How did the destruction of Hiroshima and Nagasaki start a 'nuclear revolution'?

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The climax of the Second World War ended with two atomic bombs dropped on Hiroshima and Nagasaki in August, 1945. In an instant, approximately 78,000 Japanese people were killed in Hiroshima.[1] Until the employment of atomic weaponry it took scores of heavy bombers to achieve a similar level of destruction – the incineration of Tokyo in March 1945 relied on 279 bombers and 1700 tons of explosives which killed 83,000 people.[2] Contrasting this with the results of the Hiroshima and Nagasaki bombings – two aircraft, two bombs, and well over 100,000 killed – it is clear that a new efficiency in strategic attritional bombing was achieved by the Manhattan project.

However, it must be remembered that there is considerable debate as to why the Japanese surrendered in August 1945 after two nuclear bombings, Soviet entry into the war, and the amendment to the future of the Emperor in Japanese political life. This essay is not a discussion of the logic of Japanese surrender, yet the mere fact that the influence of the atomic bombings on Japan being debated is pertinent here. If the impact of such a seminal moment in human history is debatable, then so is the assertion that the destruction of Hiroshima and Nagasaki began the 'nuclear revolution'.

It is put forward here that Hiroshima and Nagasaki did not mark the beginnings of a 'nuclear revolution' as it is understood below. The strategic environment and technological capabilities for a revolution did not exist in 1945 and not until much later. For illustrative purposes, it was not until the late 1950s or early 1960s a nuclear revolution had begun to exist due to *both* sides being able to hold a sufficient number of the other's cities hostage with thermonuclear missiles. This essay oscillates between American and Soviet perspectives to give a fair appraisal of attitudes to the atomic arrival.

To explain this reasoning, the understanding of the nuclear revolution must first be explained. It mostly revolves around one core aspect of Robert Jervis' work and Thomas Schelling's 'power to hurt' and the hostage logic. Secondly, placing the understanding of the nuclear revolution within the historical-technological and strategic context of the immediate post-war world shows how the prerequisites of a nuclear revolution did not begin to exist before the Soviets had an initial thermonuclear intercontinental ballistic missile (ICBM) capability. Most illuminating of all, is Josef Stalin's refusal to be bullied by an American nuclear monopoly. Last of all there is a brief sketch of why the nuclear revolution came about in the later years of the Cold War due to technological and strategic developments – primarily the mass production of survivable thermonuclear weapons and ICBMs on *both* sides.

The Nuclear Revolution

What is the nuclear revolution? Here it is understood to be the strategic environment when a thermonuclear second strike capability is attained by both sides in a relationship.[3] As a consequence, military victory becomes impossible, and a major war is no longer an option – it would only guarantee national suicide.[4] This logic is brought about by the development of thermonuclear – or fusion – weapons, their weaponisation into ICBMs and the survivability of a sufficient number of ICBMs to undertake a retaliatory strike if one were to suffer a first- or pre-emptive strike. This acute hostage logic changes the calculus of going to war against a similarly-armed opponent. Military victory would not be required to be able to hurt the enemy. The power to militarily oppose is dwarfed by the power to hurt.[5] This mutual second strike capability ensures that both sides' territories are devalued[6] – the shrinking of time and space makes traditional notions of defence irrelevant. The inability of a society to survive a nuclear war is a key component of the construction of the nuclear revolution. Below, we will see how Hiroshima and Nagasaki did not contain the hallmarks of such a revolution.

Western Perspectives

Bernard Brodie, as one of the earliest nuclear strategists, was very prophetic in his hypotheses about the influence of nuclear weaponry on force and statecraft. Writing in 1946, the atomic bomb – the 'absolute weapon' – changed the role of armed forces and governments from winning wars to avoiding them.[7] Brodie also claimed that there was little defence to be found against an atomic attack, and perhaps society would have to be cellular to survive.[8] Two propositions about atomic war by Brodie stand out: no defence against *missiles* exist and superior air forces do not guarantee security.[9] Brodie was ahead of his time – the conditions of the 'absolute weapon' did not come about until later in the Cold War with megaton-range hydrogen bombs and survivable missile forces.

Albert Wohlstetter correctly stated that "deterrence is not automatic", and "to deter an attack means being able to strike back in spite of it."[10] Successful nuclear deterrence had to be carefully constructed by both sides. The notion that security lies in retaliatory capabilities is also echoed by Brodie.[11] For a nuclear revolution (as it is understood above) to exist, both sides must have a retaliatory nuclear capability. However, the leap between fission and fusion bombs must not be underestimated. In the immediate post-war environment, there was no 'automatic' deterrence between the US and the USSR. The USA had an atomic monopoly for approximately four years, and the Soviets were playing 'catch-up' in the nuclear and strategic bombing technologies. Following from the delivery methods in the Second World War, the USA's atomic weaponry was air-delivered. As late as 1950-51, the concepts of strategic bombing that had emerged before and during the war had continued to provide an adequate framework to think about how an atomic war would be fought.[12]

Trachtenberg is sceptical of the significance of the events of August 1945 in reference to strategic thought and the capacity for warfare with new atomic technology. He believes that atomic bombs were not powerful enough to limit the importance of numbers and accuracy (as opposed to hydrogen bombs).[13] Brodie and Trachtenberg point out that the development of hydrogen bombs made war against a similarly armed state suicidal.[14] Trachtenberg also claims that a 'new war' would be one of attrition and endurane[15] – a point indirectly shared by Michael Mandelbaum. Mandelbaum portrayed pre-atomic wars as wars of wills between soldiers, and in contrast a nuclear exchange would be one of endurance and annihilation.[16] Whilst Mandelbaum's first point is partly true in a Clausewitzian sense[17] – that war is an act to compel the enemy to do our will – the suggestion that a Third World War would be just a war of annihilation and endurance is ill-conceived. Consequently, Trachtenberg is also incorrect in neglecting the political nature of nuclear war. Such a war would also be a war of wills; of politics. Brodie preserves the relevance of Clausewitz by claiming that nuclear weaponry would have to be carefully used to serve political goals.[18]

However, there were elements on the American side that hinted at the new possibilities of the atomic bomb. There were high-level discussions as to where the first a-bomb should be deployed in 1945: a Japanese city, a neutral test site with international observers or a largely unpopulated Japanese area. This hinted at the possibility that some

individuals with considerable influence in American policy did not treat the atomic bomb as just another weapon.[19] Such fears of a future atomic war, following an atomic arms race, can be seen to have led to the calls for international atomic control by the Americans.[20] Indeed, there was widespread hysteria among the American populace about a future atomic war, and calls for changing politics and human nature according to new physics abounded.[21]

Soviet Perspectives

Some Soviet scientists, such as Georgy Flerov, understood the military significance of the atomic bomb, and its leap in destructive capabilities, before the events of August 1945.[22] Indeed, Stalin knew about the Manhattan Project before Harry Truman did, and Stalin's now infamous reaction was cool and calculated, which deprived Truman of his hopes of catching Stalin off-guard.[23] Stalin interpreted the atomic bombings of Japan as a direct American attempt at blackmailing the Soviet Union.[24] It appears that Stalin went through a transition on his views of the significance of the a-bombs at the end of World War II. Initially he believed that the power balance had been destroyed.[25] Stalin's plans of reaping the benefits of steamrolling over the Japanese in Manchuria were 'shattered' due to the hastened Japanese surrender, *perhaps* as a result of the atomic bomb (though this is not certain, by any means).[26]

However, shortly after the dust had settled, Soviet embassy agents had reconnoitred the remains of Hiroshima and Nagasaki, and accused the Japanese authorities of exaggerating the devastation of the bombs.[27] According to Craig and Radchenko, as far as Stalin was concerned, armies still decided wars, and the atomic bombs were designed to intimidate those with weak nerves. Stalin made efforts to become more stubborn against the demands of the Americans to show that he was not intimidated by the bomb – and a three point policy towards the a-bomb developed: the first was to downplay the significance of the a-bomb; the second was to be stubborn against atomic blackmail; and thirdly Stalin's policy to the West remained largely the same since he came to power in the mid-1920s – to cooperate with other states only when it was expedient to do so. Conflict with the capitalists was, in dialectical terms, inevitable. For Stalin, Hiroshima was not a 'fork in the road'.[28] Craig and Radchenko's point is shared by S.J. Ball – he concluded that Stalin's general policies between 1945 and 1953 had little change. It involved economic recuperation, military modernisation, the pursuit of the atomic bomb and the establishing of security zones to the west and the east of the Union.[29] H.S. Dinerstein also claims that in the early Cold War, Soviet leaders did not believe that the deployment of atomic weaponry would decide the outcome of war.[30] MccGwire also makes the claim that the territorial buffer was still seen as the best defence against western aggression until the end of the 1950s.[31]

Nonetheless, it could be argued that the Soviet Union had chosen at outmoded concept of security.[32] Its hard-fought territorial buffer to the west could now be rendered obsolete with atomic weaponry. The relatively small compression of time and space as a result of air-delivered atomic bombs (when compared to thermonuclear weapons and ICBMs) did devalue territory somewhat. As Jervis notes, the devaluing of territory for defence is a condition needed for the nuclear revolution.[33] Kintner and Scott accuse Stalin of stagnating strategic thought in the post-war years, by maintaining the relevance of the five 'Permanently Operating Factors' for success in war.[34] There is no question that Stalin prevented constructive criticism and discussion of his policies and ideas. Nevertheless, during Stalin's reign the nuclear revolution was not set in stone any more than it was a decade after his death. It was not until 1947 that a stockpile of atomic warheads accumulated in the USA.[35] Also, as the atomic bombs would have been delivered by air – air defences could still provide some chance of resistance against unchallenged American nuclear superiority. 1948 saw the establishment of the Soviet air defence system.[36] Conversely, Western air defences did not guarantee Soviet atomic delivery capability before they had a sizeable ICBM force. Kintner and Scott claim that the quality and quantity of Soviet divisions were no longer as important in the atomic age.[37] Dinerstein echoes this, yet claims that the operating factors are still relevant.[38]

The Mitigated Influence of Hiroshima and Nagasaki

Where do the perspectives above leave the influence of the bombings of Hiroshima and Nagasaki, and the birth of the nuclear revolution? It is clear from the American perspective that atomic bombing was not a large step beyond conventional strategic bombing during World War II.[39] Hiroshima and Nagasaki, if they were the harbingers of the nuclear revolution, would have ushered in bilateral caution, as opposed to provocation. Events did not unfold as such. NSC-68 and the Truman doctrine were aggressive diplomatic manoeuvres, and the Marshall plan and the Berlin Airlift forced Stalin to formally divide Europe along economic, and later political, lines.[40] Stalin's stubbornness and refusal to compromise over eastern Europe speaks for itself. Neither side could convincingly hold the other's cities hostage.

The atomic bombings of Japan did not alter two very important facets that are required in a nuclear revolution – a sufficient compression of time and space. Whilst atomic delivery by air was faster than moving entire divisions and levelling a city with an entire air wing, nuclear weapons could only be delivered *after* air superiority was won. Would a state attach a precious and rare (as of before the late 1940s) nuclear warhead on an aircraft that may not reach its destination due to competent enemy air defences? Winning an air superiority campaign can take time – days, weeks, or even longer. Contrasting this with the 8-10 hours needed for strategic bombers to hit their targets in the early 1960s (and even longer in the late 1940s) with a 30-35 minute arrival time of a nuclear-tipped ICBM[41]shows how much ICBM technology compressed time. The first ICBM was successfully launched in 1957 by the Soviets – the R-7. In the USA, Wernher von Braun and his team successfully launched the first American ICBM – Atlas-D in 1959. These ICBMs significantly compressed time by drastically shortening the length of time needed to deliver the warhead.

Space was compressed by the thermonuclear revolution. In 1950 Truman ordered the hydrogen bomb project and successfully tested it in 1952. The Soviets were not far behind and tested hydrogen bombs from 1953 onwards. The nuclear revolution came about as a result of the thermonuclear and ICBM technologies. It is by the late 1959 and into the 1960s that mutually assured destruction becomes a reality, and the nuclear revolution begins to form. The leap from kilotons to megatons of destruction within hours made total war between the USA and USSR truly unwinnable and suicidal. As time progressed, so did vertical proliferation. Hanson Baldwin's "push-button warfare" had come about.[42]

Conclusion

In sum, the bombings of Hiroshima and Nagasaki – and the technology available in the decade following the end of World War II – did not compress time and space sufficiently to bring the nuclear revolution into effect. In other words, atomic war via air-delivery was considered to be survivable. Furthermore, the prerequisite of mutually assured destruction did not exist until the Soviet Union had weaponised its rocket forces with thermonuclear warheads – from the late 1950s onwards. It was only when both sides could hold the other's cities (or even a handful of them) hostage that the nuclear revolution could come into being.

It is clear that once the thermonuclear threshold had been crossed, the Soviet superiority in the quantities of its divisions in Europe became less relevant to the defence of the *rodina*. The Soviets recognised its unique characteristics, particularly when a handful of megaton warheads could obliterate most of the industrial centres of the United Kingdom and West Germany.[43] For the Americans, Soviet thermonuclear *and* ICBM capability put quite a spectacular end to their notion of 'free security'. The USA's natural oceanic defensive barrier became less relevant, and the continental United States was at risk of destruction. Atomic bombs did not change Soviet leaders' perceptions of the decisive factors in conflict.[44] ICBMs with thermonuclear warheads gave the Soviet Union the ability to strike at the American heartland. The introduction of submarine-launched ballistic missiles (SLBN) in the early 1960s made a second strike capability more credible, and the chances of undertaking a disarming first strike increasingly remote. It is clear here that the nuclear revolution was not instigated at Hiroshima and Nagasaki in August 1945.

However, it must be noted that the nuclear revolution ebbed and flowed in strength. Both the USA and the Soviet

Union toyed with 'flexible response' and limited nuclear wars or conventional operations against each other in the 1970s.[45] This tacitly shows that the influence of the nuclear revolution itself is not absolute, despite the thousands of nuclear weapons aimed at both camps in the later Cold War. The Warsaw Pact drafted war plans that incorporated nuclear weapons into the entire conventional strategy of attacking Western Europe and taking its territory.[46] Not even the advent of thermonuclear ICBMs eradicated conventional thinking. From a wider perspective, Mandelbaum believes international relations did not change at all in its anarchic system, by convincingly portraying the US and USSR as Athens and Sparta, with few caveats.[47]

Nevertheless, the arguments over the existence of the nuclear revolution during the duration of the Cold War and beyond are another matter. The conditions required for any *possibility* of the existence of the nuclear revolution did not exist embryonically until the latter years of the 1950s. The bombings of Hiroshima and Nagasaki were the culmination of the strategic bombing of Japan and Germany by the United States – although it ushered in the nuclear era, no revolution took place. The technical revolution required for the nuclear revolution in its entirety to form had not taken place by 1945.[48] Mutually assured destruction, the second strike capability and the hostage logic took time to develop. As Wohlstetter claimed, deterrence was not automatic. The nuclear revolution was by no means automatic after August 1945, and the United States could have survived a conflict with the USSR before the advent of thermonuclear ICBMs.

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