



THE REAL IRON MAN

Some of mankind's greatest innovations have been born of warfare, but at what cost? Here, MOJEHMEN examines the historic underbelly of global conflict to better understand the high price we're willing to pay for progression.

Words by Simon Harrington

We live in uncertain times. Russia's aggression in Crimea, China's revisionism and the global rise of nationalism all threaten a fragile world peace. And with President Donald Trump promising to bump US military spending to \$1 trillion during his term, hushed discussions about the risk of conflict are undoubtedly being had in darkened boardrooms across the world. As I type, scores of nervous politicians are painstakingly scouring spreadsheets, pencils in sweaty palms, ready to make the budgetary cuts to education and healthcare deemed necessary to defend their country. But what are the moral implications of a world further ruled by dissonance? "A nation that continues year after year to spend more money on military defence than on programmes of social uplift is approaching spiritual death," Martin Luther King Jr. once said in an impassioned 1967 speech, condemning the Vietnam War. As piercing as his sentiment was, and as powerfully delivered as it may have been, his words had little effect.

The chaotic, tangled and bloody dispute in Vietnam raged for a further eight years, claiming the lives of more than one million people. This is a common theme in wartime. Raised voices of contention are often drowned by a sea of political motivation, corporate interest and cash-rich beneficiaries. It is a story as old as time. From cavemen trading quality stones to forge crude axes 100,000 years ago, to China's invention of gunpowder in the 9th Century, the business of weaponry and protection marks the inception of civilised society itself. But our relationship with conflict is dichotic. On one hand, it has driven us to the very depths of human depravity, exposing the worst qualities of mankind: greed, animosity, mercilessness. On the other, it has motivated some of our greatest innovations and allowed us to demonstrate an intelligence and resourcefulness that often goes unseen. More recent examples of this include the development of the US military's TALOS exoskeleton body armour – which has the ability to monitor soldiers' vital signs and assist in operations – and the XStat wound packing syringe, designed to reduce bleeding and stabilise gunshot victims on the battlefield. But advancement through warfare has a historically sinister edge.

Perhaps the most poignant example in recent history is that of Nazi Germany's infamous human experimentations. Beyond Josef Mengele's macabre legacy of torture and torment in Auschwitz, Hitler's radical regime was obsessed with improving how its military personnel performed in combat by better understanding the limits of the human body. As such, doctors in concentration camps across Europe forced prisoners to participate in radical experiments, ranging from the testing of poisons to understanding the effects of hypoxia. Inmates were subjected to unthinkable atrocities, in some cases undergoing chemical castration, suffering amputations and being infected by diseases like

tuberculosis. Although the overwhelming majority of research conducted by these doctors was little more than negligible pseudoscience, a minute fraction of their experiments have informed scientific practice today. Operating beyond ethical and moral obligations, Nazi research into hypothermia and exposure, for example, detailed exactly how long humans could survive in the cold, and determined the most effective methods for reviving victims.

In 1988, Dr Robert Pozos, former director of the hypothermia research lab at the University of Minnesota Duluth, planned to publish a paper in the New England Journal of Medicine that included data from the Dachau concentration camp experiments, entitled The Treatment of Shock from Prolonged Exposure to Cold. The paper was rejected. It instantly raised questions of ethics among post-war researchers. On the controversy, Dr Pozos told The New York Times, "It could advance my work in that it takes human subjects farther



than we're willing." Understandably, ethicists are split on the topic; some view this as a way of legitimising the actions of the Nazis, while others argue that the research could save lives in the future, and should be published with a condemnation of the methodology.

Another similar institute operating through the Second World War, which conducted human experiments of its own, was the Japanese Army's Unit 731. A covert facility for biological and chemical warfare research based in the Pingfang District of China, it's suspected that the camp subjected some 250,000 men, women and children to forced medical experimentation, including vivisection, exposure to lethal x-rays and bioweapons testing. Despite the sheer scale of the atrocities committed at Unit 731, none of the researchers involved were ever tried for war crimes. Instead, they were granted immunity by the US government in exchange for the





Commissioned by the United States Special Operations Command (USSOCOM) as a next-generation armoured exoskeleton suit for military use, the project represents the collaborative effort of 16 government agencies, 13 universities, 10 national laboratories and 56 private corporations. Slated for prototype testing in 2018, the battery-powered suit will integrate smart, lightweight materials and sensors to monitor the wearer's vital signs, improve strength and perception, and reduce the risk of combat injury. In the words of Barack Obama: "We're building Iron Man." Beyond its borderline sci-fi capabilities and sheer innovation, TALOS represents something more about the US military, and global militarisation in general. The level of excitement, scale of funding and sense of collaboration motivated by high-tech, war faring projects such as TALOS are unrivalled by any other industry. One look at the United States' discretionary spending will tell you everything you need to know. In 2015, combined spend on

healthcare and education was US \$136 billion. This pales in comparison to the US \$598.5 billion spent on the military – representing 54 per cent of the country's annual budget. And this is something that President Trump promises to increase almost two-fold during his term. In short: warfare spells big business. However, not all of the money sunk into the military goes on researching weapons to inflict maximum damage. A portion is earmarked to fund forward-thinking medical advancement, often with applications beyond the military.

The most notable example in the last decade is RevMedx's development of XStat, a first-of-its-kind haemostatic device to treat gunshot and shrapnel wounds, reducing bleeding by injecting a group of "small, rapidly-expanding sponges into a wound cavity using a syringe-like applicator." The device saved its first life on the battlefield in 2016 and wider applications, such as equipping police officers and paramedics, are now being considered. This is not the only example of the military acting as a catalyst for innovation in the medical field. Since the wars in Afghanistan and Iraq, there have been vast improvements in regenerative medicine – including burns repairs, craniofacial reconstruction and scarless wound healing, as well as prosthetics and pain management. In fact, more widely, the military is responsible for a host of fundamental advances in healthcare. It was during the Second World War that penicillin began to be manufactured widely as an antibacterial agent and that blood-banking became commonplace. The future looks equally promising, with research underway to develop a memory pill that reduces the physiological effects of post-traumatic stress disorder, as well as the invention of a synthetic organic material that can be injected – just under the skin – to restore missing or damaged portions of the face.

From the sheer scientific creativity of TALOS to the mind-bending trajectory of biomedical advancement, there's no arguing that these innovations are awe-inspiring. However, the question we have to ask is: would any of it have been necessary, or indeed possible, without warfare? The answer, of course, is a resounding "no" and can be interpreted in two ways. The first is in thinking that we have rightfully benefitted from centuries of conflict, making the most of bad situations through characteristic resilience – after all, it's human nature: we can't fight it. The second, and more challenging, is to look more closely at what we, as a civilised society, have become. Blinded by propaganda, consumed by greed and ruled by money, the perpetual advancement of progressive warfare is a train hurtling out of control. Yes, it has catalysed innovation – but at what cost? Just as thousands died at the hands of Nazi doctors in the pursuit of advancement, so too have died thousands on modern-day battlefields. Does the human cost really justify the benefit? Or should we be looking to make a fundamental psychological change, rather than constantly scrambling for a scientific solution?



extensive data collected through their experiments. This data has since been used to inform the United States Biological Weapons Programme. These are but a handful of examples that demonstrate the blurred line of morality that exists amidst the melee of warfare. In the case of Nazi Germany and Unit 731, the moral obligation to condemn the heinous actions of the perpetrators is counterbalanced by a selfish desire to learn from their findings; all in an attempt to further military and medical agendas. So, how does warfare research differ today, in peacetime? The answer lies in motivation. Where the Nazis were looking to further a propagandised agenda and the Japanese were hoping to prolong the lives of soldiers on the battlefield, the overriding motivation of ethical companies working in military research today is financial. Take the Tactical Assault Light Operator Suit (TALOS) project as an example.