The Impact of World War Ii and the Cold War on the Development of Science in the 20th Century

The Second World War and the Cold War both had colossal impacts on the development of science during the 20th century both during and after their events. When analysing any kind of war from a scientific perspective, the prominent area of focus tends to land on improvements in military science. This is of course justified by the fact that during any large scale war, there is an increased focus on military improvements, thus boosting rates of development. However, it is important to also take the time to look into other important scientific developments that war can be responsible for. For example, the Second World War was crucial to the distribution of the wonder drug penicillin in the likes of Britain and the USA. This increased production pushed for further focus in medicine that created a rapid development of antibiotics. There were of course prominent military developments during the Second World War. The Manhattan project responsible for the creation of the very first atomic bomb was a huge step for science, introducing an entire new branch to the study of physics with countless knock-on effects for the future. The Cold War further developed this with its nuclear arms race. Between 1957 and 1961, Nikita Khrushchev openly threatened the West with nuclear annihilation on a frequent basis (Lewis, 2007: 70). The true terror for either power to fall behind only heightened the desperation to build bigger bombs to harness more nuclear power.

The Second World War saw the advanced use and distribution of penicillin as a means to treat infection. From a simple sore throat to pneumonia, penicillin had astonishing results as treatment. Although the drug had been discovered years before the outbreak of war, the drugs' development and branding was greatly benefited by wartime need. The drug became available at a time when publics worldwide yearned for good news. The rising casualty rate across all war fronts pushed for the red tape of experimentation to be lifted. The US military was so impressed by its results on wounds that by the end of the 1943 North Africa campaign, soldiers began to receive penicillin in significant quantities (Robert, 2008: 56). Doctors even managed to successfully argue that the drug be distributed to German soldiers as well as allied casualties. Soon supplies increased and the treatment made a complete shift from experimental to icon. There was now enough supply for both military and civilian patients, and the drug was distributed to a number of civilian hospitals. All in time to allow allied forces to land in Normandy with a strong supply. The US army specified that 'penicillin was to be administered by powder in open wounds and parentally (by means of drip) as close to the battle front as possible' (Robert, 2008: 60). Images of soldiers being treated on the beaches would later circulate as testimony to the power of the drug. It was wartime desperation that spurred the development and distribution of penicillin, and with it came further developments in mainstream medical

science. In the likes of Britain and the USA, the wartime mass production of penicillin lead to a vast number of advances in antibiotics and a growing number of pharmaceutical companies that were research orientated. This resulted in a variety of new drugs effecting both the cardiovascular and nervous systems (Pickstone, 2001: 185).The fresh faced National Health Service became a major funder that backed forms of medical research, replacing part time teachers with salaried clinical professors. Pharmaceutical companies began to fund medical teaching hospitals in order to enable clinical research as a common practice. The USA saw increases in government funding for Universities that allowed for advancements in biomedical science that could be taken further during the Korean War. The Second World War was a golden opportunity for penicillin to truly get its foot in the door of medical science. The results seen on the growing number of horrific wartime casualties was more than enough evidence of the drugs potential. Through its interest came a rapid growth in funding in a range of areas within medical science that would greatly benefit future generations. There is no doubt that the war was hugely impacting on the development of this area of science.

Vannever Bush refers to the Second World War as ‘a new type of warfare in which science becomes applied to destruction on a wholesale basis’ (Mendelsohn, 2013: 185). Previous wars had of course adapted elements of science into warfare, but the Second World War’s developments marked a clear turning point in the history of civilisation. The centre of this turning point was of course the creation and use of the world’s first atomic bomb. During the early decades of the 20th century there was much exploration into the power of atoms. Upon the discovery that radium breaking down within uranium contained large amounts of radioactivity, it was concluded that atoms were breaking down and changing into varying elements. This concept excited scientists in the hope that the surrounding elements were capable of emitting a colossal amount of energy that was waiting to be harnessed. The Manhattan project lead under J. Robert Oppenheimer turned this dream into a reality. The potential power of such a weapon was apparent to both allied and axis forces, and after much debate, the race to build the first bomb was on. The Second World War created the perfect vessel to deliver nuclear weaponry into the 20th century. As the war dragged on, the pressure to have any sort of upper hand became huge. The Manhattan project began the intricate process of designing and testing nuclear weapons with uranium and later plutonium after the realisation that using uranium was a much slower process. However, on May 7 1945 Germany surrendered. There was now no need to flatten the already defeated Nazi war machine. This now turned attention to the determined Japanese. On both August 6th and 9th of 1945, the true power of the nuclear bomb was put to the test on Japan, in one of the most controversial war time decisions to date. Great portions of both Hiroshima and Nagasaki were flattened (Agar, 2012: 289). This was a monumental statement that would impact not only the war itself, but possibly the entire future of civilisation. The push to build and improve on nuclear weapons is an ongoing one, with country after country arming itself in hope of defending future conflict. This research into nuclear science also opened the door to harnessing nuclear energy for other uses such as providing electricity.

Although this form of energy has been shunned for its high output of radioactive waste, its development has been hugely impactful on the production of power world wide. Without the pounding pressure to win the ongoing war, there would have been little need to push such an outgoing scientific challenge. The Manhattan project cost just over $2 Billion to fund during the 1940s (Agar, 2012: 291). Such outstanding costs could not have been justified without a worldwide pressure to force development and research. This nuclear success has changed the face of both science and politics that can never be reversed.

This theme of nuclear power continued on strongly into the Cold War, when it most notably began to spread fear and terror of worldwide annihilation. International tensions had continued into the post war period, with the Soviet Union as the replacing threat to Western democracy. Once hostilities had fallen back into place it was a simple task for scientists to argue that previous military research should be resumed. The possibility to run even the simplest of “Big Science” experiments would prove to be costly, and scientists had the immense impulse to encourage military projects as it seemed to be the only way to gain full support. (Bowler, 2005: 480). The Soviets soon responded to America’s nuclear power with their very own atomic arms. The race was on to build bigger and more powerful opposition. The introduction of the hydrogen bomb was the next step for the US to gain nuclear dominance. With a much greater yield than that of an atomic bomb, it was a clear path forward. However, the Soviet Union had its own hydrogen response (nicknamed the Tsar bomb) that came as a true warning to the US. Its testing in 1961 is the largest recorded manmade explosion in history. The Cold War tensions were further worsening the escalation of nuclear arms that could eventually cause colossal damage on a worldwide scale. The struggle between the USA and USSR was also famous for its espionage. Both sides suffered from a desperate paranoia of being secretly infiltrated by their opposition, and rightly so. This was a key factor that allowed nuclear research to become even more multinational. Spies worked relentlessly on both sides in order to keep up to date with opposing power and progress. This was incredibly effective in some cases such as 1949, when such infiltration allowed the Soviet Union to create a near identical version of the plutonium bomb (Edgarton, 2008: 123). This pattern continued into the Cold War as new military productions between the great powers appeared remarkably similar. This accidental scientific cooperation allowed for technological advancement at an alarming rate as the war continued. Although there was never any direct nuclear conflict during the Cold War, it was a time of propaganda and scare mongering. Fear was spread world wide as both sides attempted to portray their dominance with nuclear arms. Each spurred their scientific success in order to gain new allies in their struggle. With such a major conflict surly to take place just around the corner, many countries took interest in siding with the power most likely to succeed (Fara, 2009: 404). Although the Second World War can take full responsibility for pushing the creation of nuclear weapons, the Cold War created the true pressure to develop them to the extent of the overkill that is possible today. Funding for experimental research would have been in no way possible to the same level without the growing tensions between the two super powers, and it truly

encouraged the developing science behind the nuclear age.

To conclude, World War II and the Cold War both had huge impacts on the developments of key scientific areas during the 20th century. The Second World War created an ample opportunity for developments in medical science. The production and distribution of penicillin for a staggering casualty rate allowed for crucial funding in medicine that enabled a variety of drugs with impressive capabilities. The war also impacted physics on a whole new level, with the creation of the first atomic bomb. Without the crippling pressures of large scale war, there would be no means to fund such a costly project. This of course bled into the Cold War. Continuing tensions between super powers allowed for further expensive developments in nuclear energy. The determination seen in both of these world changing wars clearly had a massive impact on 20th century science.