

Art and Science in Air Power Strategy^I

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Resumé

Denna artikel diskuterar frågan om Strategi är en konst eller en vetenskap genom att analysera två motstående teorier om luftmakt utifrån den epistemologiska grund som de är uppbyggda på. Wardens förståelse av motståndaren representerar utövarens konst som genom strategisk bombning försöker uppnå paralis i fiendens system. Horowitz och Reiter representerar vetenskaplig positivism och ser historiska samband mellan taktisk användning av luftmakt och framgång. Denna artikel argumenterar för att båda har rätt och synsätten kan komplettera varandra som de gjorde under Gulfkriget 1991, eftersom Strategi är både en konst och en vetenskap.

THE QUESTION OF whether strategy is an art or a science presupposes that there is a choice of only two alternatives. The headline, written as a statement, indicates the answer to this question according to the current paradigm of strategic thought. This article will argue that it is, in fact, both and that more science can facilitate our strategy-making, just as math and algorithms can be used to create music. To demonstrate this, two opposing theories of air power coercion will be examined, Colonel Warden's strategic paralysis bombing from "The Enemy as a System" and American political scientists Horowitz and Reiter's coercion by denial from their article "When Does Aerial Bombing Work?". The examination shows that their differing strategies are a consequence of epistemological differences and, essentially, whether strategy is considered to be an art or a science. Both theories are logical, and in practice, they complement each other, furthering the argument that strategy is both art and science. In the Gulf War, both theories were

used simultaneously and brought success on the battlefield for the coalition.

This article initially differentiates art from science, with the former focused on creative ability and the latter seeking knowledge and governing rules. Strategy is about applying force to achieve the ends set by policy in a dialectic with the adversary. The side in a war that gains air superiority must devise a strategy on which targets to strike in order to achieve the policy objectives. The practitioner Warden advocates strategic bombing in his article from 1995 called "The Enemy as a System"². Strategic bombing aims to defeat the enemy by destroying its leadership, morale, or ability to produce and transport goods to the area of military operations. It is distinct from tactical air warfare, which is directed at the enemy's military forces, often closer to the front.³ Horowitz and Reiter examine all cases of air power coercion from 1917–1999 in their article "When Does Aerial Bombing Work?" and conclude that targeting the enemy's fielded forces is most likely to bring successful coercion.⁴

The two opposing theories are a consequence of differing research philosophies. Horowitz and Reiter believe that the social world is predictable enough to find a governing principle of warfare. At the same time, Warden seeks a deeper understanding of the enemy and expands on strategic thinking. According to a general reading of multiple sources, the current paradigm of strategic thought considers strategy an art, but it must be both.⁵ Science in strategy is needed to take full advantage of historical experiences and modern technology. Still, art and intuition are also required in situations driven by chaos, emotion, and creativity and to deal with the lack of information that characterises war. Therefore, we should embrace more science in strategy without losing the creative skills in the art.

Art and science

It is essential to explain the terms art and science before a balanced discussion can occur. Initially, the term art implied practical skills and the ability to perform things of practical nature, as reflected in the word artisan meaning skilled craftsman.⁶ Since then, art has evolved to mean applying creative skills and imagination to produce something that is appreciated mainly because of its beauty or emotional power.⁷ Science originally referred to theory rather than practice, abstract knowledge and reflection upon a subject.⁸ Science systematically studies the natural and social world through observation and experiment following an evidence-based and systematic methodology.⁹ Clausewitz expands on this distinction when he explains that the object of art is the creative ability and includes, for instance, architecture and war. At the same time, the term science should be kept for disciplines such as mathematics and astronomy where knowledge is sought.¹⁰

Strategy as an art implies that rules do not bind it, it is a skill that has to be mastered through a combination of innate talent and training, and if created with skills and imagination, strategy can be beautiful. Strategy as a science should involve facts, data, evidence, experimentation, and risk management to reduce the many factors involved to a set of principles or governing rules. Science needs the benefit of artistic and creative elements to progress, and scientific theories can help practical art. Therefore, all disciplines combine the interdependent aspects of art and science to varying degrees.¹¹ The examples of air power strategy discussed will arguably not be at either endpoint of the spectrum, but hopefully, the distinction between them will be clear enough.

Strategy

Clausewitz defines war as “an act of violence to impose our will upon the enemy,” indicating that war is both instrumental and adversarial. Instrumental because there is a political objective, our will, that we want to achieve and adversarial because the enemy opposes that will.¹² His definition of strategy, “the use of the engagement to attain the object of war”, puts military action in focus.¹³ According to the UK Defence Doctrine, strategy is creating and orchestrating the instruments of power in support of long-term policy objectives.¹⁴ Military strategy is a subset of defence strategy and the use of the military instrument as part of a response to a specific challenge.¹⁵ The UK Defence Doctrine’s view on strategy seems to be influenced by Colin Gray’s metaphorical bridge that links political aims (ends) with how they will be achieved (ways) and military resources (means) and by Hew Strachan, who emphasises the interdependence of policy and strategy because there must be a

balance between what is desired and what can be achieved.¹⁶ To accommodate both the classical and modern definitions of strategy, this article will turn to the French General André Beaufre, who describes strategy as “the art of applying forces so that it makes the most effective contribution towards achieving the ends set by policy” and “the dialectic of two opposing wills using force to solve their dispute.”¹⁷

There are many types of military strategies regarding the actual application of force. Annihilation and dislocation seek swift victory by attacking the opponent’s capacity and will to fight, respectively. Attrition and exhaustion do the same thing, only acknowledging that defeating an enemy may take considerable time.¹⁸ Crushing the adversary might not be necessary to achieve the political objective, especially if the aim is limited. Coercion means compelling the opponent to do our will and can be seen as a form of violent bargaining.¹⁹ Following the definitions above, how to impose our will upon the enemy and what targets to engage to achieve the objective of war is a matter of strategy. Air power coercion will exemplify strategy when discussing whether it should be seen as an art or a science. Air power has made possible new means of strategic warfare thanks to its inherent ability to overfly the enemy’s fielded forces and attack targets in the whole area of operations.²⁰ In war, the side that gains air superiority and the ability to attack targets from the air must devise a strategy about what targets to hit to get the desired effect and thereby increase the chances of attaining policy objectives.

The benefit of studying air power theory as an example is that the strategic choices are immediately visible. As Bernard Brodie stated in 1973, “strategic theory is a theory of action.”²¹ Hence, by focusing on air power coercion, the discussion will get linked to the

practical application of strategy. Therefore, air power provides a good illustration of the debate between science and art in strategy. Additionally, as a vehicle for debate, it is representative of science and art in strategy in other military spheres as well. This article will analyse two different strategies for the use of air power.

The first strategy was presented by Colonel John Warden III, a practitioner from the United States Air Force (USAF) with experience from the Vietnam War. In his article from 1995, ‘The Enemy as a System,’ he compares his deductive strategic thinking with an architect’s, and his goal is to influence the enemy’s leadership directly. A contrasting theory has been brought forward by the American scholar Robert Pape and further developed by Michael Horowitz and Dan Reiter.²² They conclude by historical case studies and scientific data analysis that coercion by denial, which means reducing the capacity of the enemy’s fielded forces, is most likely to bring about successful coercion.²³ It is important to note that the focus is not on the air power theories per se but on the underpinning belief systems and how they relate to art and science. Analysing the research philosophy of two articles with opposing views on strategy will help examine both sides of the argument in further depth.

The Enemy as a System

According to Warden, strategic thinking must start with objectives and the nature of the enemy, working top-down and thinking deductively to devise a campaign plan comprised of operational art.²⁴ He describes the enemy as a system of five concentric rings, with the centre and most important ring being the state leadership. The second innermost ring is organic essentials, which can be the production of energy, electricity, oil, and

food. The third ring is infrastructure, such as railways, airfields, roads, and factories. The fourth ring is the population, and the outermost ring consists of the military.²⁵ If possible, the clash with the enemy's fielded forces should be avoided entirely because the aim is to achieve the political objective, to impose our will on the enemy.²⁶ To achieve the desired outcome, both the morale and the physical side of the enemy system can be affected. The physical side is predictable, but the morale, or the human side, is beyond the realm of predictability, according to Warden.²⁷ A decapitation strategy of directly targeting the enemy leadership is often decisive but can be difficult to accomplish.²⁸ With parallel attacks, several of the rings in Warden's model can be attacked simultaneously to achieve a strategic paralysis of the system, making the enemy unable to respond. All actions are aimed against the mind of the enemy command or at the system as a whole.²⁹

Warden's article is non-scientific in the way that it lacks empirical material and references to other sources. However, it borrows its logic from systems theory by looking at the larger system as a whole rather than dissecting the parts. Michael Weeks has argued that warfare can be seen as a non-linear system and that chaos theory can give valuable insights into the behaviour of such systems.³⁰ Weeks suggests that Warden's five-ring model should not be considered static since it adapts to our actions and our own system will also be affected.³¹ The latter is valid if you consider the bombing campaigns in Vietnam that also spurred protests and civil unrest in the United States, eventually decreasing the political will to fight.³²

This article will not position Warden as non-scientific, but definitely as a practitioner. Experiences from the Vietnam War taught Warden the need for clear objectives, over-

whelming force, an exit strategy, and integration of the political and military dimensions.³³ The focus in Warden's article is not on statistical correlations but on understanding. Warden's epistemological base is his ability as a social actor to share and understand the meaning of strategy. Metaphorically speaking, Warden paints a picture of the enemy as a system with his five-ring model, a beautiful and elegant model with implications on how to manipulate the system to your advantage. The methodological goal is to understand the complex world of lived experience and to grasp the situation.³⁴ The text is not prescriptive; it is suggesting how to understand the enemy as a system and how to think strategically. The epistemology used by Warden can also be found in the work of Clausewitz, who argues that the endless complexities of war and the fact that military action is intertwined with psychological forces make it necessary to use talent and genius to operate outside of rules and principles.³⁵ Theory should educate the commander and not follow him to the battlefield.³⁶ Even though Warden, when comparing strategic bombing with face-to-face combat, thinks that psychological factors have a lesser effect on war today than when Clausewitz wrote, they both emphasise that the physical destruction of the enemy's centre of gravity is the shortest way to achieve one's political objectives.³⁷

The difference is that, according to Warden, the centre of gravity is the enemy leadership or the more central rings in his model, and the clash with the fielded forces should be avoided. Still, for Clausewitz, the centre of gravity is the enemy's army.³⁸ The critical point is that they both consider strategy to be an art. That view is reflected in the method of trying to explain strategy to enhance the creative ability of the commander. They are not looking for statistical correlations

which can be used to create explanatory principles because they believe that no specific rules can govern the complexities involved in war and strategy.³⁹ A contrary view exists in Horowitz and Reiter's article "When Does Aerial Bombing Work?", which will be examined next.

When Does Aerial Bombing Work?

Horowitz and Reiter build on Pape's work in "Bombing to Win" when they examine factors leading to successful air power coercion in all cases from 1917 to 1999.⁴⁰ Their empirical results confirm Pape's findings that the use of air power to exploit the military vulnerabilities of the enemy, referred to as 'coercion by denial', is most likely to accomplish the policy objectives of the attacker.⁴¹ The vulnerability of the target's civilian population does not affect the likelihood of success, contrary to the thoughts of early air power theorist Giulio Douhet and incompatible with Warden's model.⁴² Furthermore, air power is less likely to work if the attacker demands that the target government step down from power and neither more nor less likely to work if the target is democratic.⁴³

This article represents an attempt to bring science into air power theory. Empirical work is done on factors explaining the likelihood of success in air power coercion.⁴⁴ The theoretical tradition can be classified as naturalism since cause-and-effect relations based on evidence are sought.⁴⁵ The reduction of complex events in war to numbers that can be entered into a matrix suggests a view that the world to be examined is measurable and separated from the person studying it.⁴⁶ Neopositivists, as Horowitz and Reiter can be called, believe that it is possible to come close to objective truths based

on empirical research and that covariations between variables will continue to exist with a certain lawfulness.⁴⁷ The article measures several variables from 53 historical cases where air power has been used. Advanced statistical analysis is used to systematically test the relationships between the variables and ensure the significance of the results.⁴⁸ An essential step in quantitative research is how well the variables capture the concepts relevant to the theory, leading to research validity.⁴⁹ In the article, among other things, democracy, military vulnerability, and civilian vulnerability are assessed, coded to values and inserted into a matrix.⁵⁰ How certain conflicts are interpreted can be a source of criticism, and the assessments will impact the results of the study. Wars are complex and rarely have the same characteristics as the previous ones, which makes it difficult to control all the possible variations and deviations. Reducing war to numbers that can be plugged into a matrix enables broad generalisations but can also oversimplify reality.

Unlike in physics, the subjects of study can learn and adapt. Even if they existed, regularities would therefore be embedded in history and quickly disintegrate as actors creatively seek new solutions and adapt to historical lessons. Ironically, research can contribute to the disintegration of these regularities and theories.⁵¹ Still, almost a century of conflicts shows some insight that can be classified as temporary knowledge, until proven wrong. Among the classical strategic thinkers, Jomini is often considered a positivist who desires to construct a scientific theory of war. Although Jomini believes that a few scientific principles can guide war on the operational level, he still thinks it takes a military genius with intuition to apply these basic principles successfully.⁵² Furthermore, on the highest levels, Jomini states, war is far from an exact science; it is a terrible and

impassioned drama.⁵³ Nevertheless, in a positivistic view of the social sciences, strategy will look more like science than art, even though elements of both science and art always will be present.

Differences in research philosophy seem deeply connected to whether strategy is considered an art or a science. The two theories have opposite views on how to best use air power to coerce the enemy. Warden promotes decapitation and strategic bombing of the enemy system, while Horowitz and Reiter claim that neither decapitation nor punishment strategies work; only coercion by denial is likely to be successful. Horowitz and Reiter are scholars and not practitioners. Their statistical results show what historically has worked best on average in air power coercion. Still, the question is whether it gives the commander better guidance than the strategic understanding offered by Warden's five-ring model.

When Iraq invaded Kuwait in 1990, a campaign with previously unmatched air capabilities and precision in weapons was planned, utilising Warden's five-ring model. Warden, now director of the Checkmate Division responsible for planning the campaign, wanted to apply shock and paralysis with a strategic air campaign that could secure the campaign objectives without attacking the Iraqi army in Kuwait.⁵⁴ Still, General Powell and General Schwarzkopf wanted to attack the Iraqi military to send a political message to Saddam and others.⁵⁵ Strategic targets in Iraq, the air defence network, and Iraqi forces in Kuwait were attacked simultaneously, followed by air support to the ground campaign in the final phase.⁵⁶ In effect, both theories were executed simultaneously, forcing Iraq to comply with coalition objectives. Without the strategic bombing, Iraq's military might would still have represented a formidable threat in the region,

and the coalition losses in the war would have been higher.⁵⁷ On the other hand, Iraqi troops in Kuwait showed no signs of retreat despite the paralysis of their leadership, and the Iraqi people suffered because of the destroyed industry and infrastructure.⁵⁸ In conclusion, art and science complemented each other and were both needed to make the campaign successful. When power and resources are abundant, it is possible to pursue both strategies simultaneously. For lesser powers with finite resources, prioritisation has to be made.

Whether one considers strategy an art or a science will have consequences when doing air power coercion and similarly in other military activities as well. Despite the narrow focus on air power coercion, some general conclusions can still be inferred. Current UK doctrine is influenced more by Clausewitz than Jomini, even though the latter was far more influential during the 19th century.⁵⁹ With evolving methodology, the scientific study of war can give invaluable insights to guide strategy makers and slowly start to change the paradigm. Because of problems in achieving Western goals in Iraq and Afghanistan in recent years, confusion about policy and strategy is reflected in the debate. There is a crisis of confidence regarding strategy; some even say it is a lost art.⁶⁰ If the future is expected to hold more state-on-state warfare, a rejuvenation in research, doctrine, and scientific writing on strategy can be expected. With increasingly sophisticated scientific methods and systematic study of war, the balance is likely to shift, if ever so slightly, towards more science in strategy. But no matter how advanced science is, it is sometimes necessary to pause logical thinking to better respond to situations driven by chaos, emotion, and creativity and to deal with the lack of information that characterises war.⁶¹

Conclusion

This article has discussed the statement, “Strategy is an art, not a science”, and argued that it has to be both. Analysing two articles, including their respective research philosophy, with opposite views on air power coercion, has highlighted the practical outcomes of considering strategy as an art or a science. The practitioner, Warden, offers his understanding of the enemy as a system so we can grasp the situation and think strategically. Without being non-scientific, Warden aligns with Clausewitz and the current paradigm of strategic thought that considers strategy an art. Horowitz and Reiter empirically prove

that coercion by denial has worked best in the history of air power. Their neo-positivist research philosophy is connected to the science of strategy, and just like Jomini did, they offer decision-makers guiding principles. Science in strategy is needed to take full advantage of historical experiences and modern technology. Still, art and intuition are also required in the fog and friction of war. Therefore, we should embrace more science in strategy without losing the creative skills in the art because strategy is both an art and a science.

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Notes

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