

America's century

Americans have made major inventions and led major movements in the 20th century. While the 19th century belonged to Britain and France, the 20th has beyond doubt been America's, Dr. Fakhruddin Ahmed writes from Princeton

HUMAN race's achievements in the twentieth century can be summed up through the following inventions and mass movements, roughly in the following chronological order: photograph, phonograph, electricity, air conditioner, radio, automobiles, air planes, motion pictures, theory of relativity, World War I, quantum mechanics, women's suffrage, non-violent non-cooperation, penicillin, fascism and World War II, atomic bomb, television, computer, communism and cold war, democracy, laser, pill and women's movement, space exploration, personal computer and Internet. Notice that most of the major inventions have been made, and the movements led, by Americans. While the nineteenth century had belonged to Britain and France, without a doubt the twentieth has been America's Century.

Thanks to George Eastman of Rochester New York, we have a picture of the nineteenth century, the century of our grand fathers and great grandfathers. Eastman commercialised his Kodak camera in 1888 and by the 1920s had a monopoly on the photographic industry. Modern life without still and movie cameras is unimaginable. At the turn of the century, summers in New York State could be oppressively hot. This was not to the liking of a native New Yorker, Willis Haviland Carrier. In 1902, Carrier designed the first system to control temperature and humidity. Carrier's invention, air conditioner, has cooled countless bodies and minds over this century.

The twentieth century greeted the humans with a burst of light. Although electricity was discovered in the previous century, and was available in some cities in the 1890s, beginning in the early years of the twentieth century, electrification went to the masses. With the invention of the world's greatest inventor, Thomas Alva Edison, human beings freed themselves from the drudgery of gas lamps and began colonising the night. By the end of the century most of the world has been electrified.

Although born in Michigan, Thomas Edison made all of his inventions from his lab in Menlo Park, New Jersey. The township has been named "Edison" in his honour and is proudly the birthplace of the people from the Indian subcontinent. What every people know is that the records for Edison's phonograph were cylindrical, not flat! Edison had a bed in his lab, slept very little (four hours), survived mostly on coffee and cakes and lived by his own creed, "genius is one per cent inspiration and 99 per cent perspiration." Although acknowledged as the greatest inventor of all time (1093 patents), in scientific circles he did not have a high standing. Edison's inventions revolu-

tionised the world. Phonograph is the precursor to the gramophone, the long playing record and the compact discs (CDs), where the pin of the record player has been replaced by laser. Edison also invented motion picture projector, which made the motion picture industry possible. American D. W. Griffith was the first film maker to exploit the enormous power of this new medium in the classic, *Birth of a Nation* (1915), unfortunately marred by his glorification of the racist Ku Klux Klan.

Italy's Guglielmo Marconi perfected a radio system in 1901 that transmitted Morse code over the Atlantic. On April 14, 1912 David Sarnoff, operating the most powerful radio station in the world atop a New York

City department store picked up the distress signal from the sinking Titanic and passed the news to the world. The first radio was marketed in 1916. In 1921 the Radio Corporation of America (RCA) demonstrated the market potential of radio by broadcasting the Dempsey-Carpenter world heavyweight boxing bout. Within three years RCA sold radio sets worth 80 million dollars. Replacement of the vacuum tubes by transistor in the 1950s allowed miniaturisation and sound quality enhancement of the receivers. Before the advent of television pictures, radio sounds kept the people of the world in touch.

Henry Ford, the son of poor Irish immigrants was determined to make automobiles affordable for the ordinary people. Forming Ford Motor Company in 1903, Ford introduced the assembly line method of production and in 1908 mass produced the Model T for as little as \$500, making car affordable for ordinary Americans for the first time. The automobile is the personal transportation medium of the century.

Brothers Orville and Wilbur Wright did not much care about driving on the ground, they

invented the airplane and they self-taught, the brilliant brothers achieved the first powered, sustained and controlled airplane flight (1903) and built and flew the first fully practical airplane (1905). Use of three-axis control was their most significant contribution to aerodynamics and practical flying. On the morning of December 17, 1903, at Kill Devil Hills, North Carolina, the brothers took off on their plane, Kitty Hawk, for history's first powered, sustained and controlled flight. The flight lasted only 12 seconds and covered 852 feet of ground, but it freed human being from the shackles of earth and lifted them to the medium above. Wright brothers set America on a course not only to pioneer commercial and military aviation; it also set the path to space, the moon and beyond.

West after World War II would bring the world to the brink of nuclear war during the Cuban missile crisis of 1962. Under the weight of tremendous defence expenditure Russian communism collapsed in 1989. Like a house of cards every other European communist nation followed; at the end of the century communism remains in place most notably in Cuba and China, where it will end with the death of their ageing leaders. The reason communism failed is because it was totalitarian, not worker's paradise. The reason capitalism survived is because the rights to form a union to protect workers rights put a compassionate face on capitalism.

The 1920s also saw the birth of the new science of quantum mechanics, which defined the structure of matter at the

atomic level. Max Born, Werner Heisenberg, Louis de Broglie, Erwin Schrodinger and Paul Dirac contributed to the theory. It can explain why glass breaks and a piece of plastic does not. Quantum mechanics states that atoms and molecules can take only discrete, not continuous energy levels. This is a concept that even Einstein had problem with in the beginning. A laser light is nothing but an intense, stimulated transition between two such discrete energy levels.

Women won their suffrage in America in 1920. However the work-place was still hostile to women. Instead, women spent their new freedom on fashion and fun, giving rise to the "swinging twenties." It was in the 1920s that Mahatma

Gandhi unnerved the British by employing non-violent non-cooperation technique against them. The idea was not to merely replace the British government with an Indian one, but to demonstrate that certain laws, such as ban on Indians from producing salt, are inherently unfair and should not remain on the statutes. D. H. Lawrence's *Women in Love* (1920), and E. M. Forster's *Passage to India* (1924) were published this decade. However, James Joyce's *Ulysses*, published in 1922, has been adjudged the Best Novel of the Century. The 1920s were a prosperous time in America. All that came tumbling down when the New York stock market crashed in October 1929, ushering in the Great Depression.

As America remained mired in depression, Hitler rose to power in Germany in the early 1930s, and in 1939 plunged the world into World War II by invading Poland. Fifty million people would die in a six-year span. Although Winston Churchill had tried his best not to get America to join the war efforts, it was the sneak Japanese attack on Pearl Har-

bor (1941) and Rudyard Kipling's *Kim* (1901).

The 1910s arrived unapologetically. On April 15, 1912 the "unsinkable" British cruise ship Titanic sank 400 miles off the coast of Newfoundland, Canada after colliding with an iceberg, drowning 1500 people. Americans salvaged the Titanic in 1985 and found that the construction was structurally flawed. Many an epic film has been made about the ill-fated liner's maiden voyage, none more memorable than Kenneth More's 1950s British epic *A Night to Remember*. However, the 1997 Hollywood version featuring Leonardo Di Caprio and Kate Winslet has become the highest grossing film ever.

Margaret Sanger of New York attempted to provide women with a birth control pill in 1916; the effort earned her a 30-day jail sentence. Somerset Maugham published his *Of Human Bondage* in 1915. The decade saw "the war to end all wars", World War I, not end wars at all. Unfair treatment of Germany in the Treaty of Versailles sowed the seed for World War II twenty years later. The Bolshevik revolution of 1917 ushered in the communist era

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Thanks to Sir Alexander's discovery, armed with an arsenal of antibiotics, human beings now lead a much healthier life. The 1940s saw the beginning of the environmental movement, frozen food, atomic bomb, television and another revolution that would eclipse the industrial revolution - computers. J. Presper Eckert and John R. Ragazzini built the first automatic digital computer at the University of Pennsylvania, Philadelphia, in 1946. Omnipresent computer remains the signature invention of the twentieth century. George Orwell published his futuristic novel *1984* in 1949. The 1944 film *Double Indemnity* was the late Satyajit Ray's favourite film. However, Orson Welles's tale of a newspaper publisher, *Citizen Kane* (1941), is considered the greatest movie of the twentieth century.

Work on television began in the 19th century by German scientist Paul Nipkow who patented his idea of a complete television system. In 1926 John L. Baird of England demonstrated a true television system by electrically transmitting moving pictures. However, it was at the Radio Corporation of America (RCA), Princeton that modern television was invented. Spearheaded by Vladimir Zworykin, the first all-electronic television used a camera called the iconoscope and a cathode ray tube receiver. It was at the David Sarnoff Laboratory of the same RCA Princeton facility that colour television was invented in the 1950s. Television pictures made the world a global village; now people could not only hear, but also see what was going on in the rest of the world. Videocassette recorders (VCRs) and discs followed in the 1970s and 80s. Television was introduced in Bangladesh in December 1964.

In 1952 American Jonas Salk invented the polio vaccine that saved millions of children world-wide from death and deformities. The 1950s also saw the introduction of dishwasher that made life a whole lot easier for mothers. Also in the 1950s American James Watson and Briton Francis Crick decoded the structure of the DNA - our genetic fingerprint - the molecule that passes genetic information from one generation to another. The decade witnessed the Green Revolution - introduction of high yield agriculture (hybrid crops) that saved millions from starvation. In October 1957 Russia sent a small satellite, Sputnik, into space alerting America, and bringing on the space race. David Lean's *A Bridge on the River Kwai*, released in 1957, remains the best war movie ever made.

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Decade of the Century. It started innocently with boxer Muhammad Ali (then Cassius Clay) and the Beatles bursting into the scene. Yuri Gagarin of the USSR became the first human being to go into space in April 1961 (followed by American Alan Sheppard a month later) prompting President Kennedy to vow: "before the decade is out to put a man on moon and bring him back safely to earth." Things turned ominous in October 1962, when the USSR and America came to the brink of nuclear war over Russia's nuclear missiles in Cuba, which Russia removed to save the world from obliteration.

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Crises, President Kennedy committed American troops to save South Vietnam from the communist North, leading later to the Vietnam War. America would lose that war, along with 50,000 of its citizens. On November 22, 1963, Lee Harvey Oswald, who had just returned from the USSR, gunned down President Kennedy in Dallas, Texas, ending the most charismatic American Presidency of the twentieth century. One wonders whether President Kennedy paid the ultimate price for humiliating Russia one year earlier; similar fate would befall Pakistan's General Zia-ul-Haq (1988) and Dhokar Durdadev (1996) for humiliating Russia in Afghanistan and Chechnya respectively.

Women's Liberation Movement came into its own in the 1960s. With introduction of the oral contraceptive in the 1950s, women gained reproductive freedom. For the first time in history they could choose if they were going to be mothers, if so of how many children. This time they were not only content to vote, they sought political office. Women fought for equality with men in every sphere of life. Although the equal rights amendment has not become a law, women have made astounding progress this century. The motel business went into a tailspin after the release of Alfred Hitchcock's *Psycho* in 1960. David Lean's *Lawrence of Arabia*, (1962) remains one of the most visually spectacular movie ever made. And the first definitive film on space travel,

Stanley Kubrick's *2001: Space Odyssey*, remains as relevant today as it was at its release in 1968. Joseph Heller, who died last week, published his anti-war satire, *Catch-22* in 1961.

The 1960s also saw the end of colonialism. Independent states sprang up in Asia and Africa; this gave the natives a feeling of self-worth. Adopting the Gandhian non-violent tactics, Dr. Martin Luther King won civil rights for the African-Americans. In December 1967, South African surgeon Dr. Christiaan Bernard carried out the first heart transplant. The pioneering work lay the groundwork for subsequent transplant of several other human organs. At the end of the decade, as President Kennedy

riches man, worth about one hundred billion dollars. Steven Spielberg's tale of an alien from another planet left behind on earth, *E.T. Extraterrestrial* smashed all box office records in 1982.

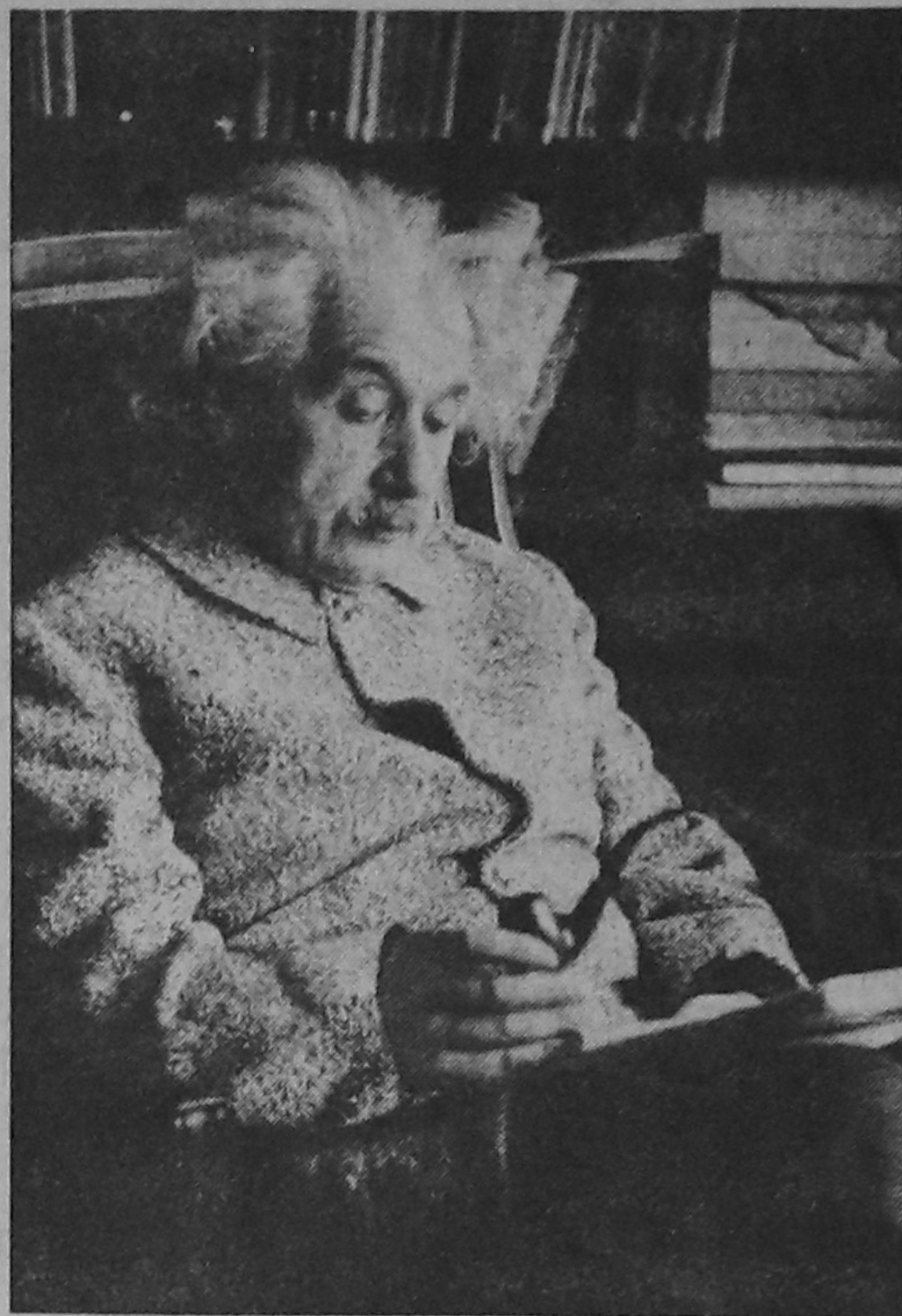
Starting in the 1960s, the US government agencies began sharing data through the computer. Soon the hospitals and the universities were included in the programme. By the 1990s computers all over the world were linked, giving rise to the Internet. The full implication of the explosion of Internet activities - information sharing, e-commerce etc. - will be felt in the next century. Currently in America it appears that the easiest way to become a billionaire is to float an Internet company whose name ends in dotcom (.com). At the last count, one hundred million people use the Internet world-wide today.

For the human race, in spite of the two world wars, the twentieth has been a good century. With better food, medicine and conveniences of life, we live better. The colonial age has ended. Whereas only 10 democracies existed in the nineteenth century, we now have over a hundred. Half the human race - the womenfolk - was officially treated as second class citizen in the previous century. Women have made astonishing gain in this century in every sphere of life. All of this was possible because education reached the masses; with literacy up, people could think for themselves and not be dictated to. After looking at the photographs our lively, yet fragile earth from a dead moon, we became far more environmentally conscious.

As the century winds down, through fibre optics or satellites we are globally connected. We are so wired that national boundaries and where we live will matter less and less in the next century. E-commerce will dominate. How well a nation adapts to the business needs of the global age will determine how prosperous they are. People will leave environmentally polluted areas for the healthier ones. With better food and medicine human beings will live much longer. With a few exceptions such as the United States, nation states in the twenty first century will be less diverse, and more culturally and religiously homogenous.

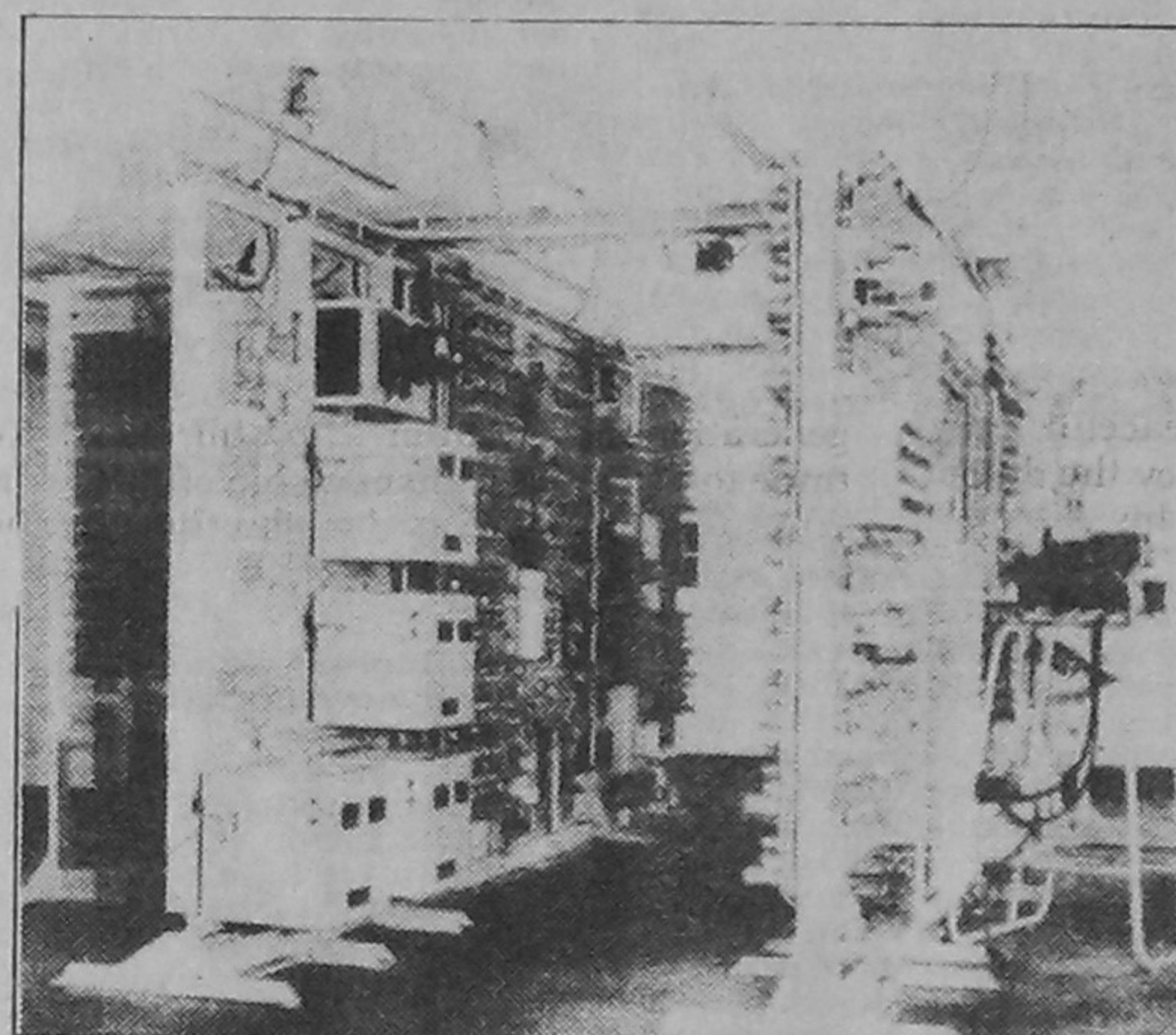
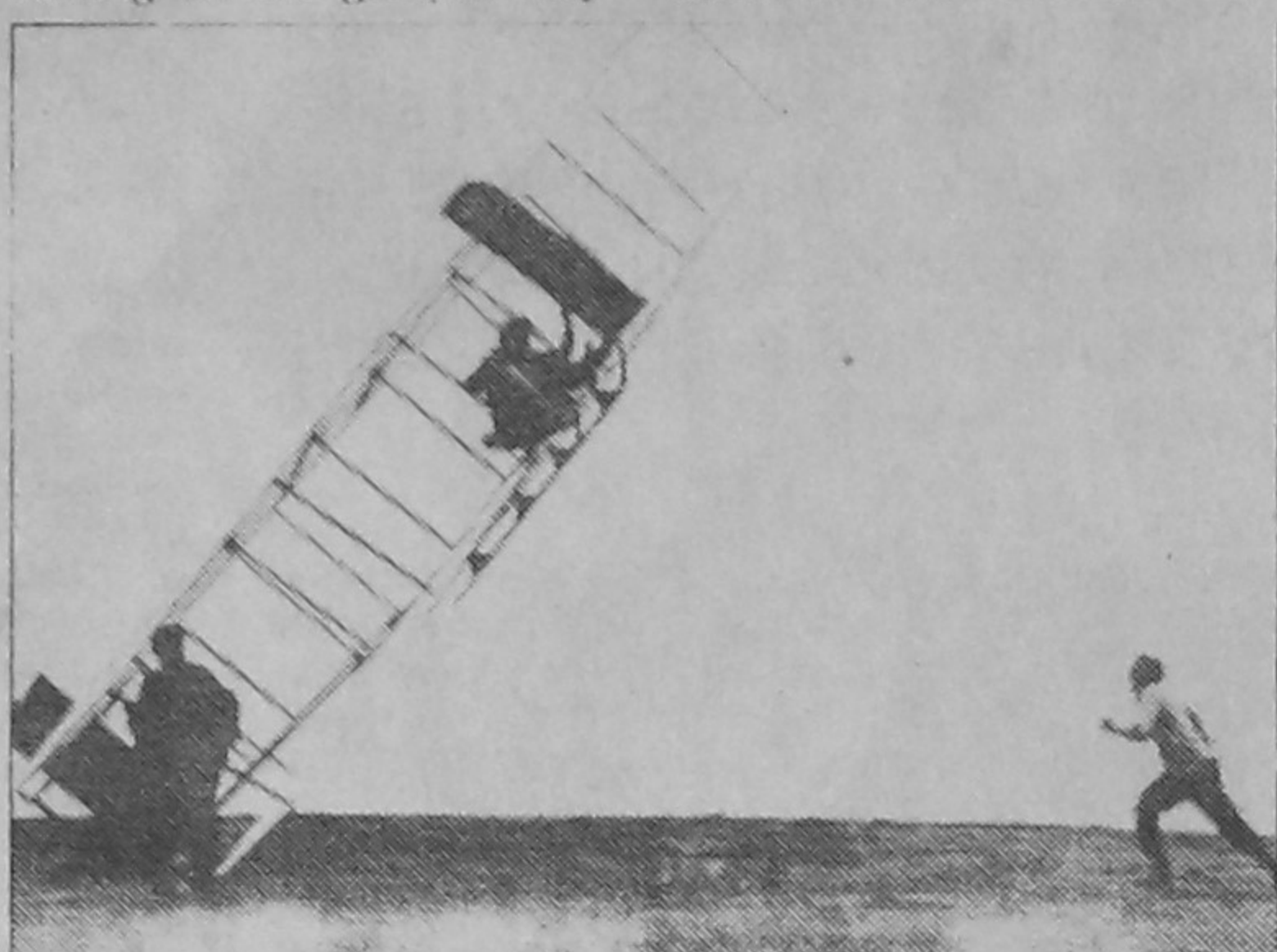
So what is the single event that defines our century? It occurred on July 20, 1969 on a different celestial body. When Neil Armstrong uttered those spontaneous words on the surface of the moon, "This is one small step for a man, one giant leap for mankind," he was summing up human being's greatest achievement of the twentieth century. Everything human beings have done thus far dwarfs in comparison.

Since the conquest of the moon, America has sent countless satellites to our other neighbours near and far. On those space ships America has loaded videotapes that show how human beings live, eat, worship and reproduce. In the hope that intelligent life, upon reviewing the tapes, would reciprocate. As America's Century draws to a close and America awaits a celestial response, the next challenge is visible on the horizon. Yes, space is our new frontier for the next century.



Albert Einstein
Born March 14, 1879, in Ulm, Germany
1902 Begins work at Swiss patent office
1905 Publishes three seminal papers on theoretical physics, including the special theory of relativity
1916 Proposes general theory of relativity; is proved correct three years later
1922 Wins Nobel Prize in Physics
1933 Emigrates to Princeton, N.J.
1939 Urges FDR to develop atom bomb
1955 Dies in his sleep on April 18.

The Wright Brothers
A pair of self-taught engineers working in a bicycle shop, they made the world a forever smaller place



While addressing a problem in the arcane field of mathematical logic, Alan Turing imagined a machine that could mimic human reasoning, the computer

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Muhammad Ali ...
floating, stinging, punching, prophesying, he transformed his sport and became the world's most adored athlete



While the Wright brothers satisfied human cravings for flying, German Albert Einstein's mind took flight of a different sort. In 1905 at the age of 26, Albert Einstein published four cosmos-shattering scientific papers, stating simply put, that everything except the speed of light is relative. After the prediction of his general theory of relativity was verified during a solar eclipse on May 29, 1919 the world of science has never been the same. Without Einstein there would have been no nuclear age, no laser, no electronics.

The first decade also saw the publication of several all time classics: Joseph Conrad's *Lord Jim* (1900), *Nostromo* (1904), *The Secret Agent* (1907), E. M. Forster's *A Room with a View*,



While Roosevelt, seen in the picture with Churchill and Stalin saw the Americans through the second world war, Martin Luther King united the African American to rally for their right.

