secondary school from Switzerland and then joined Swiss National Polytechnic which was located in Zurich. Einstein didn't like the teaching method there, so he bunked classes to study physics or play his violin. *With the help of his classmate's notes, he cleared his exams, and in 1900, he graduated. Einstein was not considered a good student by his teachers.*

Einstein accepted the job of a professor and worked as an alternate teacher for about two years. He achieved the post of an examiner in the year 1902 in Bern at the office of Swiss patent. Einstein wedded his classmate Mileva Maric in 1903. He had two sons with her but they later divorced. After some years Einstein married someone else.

The University of Zurich awarded Einstein doctorate in 1905 for

his thesis on the different sizes and extent of molecules. In order to highlight the importance of physics, Einstein published three theoretical documents which stated the significance of physics in twentieth century. One of these papers was based on Brownian motion which discussed Einstein's prediction related to the movement of particles that are present in any liquid. Later many experiments supported his predictions.

Einstein's second publication discussed the *photoelectric effect*. This paper comprised of innovative premises related to the light's nature. Einstein gave the idea that light under some conditions contains some particles and the energy that a light particle contains is termed as photon. This photon and the radiation's frequency are directly related. Its formula is $E=hu$ where E is defined as the radiation's energy and h is a constant defined as Planck's constant and u is defined as radiation's frequency. Einstein's idea was rejected by everyone because it was against the conventional idea which stated that transfer of light energy is an ongoing process.

Robert Andrews, who was an American physicist, was surprised when Einstein's theory was experimentally proven by him a decade later. The main focus of Einstein was to comprehend the nature of radiations that are electromagnetic. This led to the birth of a theory that will be a mix of light's particle and wave nature. This theory too was comprehended by few scientists.

Einstein's Special Theory of Relativity

In 1905, Einstein's third paper was published. It was based on *dynamics of bodies* in motion which later was called as the *theory of relativity*. The nature of radiation and matter and their interaction was the theme of discussion since the *era of Newton*. The view that laws of mechanics are essential is defined as the *mechanical view of world*, and the view that laws of electric are essential is defined as the *electromagnetic view of world*. None of the view has been successful in giving a reliable elucidation for the interaction between matter and radiation, that is, the relation between radiation and matter is seen concurrently by the viewer at rest and a viewer travelling at consistent speed.

After observing these problems for a decade, Einstein came to the conclusion that the main problem was in *the theory of measurement*, and not in the theory related to matter. The main crux of Einstein's special theory of relativity was the comprehension of the fact that all the dimensions of space and time are dependent on judgements that whether two events those are far off occur together. This hypothesis led Einstein

towards the development of a theory which was based on two basic hypotheses: one that laws of physics are identical in all inertial positions. This is called as the *principle of relativity*. The second postulate is called as the principle of variance, according to this principle; the light's speed is worldwide stable in a vacuum. Hence, Einstein was capable of providing reliable and accurate explanation of physical actions and measures in varying inertial positions without assuming about the matter or radiation's nature, or their interaction. Practically, Einstein's argument was not understood by any one.

Einstein's work was not appreciated by others, not because it was very tough or difficult to understand, but the main problem that people faced was from Einstein's viewpoint towards the theories and the affiliation between theory and experiment. Although Einstein believed that the sole foundation of information is experience and practice, he also maintained that scientific theories are developed by physical instinct, and the grounds on which theories are laid cannot be linked to an experiment rationally. According to Einstein, the definition of a good theory is the one that needs least number of postulates for physical confirmation. The innovation in Einstein's postulates made it difficult for all his colleagues to understand his work.

However, his biggest supporter was *Max Planck* who was a physicist from Germany. Einstein stayed at the patent agency for four years till the time he became famous in the physics society. He rapidly progressed upward in the educational German speaking world. In 1909, Einstein had his first meeting at the *Zurich University*. He then moved to the *University of Prague* dominated by German speaking people. He then came back to the *Swiss Polytechnic in Zurich* in 1912. Eventually, Einstein was selected at the *Kaiser Wilhelm Institute for Physics in Berlin* as the *director*.

The General Theory of Relativity

In 1907, before Einstein left his job at patent office, he started working on the *theory of relativity*. He began by defining the equivalence principle which states that the accelerations of the frame of reference is equal to the gravitational fields. For instance, people while travelling in a lift are unable to take a decision that the force that they feel is felt by the *elevator's invariable acceleration* or by *the gravitation of the elevator*. Until the year, 1916, the relativity theory was not available. According to the general theory of relativity, the connection bodies had been attributed to the forces of gravity, and are elaborated as the power of bodies on the

space and time dimensions.

On the grounds on general theory of relativity, Einstein gave reasons for the changes in the *orbital movement of planets* that were not elaborated previously. He also told about the movement of starlight in the surroundings of a huge body like sun. *Einstein became famous in 1919, when this prediction of Einstein was confirmed throughout the eclipse of the sun.*

In 1921, different scientific societies throughout the world awarded Einstein the *Nobel Prize in Physics*.

Einstein supported Pacifism and the Zionism movement. While the World War I was taking place Einstein was one of the academics of Germany that criticized Germany's participation in the war openly. He was attacked many times by Germans because of his continuous support toward Zionists and pacifist's goals. Einstein's theories including the relativity theory was criticised publically.

Einstein left Germany and went to United States when Hitler gained power. He got a place in New Jersey at the Institute of Advanced Study at Princeton. On behalf of Zionism world Einstein continued his efforts. Einstein had to abandon pacifist because, of the danger faced by mankind put forward by the Nazi rule in Germany.

Einstein worked together with many other scientists in 1939 and wrote a letter to President Franklin D. Roosevelt, giving the option of *making an atomic bomb and the possibility that the government of Germany was planning such route*. As the letter was signed only by Einstein, helped in building the atomic bomb although Einstein had no participation in the whole work process and he was unaware about it.

Einstein participated actively in the *international disarmament cause after the war*. Einstein maintained his support with Zionism but he rejected the offer to become the president of Israel. In late 1940's in US Einstein emphasized on the importance of making sacrifices to safeguard the freedom of politics. Einstein left this world on 18th April, 1955 in Princeton.

Some of Einstein's efforts have been considered impractical. Einstein's proposals had been very well managed and nicely planned and just like his theories that seemed motivated by the intuition of sound which comprised of wise and cautious observational assessment. Einstein was interested in politics and social issues too but it was science that really caught his interest and he believed that it was only the universe's nature that mattered in the end. *Relativity* was found in his writings. He

wrote, *The Special and General Theory*, *About Zionism*, *Builders of the Universe*, *Why War?*, *The World as I See It*, *The Evolution of Physics* and *Out of My Later Years* in the years, 1916, 1931, 1932, 1933, 1934, 1938 and 1950 respectively. In the year, 1987, Einstein's papers had begun to get published in *multiple volumes*.

