Revolutions in Science and Tech: Crash Course European History #44

Crash Course: European History
https://youtube.com/watch?v=zDEmHQhGkBg
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Hi I'm John Green in this is Crash Course European History. So the rollercoaster of European and World History continued its uneven path after World War II yielding, the Cold War, and the hot wars of decolonization but also longer healthier and more secure human lives Much of these positive changes were driven by tremendous -- really unprecedented -- advances in understanding the fields of biology communication, energy creation, space technology, and especially medicine.
In 1941 a policeman named Albert Alexander was dying of a minor scratch that became majorly infected with staphylococcus bacteria. But then, Alexander was treated with a new drug called penicillin. He experienced remarkable recovery but there wasn't enough penicillin available in the world to continue his treatment so his infection came back and he died a few months later. Within just five years of Alexander's death there was enough penicillin to treat not just one individual but millions of people every year.
In 1952 at Cambridge University Laboratories scientist Francis Crick, an Englishmen and James Watson, an America discovered the structure of Deoxyribonucleic Acid (DNA). DNA is the material in a cells chromosomes that carries a person's hereditary information. Now, according to Watson's personal account in the Double Helix from 1968, they did rely upon and steal the essential findings of female college Rosalind Franklin and did other dishonest acts to arrive at the theory for which they won the Nobel Prize. You can learn more about that in episode 40 History of Science series. Crick and Watson traced

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the path of biological inheritance when they uncovered the structure of DNA. Their findings showed how the double helix of the DNA molecule splits in cellular reproduction becoming the backbone of new cells. This genetic material biologist concluded provides a chemical pattern for an individual organism's life. As for how this affected everyday life. Advanced genetics and the new field of molecular biology sparked a deeper understanding of viruses and bacteria which fueled the creation of vaccines that would crush diseases like Polio, Mumps, Measles, and Tetanus but understanding DNA also had lots of other uses like scientist used it to alter the makeup of plants for instance to control for agricultural pests and even to bypass Natural Animal reproduction in a process called cloning obtaining the cells of an organism and then using them to create an exact copy in a laboratory.

Another development in 20th century history and beyond, the birth control pill. In the 1960s and slowly became available in Europe and the United States so many countries outlawed it. But better access to family planning tools reshaped families and also allowed women more freedom when it came to win to have babies and when to work. Meanwhile new techniques also made abortion much safer than it had been when he performed by amateurs into was generally outlawed at the time but with varying degrees of safety hundreds of thousands of women received abortions. Childbirth also became more medicalized with very few births occurring in hospitals in the 1920s to more than 90% occurring in clinics by the 1970s. Births attended by highly trained doctors, nurses or midwives also improved maternal and child health in those years. Both for home births and hospital ones. Child mortality in Sweden for instance dropped by more than 50%. Medical Science likewise transformed conception in those decades. The 1978 in English couple gave birth to

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the first so-called test tube baby, Louise Brown, in a process called in vitro fertilization. Her mother eggs were fertilized with her father's sperm in a laboratory dish and then implanted in her mother's uterus. So the Revolution and biology didn't just advance well-being it created a new path to life.

Thought Bubble
Information Technology also advanced allowing knowledge and culture and political information to be transmitted globally and nearly instantaneously. Once remote villages were linked to urban capitals on the other side of the world thanks to video cassettes, satellite TV, and Telecommunications. This also meant that local protests could become worldwide media events. Between the mid-1950s in the mid-1970s Europeans rapidly adopted television as an entertainment and communications medium. In 1954 just 1% of French household said television. By 1974 almost 80% did. TV viewership may have lagged a bit in the Soviet Union, but only a bit. In a rural area of the USSR. More than 70% of inhabitants watched television regularly in the late 1970s. With travel restricted in the Soviet Union, shows about foreign lands were particularly popular. The Average TV viewer tuned for about four and 1/2 hours a day. The audience for newspapers and theater declined. We devote more hours per year to television than to any other single artifact one professor claimed in 1969. Which was true for a long time but then Tik Tok. As with radio European governments supported television broadcasting with tax dollars, and that meant they also control programming. They wanted to avoid what they saw as the inferior offerings of American TV. Instead they featured drama and ballet and concerts and variety shows and news and other stuff that's boring, while we were watching good stuff, like Hee-Haw. But at any rate, through those means, the European welfare state gained influence on daily life.

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It literally shaped what people saw. Heads of state could also preempt regular programming. In the 1960s French president Charles de Gaulle appeared frequently on television rousing patriotism with dramatic gestures during his speeches and in time politicians began to depend on media experts as much as they did on economic and political experts. Thanks Thought Bubble, we did it! We got from Tik Tok to Hee-Haw in a single thought bubble. Let's move on to satellites. The emergence of communications satellites and video recorders in the 1960's allowed audiences to enjoy broadcasts from all over the globe. Including sports, soap operas, game shows, and sitcoms dubbed into many languages. By the early 1990's video cassette recordings of Liverpool football matches were even making their way to Alabama where a young John Green fell in love for the very first time. hen there was the computer, which reshaped work in science, defense, and ultimately industry. The Colossus used by the British in 1943 to crack Nazi military and diplomatic messages was the size of a gymnasium. By the 1980s computing machines were the size of a small carry-on bag. They also became unbelievably more powerful in less expensive thanks to tiny silicon chips that could execute millions of operations per second. In 1981 the French phone company invented a network called the minitell which predated the World Wide Web. It allowed people to make reservations online, but also to meet others socially and romantically. So, if you feel weird or uncomfortable for having met your romantic partner on the internet. Don't! We've been doing that since the 80's. Dramatic change also occurred within the space race between the United States and the Soviet Union which was made possible by computers and rocketry. The contest began when the Soviets launched the satellite Sputnik in 1957. The superpowers went on to competitively send up flights that tested human's ability to survive the process of space exploration, including weightlessness.

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Astronauts walked in space, endured weeks, and later months in orbit, dock with other craft, fixed satellites and carried out

experiments for the military and private industry. Additionally a series of unmanned rockets launched weather and television and intelligence and other communication satellites into orbit around the Earth. And then in July 1969 U.S. astronauts Neil Armstrong and Buzz Aldrin walked on the moon's surface to the astonishment of millions of television viewers and indeed to the astonishment of your Crash Course host today. We made it to the moon! We are a two orb species. It was a Space Race so of course there was competition but space ventures also necessitated global cooperation. From the 1960s on, US base flights often involved the participation of other countries. In 1965 an international consortium achieved the first commercial communication satellite Intelsat I. But even if the operation was increasing there was still plenty of mutual distrust because like 50% of satellites were devoted to spying. The Space Race also created heroes tops upon them cosmonauts Yuri Gagrin, the first human in space and Valentina Tereshkova, the first woman in space. Leisure activities including toys and games often focused on space. The film 2001 A Space Odyssey inspired by a story by British science fiction writer Arthur C Clarke portrayed Space Explorers pondering life's meaning as religious leaders once had. The same could be said to a certain extent, of Star Trek, or Polish author's Stanislaw Allen's fantasy novels Solaris which also later became a movie and also featured space-age individuals searching for life's meeting. This all gets at something that was happening in Europe and around the world in the 20th century that was really important. A new search for meaning especially as long as standing ideas about meeting began to feel less relevant to many. In 1954, four out of five Britions

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said they were Christian; in 2016 just two out of five did, with a slight majority identifying as having "no religion". So what will return to worship? Weill, perhaps nuclear power. It's extremely powerful, a little bit terrifying, quite mysterious, at least to those of us who didn't get great science educations. So yes, nations were also seeking out new sources of power, literally, including nuclear power. The USSR the world's first civilian nuclear power station in the town of Obninsk in 1954. Britain and the United States soon followed suit. During the 1960 and 70's civilian use of nuclear powers multiplied a hundredfold, not to mention expanding military use in nuclear powered submarines and aircraft carriers. Because of the vast cost and complex procedures involved in building, supplying, running, and safeguarding nuclear reactors, governments provided substantial aid or even financed nuclear power plants entirely. The USSR sponsored plants throughout the Soviet Bloc as part of the drive to modernize, but it wasn't alone, Western nations also funded nuclear power. These changes were so revolutionary that for ordinary people the idea of work became different, European and Western countries started to become post-industrial, that is emphasizing jobs in services like healthcare, research, education, while keeping a presence in industrial work. Work on average became less physically onerous while demanding a different range of technical and emotional skills. As parts of the economy became more interconnected skills in complex analysis became more important than ever in the 21st century, and this is one of many places where history can be very important to you in your professional life, as our curriculum consultant Kathy pointed out to me recently the question isn't just how to build a bridge, it's where to build a bridge. Where to build a bridge is partly a historical question as are other extremely complex questions like, should we get into this war?

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So please study history because I need you to make smart choices about that stuff.

Another important development in the second half of the twentieth century was increased cross-border economic cooperation. In Europe for instance a consortium of European firms created the Airbus. A suite of Passenger Jets as a result of cooperation among governments businesses and scientists. Increasingly European workers were themselves also crossing national borders as work-life and living conditions became cleaner, less dangerous, and often employees whether they were flight attendants or telephone-based customer service reps cared for the psychological well-being of their customers which was another big change. By 1969, there were more service sector employees than manufacturing workers: 48.8% vs 41.1%. Growth in educational facilities was also crucial to all aspects of postwar science and technology which demanded an increasingly well trained workforce. Between 1950 and 1969 the number of university students in West Germany rose by about 250% In Sweden: 580% Great Britain established technical universities to encourage practical research while France created schools to develop the future experts in administration. The Soviet scientific establishment expanded across Europe, courses in information technology and systems analysis, and overall management developed the skills essential to post industrial work. And all of this meant big life changes for young people and their families, more women worked to support the cost of economically dependent children, who now stayed in school a decade or more longer than they have a century before. And so overall the average life was longer and healthier, and better educated. But it's important to note that those changes were not equally experienced by all. In 1820 when the English poet John Keats first coughed up blood, he told a friend, *"that drop of blood is my death warrant"*

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and it was. He died of tuberculosis a year later at the age of 25. By 1950 tuberculosis was no longer a death warrant by 1990 it seemed at least too many wealthy people in Western Europe, it seemed like a disease of the past. But even in 2015 there were over 300,000 new cases of tuberculosis annually in Europe and over 30,000 European deaths from tuberculosis. When looking at the history of medicine, science, and technology we often focus on what we discover is possible. We focus on changes in what humans can do, but what we can do like for instance cure tuberculosis and many other diseases in nearly 100% of cases, is not always what we actually do. Thanks for watching I'll see you next time. Thanks for watching Crash Course which is filmed in the Jaden Smith Studios in Indianapolis and thanks to everyone at patreon.com/crashcourse for making it possible. We have many other Crash Courses including Crash Course about the history science has this kind of stuff. Thanks again for watching, and as they say in my hometown don't forget to be awesome.