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"Identify four specific changes in science and technology, and explain their effects on Western European family and private life between 1918 and 1970." (1995, #4)

During the year 1918–1970, there were changes in science and technology that ushered in a new era. At the close of the war, the use of transportation was revolutionized. Control of the skies was now possible with the use of airplanes. Air power became pivotal in the outcome of future wars. With the achievement of flight, people could now travel transcontinental distances much faster and cheaper. The introduction of cars in mass production transformed European travel. Drivers were able to use cars to travel with more freedom and flexibility to reach workplaces and to travel. Around the same time, media was developing with great influence of the masses. Radio transformed communications. Radios became vital for airplanes to navigate. Radio receivers became common ways for people to obtain information. However, nothing in media could compare to the television (TV). Television became both the eyes and ears of the masses. TV was a relatively simple and easy method to deliver messages by visual aids and sound effects. The microwave was also a revolutionary home appliance. Microwaves were a labor saving device that allowed women to have more time for outside work. Incredible medical discoveries such as antibiotics and vaccines eased the sufferings from diseases. The atomic age brought about the Arms race and the Cold War. Since ancient times, people have dreamed of exploring the cosmos. In the later half of the 20th century, the dream became reality. The space age began with the launch of the first artificial satellites in 1957. Explorations in space sparked the Space Race. The Space race was the competition between the US and USSR to be the first country to reach the moon. By the beginning of 1970, the world transformation made a very large impact average person.

I. Transportation

A. Cars

1. Automobiles in the 20th Century

- a. Gasoline-powered engines became the universal choice for automobiles because they allowed longer trips and faster speeds.
- b. Improvements in the operating and riding qualities of gasoline automobiles developed quickly after 1900.
- c. An electric self-starter was introduced in 1911 to replace the hand crank used to start the engine turning.
- d. Major reasons for the surge in automobile ownership were Ford's Model T, the assembly-line method of building it, and the affordability of cars for the ordinary wage earner.
- e. Improvements in engine-powered cars during the 1920s contributed to their popularity: four-wheel hydraulic brake systems; shatterproof glass; balloon tires; heaters; and mechanically operated windshield wipers.

2. Impact of Family

a. Efficient method to travel

- i. The cars made travel on roads comfortable and private
- ii. Automobiles had more freedom on the roads to reach destinations trains could not reach.
- iii. However, Automobiles are not as popular in Europe as in the US because of trains, mass transit, and subways.

b. Rise in standard of living

- i. Before WWII, only the rich could afford cars.
- ii. Cars were now affordable to buy by the average worker.
- iii. By 1965, there were over 44 million car ownerships.

d. European super highways

- i. Germany has a highly developed transportation superhighway known as the autobahn.
- ii. There is no speed limit on the autobahns
- iii. Frequent projects and congestion keep the speed down.

c. Source of Recreation

- i. Teenagers use the car for dating
- ii. Motorist could reach beaches, mountains, etc.
- iii. Motorist created need for freeways to be constructed.

B. Airplanes

1. Commercial aviation began in January 1914; just 10 years after the Wrights pioneered the skies.

a. The first regularly scheduled passenger line in the world operated between Saint Petersburg and Tampa, Florida.

- i. Commercial aviation developed slowly the next 30 years
- ii. Commercial aviation was driven by the two world wars and service demands of the U.S. Post Office for airmail.

b. In the 1920s, light airplanes were produced in greater number

- i. Club and private pleasure flying became popular.
- ii. The inexpensive DeHavilland Moth biplane, in 1925, put flying within the financial reach of many enthusiasts.

2. Jet airplanes

a. Wartime brought new aviation developments to the jet engine.

- i. Jet transportation arrived in 1952
- ii. Pan American World Airways inaugurated Boeing 707 jet service in October of 1958

b. Jet advantages

- i. Transatlantic jet service enabled travelers to fly from New York City to London, England, in less than eight hours, half the propeller-airplane time.
- ii. Boeing's new 707 carried 112 passengers at high speed and quickly brought an end to the propeller era for large commercial airplanes.

3. Impact of planes on lives

a. Travelers possible to visit countries more quickly.

- b. Trans-oceanic flights from North America to Europe and Asia.
- c. Air travel changed life dramatically almost overnight.
- d. The world became a “small world after all.”

II. Home Appliances and Medicine

A. Radio

1. Origins

- a. Scientists in many countries worked to devise a system that could overcome the limitations of the telegraph wire.
 - i. In 1895 Italian inventor Guglielmo Marconi transmitted a telegraph with a wireless transmitter, he called the radio
 - ii. Marconi awarded the Nobel Prize for physics in 1909.
- b. The age of broadcasting had begun.
 - i. Wireless transmission proved itself an invaluable military tool on land, sea, and air.
 - ii. Impressed by its strategic applications, it was a potential instrument of espionage and mass propaganda.
- c. Britain Radio
 - i. Broadcasting developed in a different way than the US.
 - ii. Radio owners paid yearly license fees, collected by the government which were went directly to an independent state enterprise, the British Broadcasting Corporation.
 - iii. The BBC, in turn, produced news and entertainment programming for its network of stations.
 - iv. The editorial and artistic integrity of the BBC was to be insured by its funding mechanism, which was designed to isolate it from immediate political pressures.

2. Influence

- a. Radio helped transform the homes in Europe
 - i. It immediately became a craze.
 - ii. It brought immediately variety of information and entertainment directly to homes.
- b. Radio on a Nation Level
 - i. It encouraged popular interest in current events.
 - ii. It increased the feeling of national unity.
 - iii. Radio provided greater safety for airplanes and ships.
 - iv. Radio could be used in reaching people in their nation.
- c. Radio's Height in Europe
 - i. Radio broadcasting reached the height of its influence and prestige worldwide during World War II (1939-1945)
 - ii. Carried war news directly from the battlefield into the homes of millions of listeners.

B. Television

1. History

- a. Zworykin was largely responsible for the development, during the 1920s and '30s, of the television camera and picture tube.

- b. Farnsworth invented the first simple electronic microscope and the cold cathode-ray tube, which was in some early televisions.
- c. A cathode-ray tube (CRT) is an electron tube that converts electrical signals into a pattern on a screen and forms the basis of the television receiver.

2. Effects on family

- a. Information broadcasted rapidly to audience visually
- b. Television set up new forms of entertainment, styles, and trends.
- c. Family life became revolved around the TV
 - i. Time of the family lived by the TV in the living room.
 - ii. Frozen TV dinners became popular with the microwave.
 - iii. Television took away time from daily responsibilities
- d. More uniformed culture and weakened differences
- e. Extended peoples concern for the world events

C. Microwave Oven

1. Early history

- a. In 1945 Percy L. Spencer, standing close to the magnetron, noticed that a candy bar in his pocket melted even though he felt no heat.
- b. Raytheon developed this food-heating capacity and introduced the first microwave oven in the early 1950s.
- c. Although it was slow to catch on at first, the microwave oven has since grown steadily in popularity to its current status as a common household appliance.

2. Effects of Family

- a. Uses electromagnetic energy to heat and cook foods.
- b. Microwaves cook food rapidly and efficiently
- c. At first, people were wary of it because of the fear of injury.
- d. Lowered cooking time and lightened household duties
- e. Gave women chance to make meals quickly and prepare frozen dinners because many women worked outside of homes

D. Medicine

1. Antibiotics

- a. In the 1920s British bacteriologist Sir Alexander Fleming
 - i. Antibiotics are chemical compounds used to kill or inhibit the growth of infectious organisms.
 - ii. Discovery was accidentally in 1928
 - iii. He developed penicillin

b. Penicillin

- i. in its original form could not be given by mouth because it was destroyed in the digestive tract and the preparations had too many impurities for injection.
- ii. No progress was made until renewed research
- iii. Australian pathologist Sir Howard Florey and German-British biochemist Ernst Chain purified enough of the drug

iv. Successfully used to treat such deadly diseases as endocarditis, septicemia, gas gangrene, gonorrhea, and scarlet fever.

2. Vaccines

- a. In 1954 Jonas Salk introduced an injectable vaccine containing an inactivated virus to fight poliomyelitis.
- b. Subsequently, Albert Sabin developed an oral vaccine
- c. Since the introduction of the polio vaccine, the disease has been nearly eliminated in many parts of the world.

3. Impact

- a. Antibiotics combat formerly crippling or deadly diseases
- b. Vaccines prevented dread diseases.
- c. Public health greatly lessen suffering
- d. People lived longer, healthier lives

III. Arms Race

A. History

1. Pre 1950

- i. The U.S. government established the top secret Manhattan Project in 1942 to develop an atomic device.
- ii. Near the end of WWII, on August 6, 1945, the United States dropped the first atomic bomb on the Japanese city of Hiroshima.
- iii. A second bomb dropped on the city of Nagasaki on August 9.
- iv. The United States and the USSR had different ideologies, and they mistrusted one another, leading to the cold war.
- v. USSR developed its own Atomic program

2. Cold War

- i. Post-World War II struggle between the US & USSR
- ii. Began after division of Germany
- iii. It became an intense competition between the two superpowers to accumulate advanced military weapons.
- iv. Cold war expanded to conflicts in Korea & Vietnam

3. Weapons build up

- i. ICBMs is an acronym for intercontinental ballistic missile,
- ii. A rocket designed to carry nuclear warheads thousands of kilometers to their targets.
- iii. ICBMs are the largest class of guided missiles.

B. Impact

1. Anti-Americanism

- i. Europeans against American involvement in Asia.
- ii. American missiles in Europe were greatly protested.
- iii. Viewed US involvement to interfere with their affairs.
- iv. Against Americanization of cultures and ethnicities.
- v. Americanization came in the form of fast-foods and language.

2. Worried Alliances

- i. The cold war placed a strain on relations

- ii. Feared American economic abandonment of Europe like after WWI with the Great Depression
- iii. European nations feared that the United States would not honor its pledge to defend other members of the alliance.
- iv. American changed that by creating the United Nations (UN) and the North Atlantic Treaty Organization (NATO)

3. European pressures

- i. European nations brought USSR and US to compromise
- ii. Europe wanted to end the Cold War to prevent world war
- iii. The stockpiling of missiles was eventually slowed by the Strategic Arms Limitation Talks (SALT I & II) treaties

IV. History of Space Exploration

A. Space Exploration

- 1. The desire to explore the heavens is probably as old as humankind
- 2. The history of space exploration begins very recently
- 3. Started with the launch of the first artificial satellite, Sputnik 1
 - a. Soviets sent into orbit in October 4, 1957.
 - b. Soon after, in November 3, 1957, Soviets Launched Sputnik 2, which contained the first space traveler—a dog named Laika,
 - c. Soviet cosmonaut Yuri Gagarin became the first human in space just a few years later, in 1961.

B. The Space Race

- 1. Space exploration became possible at the height of the Cold War
 - a. A superpower competition between the United States & USSR
 - b. It gave a boost to space programs in both nations
 - c. Europe was left out of the space program until 1975
 - d. The primary impact of Sputnik was political
- 2. Sputnik triggered concern about Soviet technological prowess.
 - a. USSR succeeded in putting the first human into space
 - b. Alan Shepard's Mercury (USA) flight on May 5, 1961, was a welcome cause for celebration.
- 3. Twenty days later Kennedy told Congress, "I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to the Earth."
- 4. Genesis of the Apollo program.
 - a. scientific exploration was a motivation—Cold War geopolitics was the main push behind the Moon race.
 - b. Cold War competition also affected the unpiloted space programs of the United States and USSR
 - c. The drive of early Space exploration made NASA make great bounds and leaps in technology to accomplish difficult goals.
 - d. The first humans to set foot on the Moon were U.S. astronauts Neil Armstrong and Edwin Aldrin, who landed the lunar module of Apollo 11 on the surface of the Moon on July 20, 1969.

Economic prosperity promoted European scientific and technological advances from about 1918 to 1970. The Wright brothers would have never developed the plane if it wasn't for the commercial growth pre-WWI. The successful invention of the plane spurred on inventors to patent their own ideas. Automobile companies started to appear in Europe, such as Mercedes-Benz. European rivalries were deepened as technological gaps began to appear. Other European nations wanted a share in the wealth of the new technology. In attempt to compete with other nations, a nation's communication needed to be improved in order for the scientific community to distribute knowledge. Radio became a reliable form of wireless communicating. Political parties found it necessary to increase their growing powers by broadcasting their position. Parties committed themselves to using television to promote their parties for future elections. The Arms race and Space race was fueled by the Cold war. The two superpowers, the US and USSR, were fully dedicated to reach the moon first. The world celebrated on July 20, 1969 the lunar landing with astronauts Neil Armstrong and Edwin Aldrin. Medical advancements brought about the longevity and healthiness of life. While all the world's events were occurring, the average European family could learn about the events from the radio and television. Families had time to watch the TV because of fewer hours need to do chores because of cooking and cleaning innovations. These factors forever laid the foundations of the life-styles for future generations.

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