Snowmobiles [and] Grand Ideals



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John Boyd's Vision for Thriving in Chaos

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and Frans P. B. Osinga

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EDITORIAL NOTE

All transcripts were edited by Ian T. Brown at various points during 2015–24. First passes on all transcripts were done by Same Day Transcriptions Inc. Thereafter, Mr. Brown edited the transcript for "Patterns of Conflict" with Express Scribe Transcription Software, distributed by NCH Software, and applied its background noise reduction and extra volume boost enhancements. He edited "The Strategic Game of ? and ?," "Organic Design for Command and Control," and "Conceptual Spiral" with the Offline Music app from Md Zakir Hossain. Dr. Shawn Callahan, director of Marine Corps History Division, provided invaluable feedback and editorial recommendations for "The Strategic Game of ? and ?." Time stamps, indicated by bracketed numbers (e.g., [15:00]), are inserted every five minutes.

The transcriber has included brief explanatory footnotes of various people, books, and other subjects John Boyd mentions throughout his presentations. The most recent versions of the books cited are included to aid those interested in further reading. Not annotated are familiar topics or thinkers (e.g., Sun Tzu or Carl von Clausewitz) to whom Boyd devotes significant detail in the presentations.

The transcripts are edited with the intent that the content may be read as closely as possible to the fashion in which Boyd verbally presented the material, so clipped or incomplete sentences, sudden topic transitions within a sentence, audience cross talking, and annotations on verbal sound effects that Boyd periodically used to emphasize a point are retained in the transcripts. The reader should keep in mind that these presentations were not intended by Boyd to be formal lectures but guided discussions, and so an informality of

discourse is present in all of them. These transcripts have attempted to capture that informality, along with the spoken character of the content, as closely as possible to provide the reader with the experience of being an audience member for the presentation.

FOREWORD

Twenty-eight years after his death, military strategist and U.S. Air Force colonel John R. Boyd is hailed by the likes of Sir Lawrence Freedman and the late Colin S. Gray writing on military strategy, former U.S. secretary of defense Dick Cheney writing on war in Iraq, and the militaries of countries from Denmark to Singapore and the United States, and the North Atlantic Treaty Organization (NATO). Boyd's ideas and concepts are taught in war colleges and business schools. Stranger still is the fact that Boyd wrote only one rather short piece and published nothing formally while he lived. His fame spread by word of mouth and by a few books about him and his career. Air University Press published an edition of Boyd's major briefing, "The Discourse on Winning and Losing," in 2018 and the Chinese translated into Mandarin my 2004 book *The Mind of War: John Boyd and American Security*—the latter action an adversary's indication of praise for Boyd and alarm over his brilliance.

The newest contribution to the literature on Boyd is this volume, *Snowmobiles and Grand Ideals: John Boyd's Vision for Thriving in Chaos*, and it contributes much to the discussion and understanding of Boyd and his teachings. It would be difficult to find a better pair of authors writing a book on Boyd than these two who bring not only interest and intellect to the project but personal experiences that are directly relevant to Boyd's theories and strategy. Ian T. Brown is a major in the U.S. Marine Corps, a Sikorsky CH-53E Super Stallion helicopter pilot, and former operations officer for Marine Corps University's Brute Krulak Center for Innovation and Future Warfare. He has authored *The John Boyd Primer*, an annotated collection of

recommended readings on Boyd, and *A New Conception of War: John Boyd, the U.S. Marines, and Maneuver Warfare*. Frans P. B. Osinga is a retired air commodore in the Dutch Air Force. He wrote his doctoral dissertation on Boyd at the University of Leiden in the Netherlands and is a former General Dynamics F-16 Fighting Falcon pilot. Osinga's previous book on Boyd is *Science, Strategy, and War: The Strategic Theory of John Boyd*. Brown and Osinga bring vital experience in using Boyd in different contexts to the understanding of his ideas. One approaches Boyd through experience in maneuver warfare and the other through experience in air-to-air combat. Still, it is a difficult, slow, and demanding process to write an intellectual biography, tracing the sources of ideas and insights through tapes, books, notes, and conversations. These authors have done this well and thoroughly. Brown has read every primary and secondary source on Boyd. Osinga has painstakingly gone through Boyd's personal collection of books, papers, notes, and annotations on the works of others. Together, they present a complete view and assessment of Boyd and his ideas. This book should be read and reread to fully appreciate its content.

Snowmobiles and Grand Ideals is not a quick or easy read, as it explores in depth the underlying philosophical, mathematical, and physics related concepts that underlie Boyd's thought processes and the rigor within them that reinforces his views. These detailed assessments of both analysis and synthesis, which are how Boyd thought, are well-researched and linked to the scientific discussions underway in the 1960s through the 1990s, when Boyd developed his ideas. This work traces the sources of Boyd's thinking back to their fundamental roots and explains how his ideas and concepts were grounded in science despite his self-description to others as being "just a retired fighter pilot who reads a lot."

Despite his often-profane comments and unacademic style, Boyd was steeped in the leading edge of the science of his day and studied it intensely. Boyd used his 1,500-plus briefings to hold conversations with his audiences in hopes that he would learn something more or figure out, from the questions they asked or the answers they gave to his questions, how to polish his presentations. The richness of his syntheses and the power of his logic were new to many in his audiences, primarily military officers from middle to upper ranks,

but still he frequently changed a word or moved things around after a presentation. Brown and Osinga have used the extant audio and audiovisual recordings of his presentations to help them assess the working of Boyd's mind in discussions with others.

It is a rare accomplishment to show how a complex and capable mind works. The imperative for maneuver warfare is to maneuver in one's brain, to begin the many-sided cross-reference points of analysis and synthesis to gain control for oneself while causing disorientation and confusion in your opponent. One must develop a habit of mental agility in everyday life so that one can move unhindered with a maximum degree of freedom of action. In warfare, the enemy is surprised and enveloped, minimizing the need for one-on-one combat. This is not merely one individual's opinion. There is valid, science-based evidence of its effectiveness, particularly for Boyd, in Operation Desert Storm.

What Boyd sought to instill was a habit of thought that combined analysis and synthesis, the obvious and the hidden, the *cheng* and *ch'i* of Sun Tzu, military strategist of the sixth century BCE who believed the best war was to subdue the enemy mentally, not physically. Boyd believed Sun Tzu's strategies could serve anyone but particularly military commanders, their troops, and business leaders. Boyd reduced Sun Tzu's principles to his own simple formula, the OODA loop. Boyd was a contrarian, always searching for a better way to accomplish the mission. Innovation was natural to him, so he would question "Why do we do this, this way?" (Observe); "Why not do something else or do it some other way?" (Orient); "Why not do this in this way?" (Decide); and "Try it!" (Act!). While Boyd's OODA loop process has been widely misrepresented and interpreted as a way to win by speeding up tempo and timing, Boyd did not counsel such as the only way to succeed. He believed in variety, rapidity, harmony, and initiative to confront an opponent physically, mentally, and morally. Troops should be well-trained and rehearsed units who were so thoroughly versed in what should be done that there was no lack of trust in their decision and ability to do the right thing. Boyd was careful to explain how his concepts were strategy for the commanders and tactics for those who carried the fight to the enemy and the linkage between the two. Along the way, his emphasis on moral character and integrity was revealed. For Boyd, command

and control translated not only as leadership but appreciation for your troops. This, and how these methods can be used to confront the enemy in either a blitzkrieg-style attack or in guerrilla warfare, is all carefully detailed and explained by the authors. During a career lasting from the occupation of Japan to the fall of Saigon, Boyd served from the end of World War II through the withdrawal from Vietnam as he tried to grapple with the wide array of shifting challenges America faced. Ultimately, he took on Pentagon spending for expensive high-technology weapons that were not what was needed to provide for American national security. "People first, ideas second, and things third," was his mantra. Congress and the military worried about things in reverse order. Boyd despised the "Hey diddle-diddle, right up the middle" style of attrition warfare that was the hallmark of the American military. He spent half his time in congressional testimony. During his last invited appearance before Congress, Boyd tried to get the early forced retirement of his friend and fellow maneuver warfare promoter, Colonel Michael D. Wyly, rescinded and to establish a system in which mavericks (strategic thinkers) in the military could survive and perhaps even be appreciated.

The title of Brown and Osinga's book is significant; it refers to one of Boyd's favorite examples of people who were creative and thought differently. They could make snowmobiles! The lasting legacy of Boyd at the Air War College is the Blue Horizons program at the Center for Strategy and Technology (CSAT). Its logo is a snowmobile with the U.S. Air Force insignia and draws on the idea that at some point, someone thought outside the box and combined parts from earlier inventions to create a new machine—a snowmobile. Boyd believed you should teach people not what to think but how to think in order to change strategy and technology in innovative ways: "You always should try to unravel your own ideas. Reverse cause and effect. Stand things on their heads. See if there is some other factor at work in what you think is happening." He also believed this required the unfettered freedom to do so—not a strong suit of the military. Friend and foe alike recognized Boyd as a supreme maverick.

Marine Corps University holds Boyd's papers in its archive at Marine Corps Base Quantico, Virginia, and continues to incorporate his concepts in its teachings. The genius of John Boyd continues to inform the U.S. military. Aircraft design and Air Force pilot training

have incorporated energy maneuverability, and maneuver warfare permeates the Marine Corps. Thanks to the intellectual research and writing of such students of military history as Ian Brown and Frans Osinga, John Boyd's theories will continue to share the military resource shelf with Sun Tzu and Carl von Clausewitz.

Grant T. Hammond, PhD

PREFACE

Unlike that of my first book on John Boyd, I have kept this preface brief. I hope you find my reasons defensible.

First, at this point in the historiography, Boyd does not need me to reintroduce him. His life, times, and contributions to the American military have been captured at length elsewhere. For a brief but solid look at that life, times, and contributions, readers should turn to Grant Hammond's *The Mind of War: John Boyd and American Security* (2001). For a deeper examination of Boyd's life—with some caveats on the accuracy of the other two elements—Robert Coram's *Boyd: The Fighter Pilot Who Changed the Art of War* (2002) does the job. Frans P. B. Osinga, who I am pleased to include as a contributor to this volume, does a masterful job at deconstructing the intellectual foundations of Boyd's ideas in *Science, Strategy, and War: The Strategic Theory of John Boyd* (2007), and his primer in this book is an excellent starting point on its own. To learn about Boyd's impact on the U.S. Marine Corps, I humbly offer my own *A New Conception of War: John Boyd, the U.S. Marines, and Maneuver Warfare* (2018), also published by Marine Corps University Press. Boyd does not require another biography, and so this already-lengthy tome will not try to cram one in.

Second, from the beginning, my goal for this project was letting Boyd speak in his own words, so I have kept to the sidelines as much as possible. A continued source of frustration in my own research and writing on Boyd was having other authors claim that Boyd said X or Y about Z, only to look at the footnotes and find that the supporting evidence for those claims was thin to nonexistent. Yet, I had to remind myself that a consistent challenge in quoting Boyd was

that Boyd wrote very little down in the conventional sense. I will confess that my patience with this excuse only goes so far; the Marine Corps History Division has held recordings of Boyd's presentations since the time of his death in 1997, and so any researcher could have availed themselves of this resource if so inclined.

However, I also admit that actually listening to these recordings—let alone attempting to transcribe them—is an exercise in self-flagellation that borders on martyrdom. The recordings are digital transfers from a cassette tape—for my readers who are post-millennial or younger, Google it, because odds are good you never actually saw one of these while you were growing up—that sounds like it was in a recorder placed at the back of the room, about as far away from Boyd as humanly possible. One has to strain to hear every word from Boyd (although there are no issues hearing the coughing of students seated right next to the microphone).

It is a chore to get through the recordings; yet in them, Boyd said exactly what he thought and explained it. As I wrote in *A New Conception of War*, in many ways Boyd was a YouTube personality in an analog age—his modus operandi was a dynamic dialogue with his audience in real time, and his speaker notes were all in his head. One can easily picture him on stage giving a TED Talk on war and conflict, tailored to his audience each time so that no two presentations would be exactly alike. Unfortunately, the portable recording media of his time was not quite as prolific or capable as what we enjoy today, and so there is no possibility for a high-fidelity, high-resolution Boyd YouTube channel.

Yet, these few recordings exist and are a tremendous potential resource for any future researchers digging into Boyd, with only the audio quality an obstacle to making Boyd's ideas more widely accessible. This project is intended to remove that obstacle. Agree or disagree with Boyd as you will—but agree or disagree with what he actually said, not with what a second or third party thinks he said. And as it happens, while the technology did not exist to make Boyd a TED Talk star, the way Boyd delivered his presentations was, as mentioned above, dynamic, so it should be no surprise that putting his spoken words into text resembles nothing so much as a Socratic dialogue. Given that Boyd's ideas tend to operate in the realms of theory and philosophy, that feels appropriate.

Third, I want Boyd's words to act as a platform for future research, adaptation, and influence on security challenges and military thinking, and I want readers to experience those words as so many of Boyd's audiences did: fresh and unfiltered. If you want Ian Brown's interpretation of Boyd, then by all means read *A New Conception of War* or other articles I have written. But those are not a prerequisite to reading this book, and indeed, on reflection, I think if I had had a resource like this when I first began my own research on Boyd, I would have put Hammond and Coram aside and thrown this volume on top of the stack.

The only commentary I will offer is this: my original timeline for publishing this work was mid-2022. For a variety of reasons, that did not happen. But I think the delay made this book more relevant due to other events. I will not say I am grateful or happy for the delay, because those other events include Russia's invasion of Ukraine in February 2022 and Hamas's brutal attack of 7 October 2023, followed by Israel's ensuing war in Gaza. The images of what Russia and Hamas did to their victims are burned into my memory no matter how much I want to forget them.

Both of those conflicts are, in their own way, gruesome laboratories for some of the things Boyd talks about, and I believe those things are where Boyd's thinking potentially offers much greater impact than his more well-known opinions on German military tactics or the (oft-misinterpreted) OODA loop. Boyd regularly discussed a "moral" level of war—not moral in the sense of an ethical system for right and wrong, but in those intangibles that drive human beings to fight, cooperate, resist, or give up. Boyd talked about building and destroying organizational cohesion, strategic narrative, and using information to strengthen one's own side or weaken one's opponent, and he talked about these things at the bow wave of the Information Age, when the internet was slowly becoming a household item fighting for precedence over the land line. Boyd had ideas about how information and narrative could affect the battlefield, but the vectors by which combatants could exploit the opportunities offered in the Information Age did not yet exist.

Fast forward to today, and the wars in Ukraine and Gaza exploded in an age when every prospective combatant and noncombatant is an information vector on the battlefield by dint of the handheld

devices that are prolific in even the poorest and most war-torn nations. Countries, leaders, citizens, and warfighters must now incorporate these information pathways—along with the new ways to use and misuse them—into their national strategies to have any hope of military success. Ukraine offered an example of how a multilayered information campaign, integrated with military operations, could garner real material support that enabled it to resist an invasion that many observers believed would be over in mere days. Russia attempted from the beginning to offer competing narratives with window dressings such as "de-Nazification" and "special military operation," but very few external entities swallowed it. Israel's case was more complicated, with the horrifying imagery of 7 October gaining them initial sympathy. Yet unlike Russia, Hamas found many external entities quite willing to adopt and repeat their information campaign. Israel itself lost much of that sympathetic narrative with its overwhelming firepower campaign in response to the attacks.

I would submit that John Boyd understood these things in a theoretical sense, and his efforts to get his audience to understand the prospective power of information and narrative are a thread woven throughout the presentations in this book. In this way, Boyd was less an aggregator of the military theories that came before him and more a visionary for what success in conflict might look like in a world saturated with competing data and narratives. This world was only just emerging when he died. I believe that we have seen his theories at work in Ukraine and Gaza. Sadly, I fear that the future will provide more laboratories of conflict in which his theories will see action, not fewer.

As for the rest: let John Boyd tell you in his own words.

ACKNOWLEDGMENTS

In my first book on Boyd, I reminded readers that victory has many fathers, and this second book is no exception. And as with my previous book, any success this book has on broader discourse goes to those who helped make it happen; any failures, omissions, and errors are entirely my own.

At the top of the list is Angela Anderson, director of Marine Corps University Press (MCUP), who quickly and enthusiastically endorsed this project after I submitted its proposal and who then offered eternal patience as the project proceeded at a pace far more glacial than I had ambitiously promised. I am eternally grateful for the support she has given to enlarging the study of Boyd's ideas through MCUP's publications.

This book relies heavily on the transcripts generated from the audio of Boyd's presentations, and I could never have completed them without financial support from two organizations. The Marine Corps Heritage Foundation generously provided a grant to complete the transcript of "Patterns of Conflict." Readers of my first book found excerpts of that transcript in its appendices and can now enjoy it in its entirety here. The Marine Corps University Foundation, and especially the support of Jon Sachrison, provided grants to complete the other transcripts. Thanks to both organizations, Boyd's ideas can now be read in his own words, and in full.

Two of the most preeminent Boyd scholars generously shared their insights when I called on them at the eleventh hour. Dr. Shawn Callahan provided vital collaboration and editorial feedback on the "Strategic Game" transcript, based on his own separate and exten-

sive work on Boyd's presentations. Frans P. B. Osinga—whose own analysis of Boyd's thought in *Science, Strategy and War* remains to me the intellectual gold standard of the discipline—responded without hesitation to my late request for introductory materials to this volume and its individual chapters. This book would be a lesser work absent their involvement.

Last but certainly not least—my wife Brianne and children Aaron, Molly, and Josh deserve sainthood for the grace with which they allowed me to constantly distract myself at home with endless side projects, of which this book was just one of many. Thank you for letting me put this project, at least, to rest, and for only occasionally making fun of my thunderously loud typing.

Snowmobiles [and] Grand Ideals

Introduction to the Essence of Winning and Losing

A Primer on John Boyd's Strategic Thought[1]

By Frans P. B. Osinga

Part I: Introduction

John Boyd has been ranked among the outstanding general theorists of strategy of the twentieth century, alongside the likes of Bernard Brodie, Edward N. Luttwak, Basil H. Liddell Hart, and John Wylie.[2] As Colin S. Gray wrote,

> John Boyd deserves at least an honorable mention for his discovery of the "OODA loop" . . . allegedly comprising a universal logic of conflict. . . . Boyd's loop can apply to the operational, strategic, and political levels of war. . . . The OODA loop may appear too humble to merit categorization as grand theo-

[1] This chapter is a condensed and edited version of Frans Osinga, "The Enemy as a Complex Adaptive System: John Boyd and Airpower in the Postmodern Era," in John Olsen, *Airpower Reborn: The Strategic Concepts of John Warden and John Boyd* (Annapolis, MD: Naval Institute Press, 2012), 48–92; used with permission of the publisher.

[2] For a longer discussion of his influence, the accolades for and the critiques on his work, see chapter 1 in Frans P. B. Osinga, *Science, Strategy and War: The Strategic Theory of John Boyd* (London, UK: Routledge, 2007).

> ry, but that is what it is. It has an elegant simplicity, an extensive domain of applicability, and contains a high quality of insight about strategic essentials.[3]

As the transcripts demonstrate, however, there is much more to Boyd than the OODA loop construct.[4] This primer suggests that: 1) despite obvious flaws and bearing the hallmarks of his time, Boyd's work is more comprehensive than most people are aware of; 2) it contains a consistent line of argumentation with many interesting ideas in addition to the OODA loop, such as original conceptualizations of the dynamics of combat and the essence of strategic interactions; and 3) there is more substance to his arguments than most critics allow for.

Importantly, it will demonstrate that the popularized concept of the OODA loop is often simply misunderstood. The neat graphical depiction of the OODA loop (figure 1) is often regarded as *the* concise representation of his ideas, and the simplified model and limited interpretation—rapid OODA looping—is being mistaken for his theory. Such a limited interpretation masks the richness of the concept and the larger theme in Boyd's work: individual and organizational adaptability. That theme is embedded in the metaphor of complex adaptive systems that informs Boyd's work.

A brief survey of both praise and critique will precede a discussion of the key formative factors of his work. This is essential to properly appreciate the origins and logic of his arguments as laid out in his often-cryptic texts in the various presentations. Several key concepts in his work will be touched on before introducing the

[3] Colin S. Gray, *Modern Strategy* (Oxford, UK: Oxford University Press, 1999), 90–91.

[4] In addition to the author's turgid study of Boyd mentioned in footnote 2, for more readable accounts of Boyd's life and work, see Robert Coram, *Boyd: The Fighter Pilot Who Changed the Art of War* (New York: Little, Brown, 2002); and Grant T. Hammond, *The Mind of War: John Boyd and American Security* (Washington, DC: Smithsonian Books, 2001). A shorter explanation can be found in Frans Osinga, " 'Getting' *A Discourse on Winning and Losing*: A Primer on Boyd's 'Theory of Intellectual Evolution'," *Contemporary Security Policy* 34, no. 3 (December 2013): 603–24, https://doi.org/10.1080/13523260.2013.849154.

real comprehensive OODA loop that Boyd drew in 1995, two years before his death.

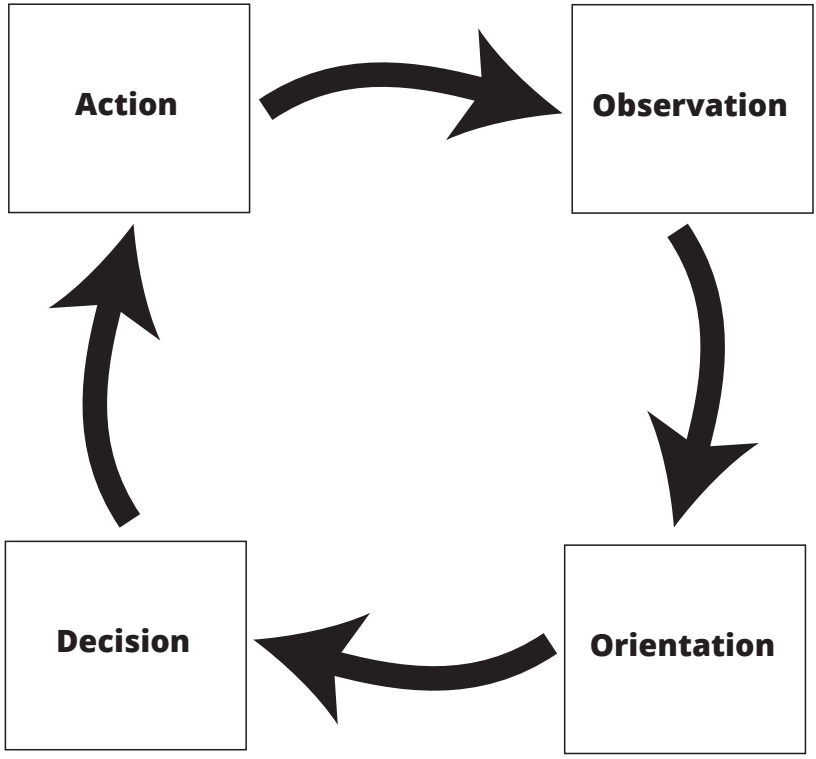
Boyd's Influence

There is no doubt about the influence of Boyd on contemporary military thought and practice in the Western world. One of the obituaries, authored by then-Commandant of the Marine Corps, General Charles C. Krulak, lauded Boyd as "a towering intellect who made unsurpassed contributions to the American art of war . . . one of the central architects in the reform of military thought which swept the services. . . . From John Boyd we learned about the competitive decisionmaking on the battlefield—compressing time, using time as an ally."[5] In a profound manner, it has inspired U.S. Army and U.S. Marines Corps doctrines and contributed to the rediscovery of maneuver warfare (resulting in AirLand Battle) first in the U.S. military and subsequently in other Western militaries. His ideas are said to have inspired the Operation Desert Storm (1991) campaign plan. Although the U.S. Air Force was reluctant to embrace Boyd's ideas after his retirement, what is certainly noncontroversial is his pivotal role in the development of iconic fighter aircraft such as the McDonnell Douglas F-15 Eagle, General Dynamics F-16 Fighting Falcon, and McDonnell Douglas F-18 Hornet.

His influence is mostly due to the OODA loop, generally understood to stand for a decision cycle consisting of four phases: observation, orientation, decision, and action. Subsequently, war can be construed as a collision of organizations going through their respective OODA loops, or decision cycles. In the popularized interpretation, the OODA loop suggests that success in war depends on the ability to outpace and outthink the opponent, or put differently, on the ability to go through the OODA cycle more rapidly than the opponent. In simplified form, it looks like figure 1, and it is mostly this rendering that has made the OODA loop, and associated fortune-cookie slogans such as "getting inside the decision cycle" and "rapid OODA looping" popular concepts. In 1996, for instance, this interpretation

[5] Gen C. C. Krulak, "Letter to the Editor," *Inside the Pentagon* 13, no. 11 (13 March 1997): 5.

Figure 1. The simplified OODA loop



John Boyd, adapted by MCUP.

of the OODA loop was incorporated in, and elevated to, long-term U.S. defense policy when the 1996 Joint Chiefs of Staff document *Joint Vision 2010* stated that U.S. forces will gain "OODA-loop dominance," being able to "observe, orient, decide, and act much more quickly than our opponents."[6]

By now, the image of the OODA loop has become an icon. A recent internet search for *OODA loop* produced hundreds of graphic renderings and thousands of hits in articles catering to a wide variety of audiences, academic and otherwise. Throughout the past

[6] *Joint Vision 2010* (Washington, DC: Chairman of the Joint Chiefs of Staff, 1995), as cited in Lonnie D. Henley, "The RMA After Next," *Parameters* 29, no. 4 (Winter 1999–2000): 46.

three decades, the term has spread like a meme beyond military organizations, infecting business consultants, psychiatrists, pedagogues, and sports instructors, and it has been fruitfully applied to explore the dynamics of non-Western style warfare, which has resulted in the notion of fourth-generation warfare.[7] In the aftermath of the terrorist attacks of 11 September 2001, U.S. secretary of state and former chairman of the U.S. Joint Chiefs of Staff Colin L. Powell implicitly honored Boyd by talking of a response involving multiple thrusts and getting inside the adversary's decision cycle.[8] The concept of network-centric warfare, a key theme of U.S. and NATO military transformation initiatives ongoing since 2002, surfaces many themes central to Boyd's work. Similarly, his work has been used in the context of the Iraqi insurgency and in literature on cyberwarfare.[9] Looking back on the stunning victory of Operation Iraqi Freedom (2003) against substantial Iraqi armed forces, the commander of the Coalition troops, General Tommy Franks, also referred explicitly to Boyd's idea of getting inside the enemy's decision cycle.[10] Boyd's concepts and terminology have become mainstream in Western militaries, and the neat graphical depiction of the OODA loop

[7] For a brief overview of his connection to the school of thought labeled "Fourth-Generation Warfare," see for instance Frans Osinga, "Boyd, Bin Laden and Fourth Generation Warfare as String Theory," in *On New Wars*, ed., John Olsen (Oslo: Norwegian Institute for Defense Studies, 2007). For doctrines that are informed by Boyd's work, see *Warfighting*, Marine Corps Doctrinal Publication 1 (Washington, DC: Headquarters Marine Corps, 1997); and *British Defence Doctrine*, Joint Warfare Publication 0-01 (London: Her Brittanic Majesty's Stationary Office, 1997). For Boyd's role, see Richard P. Hallion, *Storm over Iraq: Air Power and the Gulf War* (Washington, DC: Smithsonian Institution Press, 1992), 38–42, 278–81.

[8] Coram, *Boyd*, 446–47.

[9] See Osinga, *Science, Strategy and War*, 243–54.

[10] See the interview with Gen Tommy Franks in P. Boyer, "The New War Machine," *New Yorker*, 30 June 2003, 70. In the article, the author also introduces the military reform movement and Boyd's role in it, asserting that current U.S. Secretary of Defense Donald H. Rumsfeld had been influenced in the 1970s and 1980s and had become a supporter for military reform and innovation in strategy. Gen Franks repeated this in his biography, *An American Soldier* (New York: Regan Press, 2004), 466. However, for a balancing view, see William S. Lind's reaction to various commentators: "Don't Take John Boyd's Name in Vain," *CounterPunch*, 1 May 2003.

has become the symbol of Boyd's entire work.[11] Indeed, it is often regarded as the concise representation of his ideas, and the simplified model—which he never drew—is being mistaken for his theory.[12]

Critique

The OODA loop has also been the primary source of critique. It is often dismissed as very simplistic, too abstract, lacking detail that may serve commanders in battle, and focusing too much on the elements of speed and information superiority, which, at the strategic level or in protracted civil wars or insurgencies, for instance, are of

[11] Hammond, *The Mind of War*, 56.

[12] For other examples, see for instance Phillip S. Meilinger, "Air Targeting Strategies: An Overview," in *Air Power Confronts an Unstable World*, ed. Richard P. Hallion (London: Brassey's, 1997), 60–61, in which he states that "the key to victory was to act more quickly, both mentally and physically, than your opponent. He expressed this concept in a cyclical process he called the OODA Loop. As soon as one side acted, it observed the consequences, and the loop began anew. . . . The significance of Boyd's tactical air theories is that he later hypothesized that this continuously operating cycle was at play not only in a tactical aerial dogfight, but at the higher levels of war as well. In tracing the history of war Boyd saw victory consistently going to the side that could think the most creatively, and then acting quickly on that insight." This is not a critique of Meilinger, who merely includes Boyd as one of several theorists on airpower; his rendering of Boyd's work is, however, somewhat typical of most interpretations of it. See also Phillip S. Meilinger, *Ten Propositions Regarding Air Power* (Washington, DC: Air Force History and Museums Program, 1995), 31–32, in which he states that "John Boyd's entire theory of the OODA Loop is based on the premise that telescoping time—arriving at decisions or locations rapidly—is the decisive element in war because of the enormous psychological strain it places on an enemy." For similar brief and consequently limited discussions of the OODA loop, see Gary A. Vincent's two articles: "In the Loop, Superiority in Command and Control," *Airpower Journal* 6, no. 2 (Summer 1992): 15–25; and "A New Approach to Command and Control, the Cybernetic Design," *Airpower Journal* 7, no. 2 (Summer 1993): 24–38. See also Gordon R. Sullivan and James M. Dublik, "War in the Information Age," *Military Review* (April 1994): 47, in which the authors lay out a vision of war in the Information Age. Incorporating the same pictogram of the OODA loop as used above, they argue that the concept of time has changed: "Tomorrow we will observe in real time, orient continuously, decide immediately and act within an hour or less." Remarkable is the fact that Boyd is not listed as the intellectual father of the OODA loop, suggesting that the OODA construct has already become very commonplace. The OODA loop has even been discussed in *Forbes* and *Harvard Business Review*. See Hammond, *The Mind of War*, 11.

relative little importance.[13] Moreover, the concept might be valid for the domain from which it sprang—air-to-air combat—but inductively suggesting it is also applicable for explaining victory and defeat in ground warfare, even at the strategic level, is scientifically and perhaps also militarily unsafe. Alternatively, it is "argument by analogy" and "pseudoscience," as it is informed by an unwarranted application of theorems from mathematics, thermodynamics, and quantum mechanics to the social world.[14] J. P. Storr has even asserted that there are no OODA loops because in real life, command processes look markedly different and there are in fact many decision-making processes ongoing simultaneously at various levels in the military organization.[15] Others admit the validity of the OODA loop model, but find the concept hardly original, as it seems a mere copy of other models of cognitive processes and decision-making processes. Additional critique concerns the fact that his work is not a product of proper academic research. His work shows a confirmation bias. There is no hypothesis testing of the OODA loop concept. Indeed, Boyd's work does not constitute a properly referenced scholarly text that makes a coherent argument that can be falsified or critiqued. What does exist, apart from a dense philosophical essay, is a heavily biased overview of military history, based on secondary sources, captured in often cryptic language, typed on slides in a massive presentation and several shorter presentations that become increasingly abstract. As a theory, it is not original or comprehensive because it does not cover nuclear strategy or air or maritime warfare.

Part II: Introducing "A Discourse on Winning and Losing"

What most critiques (and quite a few of his appraisers) lack is a full

[13] See Thomas Hughes, "The Cult of the Quick," *Aerospace Power Journal* 15, no. 4 (Winter 2001): 57–68. Only in the endnotes does Hughes acknowledge that Boyd's ideas are more complex than this interpretation.

[14] See James Hasik, "Beyond the Briefing: Theoretical and Practical Problems in the Works and Legacy of John Boyd," *Contemporary Security Policy* 34, no. 3 (December 2013): 583–99.

[15] See Maj J. P. Storr, "Neither Art nor Science: Towards a Discipline of Warfare," *RUSI Journal* 146, no. 2 (March 2001): 39. Referring to Karl Popper, Storr states that "induction is unsafe" and "to generalize about formation-level C2 [command and control] from aircraft design is tenuous."

engagement with Boyd's work, a fate shared with, for example, Carl von Clausewitz. Absent a published monograph by Boyd, understandably few are familiar with the source of the OODA loop, which is titled "A Discourse on Winning and Losing," or as Boyd wrote in the margins of books he studied, "a theory of intellectual evolution." "A Discourse on Winning and Losing" consists of four briefings and an essay.[16] It was completed in 1987, although subsequently the specific wording on slides was frequently revised. The essay "Destruction and Creation" was written in 1976. This forms the philosophical foundation for his proposition that uncertainty pervades everything. In it, Boyd states that uncertainty is a fundamental and irresolvable characteristic of our lives, no matter how good our observations and theories for explanation are. The way to deal with this is to make sure one has the ability to recognize the extent to which one's mental model is correct and the ability to use different models simultaneously. This theme permeates throughout his later work. While working on his essay, he also finished a presentation titled "A New Conception of Air to Air Combat," which would not become part of "A Discourse on Winning and Losing" but is important because it shows a close relation with the essay and foreshadows several ideas he later explored in "Patterns of Conflict."[17] It is the conceptual bridge between his fighter-pilot background and his maturation as a strategic thinker.

"Patterns of Conflict" forms the historical heart of Boyd's work and is the longest of his presentations. Since the first draft was completed in 1977 and the final one in 1987, it has turned into the opus of Boyd's research on conflict and warfare. It is, in Boyd's own words, "a compendium of ideas and actions for winning and losing in a highly competitive world."[18] It also contains an introduction to the OODA

[16] Some of Boyd's briefings are available in the digital briefings collection of think tank Air Power Australia and are also available in the Boyd and Military Strategy digital collection of Defense and the National Interest. All references to pages and slides in Boyd's work concern the number as written on Boyd's slides, as accessed through these two websites.

[17] While correctly labeled on the Defense and the National Interest's Boyd and Military Strategy digital collection's webpage, the document downloads with the incorrect filename "fast-transients."

[18] John Boyd, abstract, in "A Discourse on Winning and Losing," Boyd and Military Strategy, Defense and the National Interest, 1.

loop or the "Boyd Cycle." In the presentations "Organic Design for Command and Control" (first draft in 1982) and the one intriguingly titled "The Strategic Game Of ? and ?" (first draft in 1986), he uses insights and conclusions from "Patterns of Conflict" to develop arguments about leadership and organizational culture, as well as about the essence of strategy. In Boyd's words, "Organic Design for Command and Control" "surfaces the implicit arrangements that permit cooperation in complex, competitive, fast moving situations," while "The Strategic Game of ? and ?" emphasizes "the mental twists and turns we undertake to surface appropriate schemes or designs for realizing our aims or purposes."[19] The final very brief presentation, "Revelation" "makes visible the metaphorical message that flows from this Discourse."

Later, he also developed two other briefings that are fully in line with and an elaboration on previous arguments. "The Conceptual Spiral" was completed in 1992. It is a different rendition of arguments, themes, and insights Boyd advanced earlier in "Destruction and Creation," now employed to explain how and why innovation occurs in science, engineering, and technology. If they are to thrive, all three need to be self-correcting and learning mechanisms. On the other hand, all three also continuously introduce novelty and thus uncertainty into the human environment, and hence all Boyd argues is that the dynamics at play here hold universal validity for all types of organizations that strive to survive under conditions of fundamental and unavoidable uncertainty. The final briefing is titled "The Essence of Winning and Losing," which is a very condensed rendering of Boyd's core ideas. Only in this short presentation, completed in 1995, does Boyd offer a picture of the OODA loop, and in a much more elaborated rendition than shown in figure 1 (see figure 5).

The Formative Factors of Boyd's Work

An appreciation of Boyd's work requires awareness of the *Zeitgeist* of the two decades that span the gestation of his work. Strategic theorists, like social science theorists, are influenced by both intellectual and social factors, both internal to the discipline as well as factors external to the discipline.[20] Internal intellectual factors include the

[19] Boyd, abstract, in "A Discourse on Winning and Losing," 1.

[20] Todd Stillman, "Introduction: Metatheorizing Contemporary Social The-

influence of schools and traditions of thought on a theorist, including cognitive paradigms, changes in paradigms, and metatheoretical tools. External intellectual factors include ideas borrowed from other disciplines. Internal social factors include the influence of social networks on a theorist's work. External social factors include the impact of historical change on the structure and institutions of the society being theorized.[21] Similarly, the formative factors of strategic theory in a particular period, in a particular country, or by a specific author consist of 1) the nature of war during successive periods; 2) the specific strategic circumstances of the countries involved; 3) the personal and professional experience of the particular thinker; and 4) the intellectual and cultural climate of the period in question.

Boyd's work, too, is a product of his time. The following four formative factors have had a demonstrable influence in shaping his work and should be appreciated:

- The strategic and defense-political context of the United States in the period in which he developed his ideas;
- Boyd's professional background;
- his study of military theory and history; and
- his keen and evolving interest in scientific developments and the scientific Zeitgeist during which he developed his ideas on military strategy.

orists," in *The Blackwell Companion to Major Contemporary Social Theorists*, ed. George Ritzer (Oxford, UK: Blackwell Publishing, 2003), 3. See also Avi Kober, "Nomology vs Historicism: Formative Factors in Modern Military Thought," *Defense Analysis* 10, no. 3 (1994): 268, https://doi.org/10.1080/07430179408405629. For the influence of formative factors on military thought, see also Azar Gat, *The Origins of Military Thought: From the Enlightenment to Clausewitz* (Oxford, UK: Clarendon Press, 1989); Azar Gat, *The Development of Military Thought: The Nineteenth Century* (Oxford, UK: Clarendon Press, 1992); and Azar Gat, *A History of Military Thought: From the Enlightenment to the Cold War* (Oxford, UK: Oxford University Press, 2001). The link between science and military thought is also explored by Robert P. Pellegrini, *The Links between Science and Philosophy and Military Theory: Understanding the Past, Implications for the Future* (Maxwell Air Force Base, AL: Air University Press, 1995); Barry D. Watts, *The Foundations of U.S. Air Doctrine: The Problem of Friction in War* (Maxwell Air Force Base, AL: Air University Press, 1984); and most recently by Antoine J. Bousquet, *The Scientific Way of War* (New York: Columbia University Press, 2009).

[21] Stillman, "Introduction: Metatheorizing Contemporary Social Theorists," 3.

Boyd developed his ideas during the course of two decades, starting in 1975 and finalizing in 1995. His ideas were influenced by and are a response to the organizational needs of the U.S. armed forces in the traumatic aftermath of the Vietnam War, a period in which the Services reoriented toward conventional mechanized warfare in a direct confrontation with the Warsaw Pact in Europe in the strategic context of the Cold War.[22] The Vietnam War had demonstrated stagnation in American strategic and doctrinal thinking and the limits of a military doctrine that was largely based on the use of nuclear weapons. Additionally, the Yom Kippur War of 1973 had demonstrated the capabilities of modern Soviet equipment when coupled to an innovative operational doctrine. Finally, numerical Soviet superiority meant that attrition-style warfare was pointless. Boyd's arguments (indeed his bias), including his strong critique of linear and predictable attrition-style battle and his emphasis on non-physical dimensions of warfare (unpredictability, initiative, morale, situational awareness, cohesion, agility, speed, maneuver, leadership) must be understood in the context of the discourse at the time on a new doctrine within the U.S. Army and the U.S. Marine Corps in this context.[23] There was a demand for new ideas and a receptive audience.

The second inspiration was his experience as a fighter pilot, including experience in the Korean War, and his subsequent involvement in fighter aircraft design. With a mathematical model he developed—Energy-Maneuverability—Boyd was able to attribute American air combat successes to a combination of good training; a cockpit offering an uncluttered, superior view, enabling early detection of enemy aircraft; and the superior ability of American combat aircraft for *fast transients* (rapid change of attitude) compared to the Mikoyan-Gurevich MiG-15, the primary fighter of North Korea. The emphasis on maneuverability and adaptability and not on speed, as

[22] For a lengthy discussion of the formative factors of Boyd's work, see chapters 2, 3, and 4 in Osinga, *Science, Strategy and War*. Chapter 2 details his personal experience and the organizational context of his work. Chapters 3 and 4 detail exhaustively how the academic and cultural Zeitgeist influenced his work.

[23] For an elaborate discussion of this doctrine innovation process, see Richard Lock-Pullan, *US Intervention Policy and Army Intervention: From Vietnam to Iraq* (London: Routledge, 2006).

had been usual in fighter design, led to the design of the McDonnell Douglas F-15 Eagle, General Dynamics F-16 Fighting Falcon, and McDonnell Douglas F-18 Hornet.

His extensive study of military history and strategic theories, the third source of influence, showed him different modes of warfare and the constant dynamic of action and reaction (i.e., evolutionary processes). Successful tactics, techniques, and doctrines always harbor weaknesses that be exploited by the opponent and result in specific contra developments and responses which negate the initial advantage. This is the paradoxical logic of strategy that Luttwak also had highlighted. Boyd found confirmation and elaboration of this idea in the works of authors such as T. E. Lawrence, J. F. C. Fuller, Liddell Hart, Heinz Guderian, Sun Tzu, Vladimir Lenin, Mao Zedong, and Võ Nguyên Giáp. Boyd's discussion of military history closely follows their ideas and sometimes their biased views (including Liddell Hart's and Fuller's takes on Clausewitz).

Similar to Fuller and Liddell Hart, but less prejudged, Boyd aimed to convince people that the military doctrine and practice of the day was fundamentally flawed, opposing attrition-type warfare and favoring paralysis through maneuver. And, like them, Boyd's emphasized the moral and cognitive aspects of war. Boyd also echoed Sun Tzu in emphasizing the use of superior judgment, rapidity, exploiting uncertainty, and constant adaptation as a weapon. Indeed, Sun Tzu is cited in "Patterns of Conflict" as a starting point for venturing into alternatives for the attritionist style of warfare.

Assertions that Boyd's work lacks clarity have merit, but claims that he merely stated the obvious or restated arguments made by the likes of Liddell Hart miss the mark. It is true that from the perspective of twenty-first century military thinking there is not much novelty in his work. On the face of the first 100 pages of "Patterns of Conflict," it can be asserted that he merely repackaged familiar ideas and arguments. There is much familiar territory, and there are some remarkable shortfalls in his dealing with history. He used (or cherry-picked) history to provide empirical validation for patterns he observed in air-to-air combat and in other arenas to illustrate his points and to provide his presentations with a necessary sense of credibility.

Boyd's constant reminder of the necessity to observe the oppo-

nent and the wider environment of combat and act accordingly is, when stated this way, not a novel idea but directly attributable to Sun Tzu, as are his ideas about shaping the environment and the opponent before actually engaging in combat. Sun Tzu also emphasized using superior judgment capability and constant adaptation as a weapon. He advocated variety, rapidity, surprise, creating uncertainty and multidimensional warfare, and a host of other concepts and ideas we recognize in Boyd's work. Indeed, Boyd deliberately literally incorporated various concepts from Sun Tzu's work in the first section of "Patterns of Conflict" as a starting point for venturing into alternatives for the attritionist style of warfare.

But in his day, Sun Tzu's work was not mainstream knowledge among military officers, and Boyd made an important contribution by rediscovering, translating, and updating the concepts of Sun Tzu and the other strategists to suit his era. To Sun Tzu, he adds the blitzkrieg concept, which recombines, according to Boyd, the elements that have historically produced success using the new tools of this century: the tank, the aircraft, and modern communication equipment. To some extent, one could also consider his rediscovery of operational art a novelty in his day. To his audience in the 1970s and '80s, his insistence on tempo, maneuver, the importance of the moral, organizing in semiautonomous units, etc., was novel and his rediscovery of the classical strategists timely.

Moreover, while his ideas do indeed resemble those of classical theorists of the maneuverist school of strategic theory, they transcend them by delving deeper into the essence of victory underlying various schools of thought. Although the presentation "Patterns of Conflict" initially does suggest that Boyd had been merely looking for confirmation of his hunch about the general validity of the rapid OODA loop idea, his study was neither so selective nor preconceived. And although he did favor the maneuverist style of combat in his discussion of conventional warfare (a preference that is understandable in light of his environment), when he shifted his attention to the essence of strategy, he saw the maneuverist style of warfare just as one of three possible "categories of conflict."

Indeed, each mode of warfare is joined by a discussion of the countermove to that mode. His eye was trained on the dialectic, the paradoxical and evolutionary character of strategy. Where Liddell

Hart saw victory always accruing from the application of the indirect approach, Boyd saw the process of action-reaction, of learning, anticipation, invention, and countermovements. Boyd included an elaborate discussion of cases and causes in which the indirect approach (or blitzkrieg concept) and guerrilla warfare succeeded or failed.

He searched not for one particular optimum but instead acknowledged the contingent nature of war and focused on the universal processes and features that characterize war, strategy, and the game of winning and losing. He took his audience to insights that he considered more important: a balanced, broad, and critical view instead of the doctrinaire. This view was inspired by his frantic reading into an expanding array of scientific disciplines.

Paradigm Shift: Boyd's Academic Zeitgeist

The scientific Zeitgeist is the final formative factor, and it warrants special, albeit incomplete, discussion.[24] Boyd was the first strategist to introduce the epistemological debates of the 1960s and '70s into strategic thought and to see the value and consequences of these debates and other emerging scientific concepts for strategy. He married military history with science, building his theory on Kurt Gödel, Werner Heisenberg, Kuhn, Jean Piaget, Karl Polanyi, and Karl Popper, who highlighted the unavoidable feature of uncertainty in any system of thought (as well as the limits of the Newtonian paradigm). From epistemology, cybernetics, and systems theory of the 1960s, he ventured into evolution theory, cognitive sciences, chaos, and complexity theory, which were popularized in a growing number of accessible books from the late 1970s to early 1990s. These literatures all converged on the themes of evolution, learning, and adaptation and all offered insights into the functioning of biological and

[24] For an in-depth description, see chapter 3 and 4 of Osinga, *Science, Strategy and War*, on which this section is based, in particular chapter 3. For a recent exploration of the influence of scientific developments on military thought, see Bousquet, *The Scientific Way of War*, which leans on this author's book and which positions Boyd within the chaoplexic "regime," one of the four scientific regimes that he distinguishes in the history of science. Lawrence Freedman too devotes considerable space to the influence of scientific ideas on Boyd's work in *Strategy: A History* (New York: Oxford University Press, 2013).

social systems, and they were adopted into political science, sociology, economics, and management theory. He deliberately introduced concepts from the scientific Zeitgeist into the military Zeitgeist, and his audience was aware of this. As Peter Faber recalled of his time in the Pentagon, "Boyd introduced the language of the New Physics, Chaos Theory, and Complexity Theory."[25]

The study of scientific literature provided Boyd with new terminology to analyze, compare, and explain familiar historical case studies and strategic theories, and to substantiate his own arguments. In fact, the incorporation of contemporary—postmodern—scientific insights is part and parcel of his contribution to strategic theory, and the multidisciplinary approach to understanding war and warfare became an argument in itself.

The influence of the scientific Zeitgeist is already manifest in the essay "Destruction and Creation" and the presentation "A New Conception of Air to Air Combat," and becomes gradually larger and more explicit in the presentations he developed after completion of the historically oriented presentation "Patterns of Conflict." "The Conceptual Spiral" refers exclusively to sources and illustrations from science and technology and contains a repetition of the argument of the essay. In his last presentation, "The Essence of Winning and Losing," he unfolds in just a few slides a highly conceptual synthesis of his work and presents his OODA loop in abstract terms where the central themes of the scientific literatures return.

Boyd's intellectual education occurred in the period of roughly the three decades of 1960–95, an important period for science, philosophy, and culture, for in this period a paradigm shift occurred in the natural sciences and, by extension, also in the social sciences and culture. The paradigm shift features prominently in the literature and is included in the bibliography of the essay "Destruction and Creation" and the briefing "Patterns of Conflict."[26] This literature

[25] Peter Faber, "The Evolution of Airpower Theory in the United States: from World War I to Colonel John Warden's *The Air Campaign*," in *Asymmetric Warfare*, ed. John Andreas Olsen (Trondheim: Royal Norwegian Air Force Academy Press, 2002), 58.

[26] See Fritjof Capra, *The Tao of Physics* (Boston, MA: Shambala, 1976); Richard Dawkins, *The Selfish Gene* (Oxford, UK: Oxford University Press, 1976); Edward O. Wilson, *On Human Nature* (Cambridge, MA: Harvard University Press, 1978); and Ilya Prigogine and Isabelle Stengers, *Order out of Chaos*

told Boyd that the paradigm shift transcended beyond the boundaries of the physical sciences and had become an integral part of a much larger cultural transformation. The shift involved a movement away from a scientific worldview based on Newtonian, linear, analytical, objectivistic, reductionist, deterministic, or mechanical concepts, toward a focus on change, diversity, evolution, unpredictability, complexity, nonequilibrium, and nonlinearity, themes that are dominant in Boyd's work (table 1). The new paradigm sprang in part from discoveries during the first three decades of the twentieth century: thermodynamics, evolution theory, relativity theory, quantum mechanics, and the uncertainty principle.

Neo-Darwinism, Evolutionary Epistemology, and Military Strategy

These concepts feature explicitly as points of departure in Boyd's work. Indeed, Boyd's opus starts with an epistemological investigation that is pregnant with these notions. It all started out as an effort to understand the process of *intellectual evolution*, as he scribbled in various books he read. In "Destruction and Creation" he elaborates on the insights of Kuhn, Popper, and Polanyi, who all described how knowledge is produced concerning an uncertain and ever-changing world. Uncertainty is inescapable as thermodynamics, quantum mechanics, and the uncertainty principle informed him. As Boyd notes in several presentations: "We cannot determine the character and nature of a system within itself and efforts to do so will only generate confusion and disorder." In Boyd's work, this fundamental uncertainty is a key challenge individuals and organizations need to deal with if they are to make meaningful decisions and appropriate actions that ensure their survival and growth. As

(New York: Bantam Books, 1984). Together with other bestselling works such as Fritjof Capra, *The Turning Point: Science, Society, and the Rising Culture* (New York: Bantam Books, 1982); Stephen Hawking, *A Brief History of Time* (New York: Bantam Books,1988); Richard Dawkins, *The Blind Watchmaker: Why the Evidence of Evolution Reveals a Universe without Design* (New York: W. W. Norton, 1986); Stephen Jay Gould with a whole list of bestselling studies on paleontology and evolution theory; James Gleick, *Chaos: Making a New Science* (New York: Penguin Books, 1987); and M. Mitchell Waldrop, *Complexity: The Emerging Science at the Edge of Order and Chaos* (London: Viking, 1993). These books marked the popular acceptance of science. These works are listed in Boyd's bibliography.

Table 1. Traditional versus postmodern emerging paradigm

Reductionism	Holism
Linear causality	Mutual causality
Objective reality	Perspective reality
Determinism	Indeterminism
Survival of the fittest	Adaptive self-organization
Focus on discrete entities	Focus on relationships between entities
Linear relationships	Nonlinear relationships
Newtonian physics perspectives	Quantum physics perspectives
World is predictable	World is novel and probabilistic
Prediction	Understanding
Based on nineteenth century physics	Based on biology

a corollary, Boyd proposes leveraging uncertainty as a tool in competition and warfare.

In Popper, Boyd read that science is an evolutionary process in which theories compete for offering the best explanation of phenomena through the process of hypothesis and test. Polanyi, along with Heisenberg, demonstrated that the discoveries are highly subjective processes of observation. The design of the experiment determines what slice of reality will be examined. The act of observation shapes reality. Moreover, as Polanyi added, reality is too complex and vast in scope for any one researcher to grasp in full, so scientific progress and improved understanding of our environment come from scientists sharing diverse insights with each other. A full grasp of reality requires multiple perspectives. This requires an open scientific community if science is to prosper. All authors agreed that knowledge is always incomplete, uncertainty is unavoidable, and improved understanding demands a constant development and improvement of theories and schemata—or as Boyd called it alternatively: *mental model* and *mental constructs*.

These insights are incorporated in the OODA loop concept. In a sense, the OODA loop seems a graphic rendering of the "normal model" of scientific research developed by Popper (the hypothesis-

test process). Popper sees strong similarities between the processes of adaptation at play in genes, science, and human behavior (for which Popper regards culture and genetic heritage as prime determining factors driving the process of adaptation, factors also included in Boyd's drawing of the OODA loop).[27] In the presentation "The Conceptual Spiral," Boyd offers his definition of science as "a self-correcting process of observation, hypothesis, and test."[28] In the comprehensive OODA loop, as well, the notion of hypothesis testing is included. However, a look at the more comprehensive drawing of the loop suggests it was Polanyi's work and, in particular, Kuhn's reaction to Popper on the way science advances, how scientists learn, and how knowledge grows that more deeply informed Boyd's ideas. Kuhn taught Boyd that progress—as improved understanding of real-world phenomena—depends on the Popperian notion of problem solving within a paradigm as well as on the Kuhnian emphasis on discovering mismatches between a paradigm and reality.

In Boyd's work, these notions are already apparent in "Destruction and Creation." Directly referring to Kuhn's 1970 edition of *The Structure of Scientific Revolutions*, Boyd includes a rendering of the Popperian dynamics of science within a paradigm: "The effort is turned inward towards fine tuning the ideas and interactions in order to improve generality and produce a more precise match of the conceptual pattern with reality. Toward this end, the concept—and its internal workings—is tested and compared against observed phenomena over and over again in many different and subtle ways." But at some point, Boyd asserts, following Kuhn, "Anomalies, ambiguities, uncertainties, or apparent inconsistencies may emerge."[29] In subsequent presentations, he refers often to the idea that a paradigm, a closed system of logic, cannot be falsified from within, therefore one needs to look across various systems to ascertain the

[27] For an excerpt of Popper's 1975 lecture on evolutionary epistemology, see David Miller, *A Pocket Popper* (London: Fontana Paperbacks, 1983), 78–86.
[28] John Boyd, "The Conceptual Spiral," 7. For this presentation, see the compilation of the original slides by Grant Hammond, ed., *John R. Boyd: A Discourse on Winning and Losing* (Maxwell Air Force Base, AL: Air University Press, 2018). The citation here is from p. 7 of Boyd's slides. In the compilation, it is printed on p. 333.
[29] Boyd, "Destruction and Creation," 7. The citation from the essay is reprinted by Hammond, *John R. Boyd*, 319.

nature of reality and similarly one has to evolve one's orientation patterns. The necessity of applying a multitude of perspectives (also in command centers) comes to the fore when Boyd asserts in "Organic Design":

> Orientation is an interactive process of many sided implicit cross-referencing projections, empathies, correlations and rejections . . . expose individuals, with different skills and abilities, against a variety of situations—whereby each individual can observe and orient himself simultaneously to the others and to the variety of changing situations.[30]

Strategic activities thus are similar to the Kuhnian scientific endeavor. Indeed, Boyd asserts that "The Conceptual Spiral" also represents "A Paradigm for Survival and Growth." The neo-Darwinist slant in this sentence is reinforced in the opening remarks in the essay "Destruction and Creation," where one reads that "studies of human behavior reveal that the actions we undertake as individuals are closely related to survival." Boyd states that the goal of an individual is therefore "to improve our capacity for independent action."[31] In the opening slides of "Patterns of Conflict," this surfaces again when he discusses human nature. The goal, again, is "to survive, and to survive on one's own terms, or improve one's capacity for independent action." Due to forced "competition for limited resources to satisfy these desires, one is probably compelled to diminish [the] adversary's capacity for independent action, or deny him the opportunity to survive on his own terms, or make it impossible to survive at all." For Boyd, "life is conflict, survival and conquest" (a section that reveals the shadow of the 1973 oil crisis and the gloom in the influential report of the Club of Rome, which warned about the depletion of Earth's resources).[32] Therefore, instead of relying just on insights from military history, in studying war, "One is naturally led to the Theory of Evolution by Natural Selection and The Conduct of

[30] Boyd, "Organic Design for Command & Control," 15, 18, as reprinted in Hammond, *John R. Boyd*, 232, 235.
[31] Boyd, "Destruction and Creation," 1.
[32] Donella H. Meadows et al., *The Limits to Growth* (New York: Universe Books, 1972).

War."[33] Darwin also features in "Organic Design for Command and Control," in which Boyd states that "we observe from Darwin that the environment selects [and] the ability or inability to interact and adapt to exigencies of environment select in or out."[34]

Cognitive Sciences

In parallel with the literature on epistemology, Boyd studied a steady stream of new studies on the functioning of the brain. Survival and growth hinge on adaptive cognitive processes, and this had to have a bearing on strategic thought and the processes involved in commanding military units. The cognitive revolution, combined with neo-Darwinist studies and later complexity theory, showed Boyd the role of schemata formed by genetics, culture, and experience.[35] Indeed, his model may in part be retraced to Gregory Bateson, who developed a model of mind based on systems-theoretical principles.[36] Bateson asserted that "if you want to understand mental process, look at biological evolution and conversely if you want to understand biological evolution, go look at mental process."[37] Jacques Monod, in turn, told Boyd that we observe and respond through a genetically determined program, which is the result of "experience accumulated by the entire ancestry of the species over the course of its evolution," which in turn shapes action and current experience after analysis of the effect of the action.[38] The human nervous system interacts with the environment by continually modulating its structure, and emotions and experience play a large role in human intelligence,

[33] Boyd, "Patterns of Conflict," PowerPoint, Boyd and Military Strategy, Defense and the National Interest, 10–11.
[34] Boyd, "Organic Design for Command and Control," Boyd and Military Strategy, Defense and the National Interest, 20.
[35] One very readable account Boyd studied was Howard Gardner, *The Mind's New Science*: *A History of the Cognitive Revolution* (New York: Basic Books, 1985). Other works he read that are considered part of the cognitive revolution include John von Neumann, *The Computer and the Brain* (New Haven, CT: Yale University Press, 1958); Norbert Wiener, *The Human Use of Human Beings: Cybernetics and Society* (New York: Avon Books, 1967); and Gilbert Ryle, *The Concept of Mind* (London: Hutchinson, 1949).
[36] Gregory Bateson, *Mind and Nature: A Necessary Unity* (Cresskill, NJ: Hampton Press, 2002).
[37] Sergio Manghi, foreword, in Bateson, *Mind and Nature*, xi.
[38] Bateson, *Mind and Nature*, 154.

human memory, and decisions. The influence of culture, too, was highlighted by psychologist Piaget; neo-Darwinists Jacques Monod, Robert Dawkins, and Edward O. Wilson; and Edward T. Hall, from whose book *Beyond Culture* Boyd learned that "everything man does is modified by learning and is therefore malleable. But once learned, these behavior patterns, these habitual responses, these ways of interacting gradually sink below the surface of the mind and, like the admiral of a submerged submarine fleet, control from the depths." A sentence he was to incorporate in "The Strategic Game."[39]

The influence is also evident in the element of *orientation* of the OODA loop, when Boyd asserts that "orientation, seen as a result, represents images, views, or impressions of the world shaped by genetic heritage, cultural traditions, previous experiences, and unfolding circumstances."[40] The following examples, again from Boyd's presentation "Organic Design for Command and Control" also reflect this concept:

> Orientation is the Schwerpunkt [focus or center of gravity]. It shapes the way we interact with the environment—hence orientation shapes the way we observe, the way we decide, the way we act. Orientation shapes the character of present observation-orientation-decision-action loops—while these present loops shape the character of future orientation.[41]

These insights implied to him that "we need to create mental images, views, or impressions, hence patterns that match with activity of world." And they gain a strategic character when Boyd advances the idea that "we need to deny adversary the possibility of uncover-

[39] Jean Piaget advanced the idea that there are "mental structures" that exist midway between genes and behavior. Mental structures built up as the organism develops and encounters the world. Structures are theoretic, deductive, a process. Interestingly, Piaget was influenced by Ludwig von Bertalanffy, among others. See Peter Watson, *A Terrible Beauty: A History of the People and Ideas that Shaped the Modern Mind* (London: Phoenix Press, 2000), 629–30; Edward T. Hall, *Beyond Culture* (New York: Anchor Books, 1976), 42; and John Boyd, "Strategic Game of ? & ?," Boyd and Military Strategy, Defense and the National Interest, 22.

[40] Boyd, "Organic Design for Command and Control," 13.

[41] Boyd, "Organic Design for Command and Control," 16.

ing or discerning patterns that match our activity, or other aspects of reality in the world."[42] In "The Strategic Game of ? & ?," when he discusses the ways to maintain interaction with the ever-changing world to ensure one's ability to adapt, he asserts that this is accomplished "by an instinctive see-saw of analysis and synthesis across a variety of domains, or across competing/independent channels of information, in order to spontaneously generate new mental images or impressions that match up with an unfolding world of uncertainty and change."[43]

This can also be traced back to, for example, James Bryant Conant, who taught Boyd the benefits and dangers of the theoretical-deductive and empirical-inductive approaches, respectively, and that "without a combination science does not progress."[44] The reconciliation of both approaches is essential for the continuation of a free society in an age of science and technology.[45] Subsequently, Boyd recommends both analysis and synthesis and both induction and deduction to comprehend the world and an opponent's system. This mode of thinking, which is in line with the ideas of Polanyi, became a key insight Boyd wanted to get across as an essential element of proper strategic thinking.

Open Systems

Boyd also incorporated many insights from cybernetics and systems thinking. Cybernetics, which informed the cognitive revolution, introduced the element of *feedback and homeostasis* and Ludwig von Bertalanffy's *General System Theory* brought him the recognition that living systems are not closed systems as described by cybernetics but are *open systems.*[46] As Bertalanffy described it, "We express this

[42] Boyd, "Organic Design for Command and Control," 16.
[43] Boyd, "Strategic Game of ? & ?," 58.
[44] James Bryant Conant, *Two Modes of Thought: My Encounters with Science and Education* (New York: Trident Press, 1964), 31.
[45] Conant, *Two Modes of Thought*, 91.
[46] In the bibliography of "Destruction and Creation," Boyd also lists Maxwell Maltz, *Psycho-Cybernetics: A New Way to Get More Living out of Life* (Hollywood, CA: Wilshire Book, 1971). The personal papers include U. S. Anderson, *Success Cybernetics: The Practical Application of Human-Cybernetics* (West Nyack,

by saying that living systems are basically open systems." An open system is defined as "a system in exchange of matter with its environment, presenting import and export, building up and breaking down of its material components. . . . Closed systems are systems which are considered to be isolated from their environment."[47]

Unlike closed systems, open systems maintain themselves far from equilibrium in this "steady state" characterized by continual flow and change. They can "actively" tend toward a state of higher organization, i.e., they may pass from a lower to a higher state of order, and feedback mechanisms in open systems can reactively reach a state of higher organization owing to "learning," i.e., information fed into the system.[48] These insights were later on refined and mathematically undergirded by Ilya Prigogine and form the basis for chaos and complexity theory. In his presentation "The Strategic Game of ? & ?," in which he distills the abstract essence of strategy, Boyd includes the idea that

> living systems are open systems; closed systems are non-living systems. Point: if we don't communicate with outside world—to gain information for knowledge and understanding as well as matter and energy for sustenance—we die out to become non-discerning and uninteresting part of that world.[49]

Indeed, when we do not maintain communication with the outside world, Boyd asserts, both Gödel and the second law will kick in: "One cannot determine the character or nature of a system within

NJ: Parker, 1970); F. H. George, *Cybernetics* (London: Hodderand Stoughton, 1971); Marvin Karlins and Lewis Andrews, *Biofeedback: Turning on the Power of Your Mind* (Philadelphia, PA: J. B. Lippincott, 1973); and Wiener, *The Human Use of Human Beings*.

[47] Ludwig von Bertalanffy, *General System Theory* (New York: George Brazilleer,1968), 141.

[48] Bertalanffy, *General System Theory*, 150. In popular systems thinking, this feature is enclosed in the notion of feedforward, actions which are the result of expectation and anticipation.

[49] Boyd, "Strategic Game of ? & ?," 28.

itself. Moreover, attempts to do so lead to confusion and disorder."[50] In "Patterns of Conflict," he also employs the second law by stating that one of the key elements of victory consists of "Diminish own friction (or entropy) and magnify adversary friction (or entropy)."[51]

Nonlinear Sciences and Complex Adaptive Systems

Already at the end of the 1970s, the first studies on nonlinearity started to appear in the popular press, and by the beginning of the 1990s chaos and complexity became best-selling themes in the popular science sections. The works Boyd was reading and rereading at the time of his death are almost exclusively concerned with the neo-Darwinism and the "new sciences" as they are sometimes called. The list includes Brian Goodwin's *How the Leopard Changed Its Spots*, which deals with the evolution of complexity and is marked with a Post-it note reading "Dad's favorite."[52] In this literature, many of the

[50] Boyd, "Organic Design for Command and Control," 20. See also Boyd, "Strategic Game of ? & ?," 41.

[51] Boyd, "Patterns of Conflict," 184. Note how Boyd uses the concept of friction not in the mechanical sense, as Clausewitz did, but in the thermodynamical sense, indicating that for Boyd friction refers to disorder.

[52] This list was provided by one of his biographers, professor Grant Hammond. The list included John D. Barrow, *The Artful Universe: The Cosmic Source of Human Creativity* (Oxford, UK: Clarendon Press, 1995); John D. Barrow, *Pi in the Sky: Counting, Thinking, and Being* (Boston, MA: Little, Brown, 1992); John D. Barrow, *Theories of Everything: The Quest for Ultimate Explanation* (Oxford, UK: Clarendon Press, 1991); Fritjof Capra, *The Web of Life: A New Scientific Understanding of Living Systems* (New York: Anchor Doubleday, 1996); Peter Coveney and Roger Highfield, *Frontiers of Complexity: The Search for Order in a Chaotic World* (New York: Fawcett Columbine, 1995); Peter Coveney and Roger Highfield, *The Arrow of Time: A Voyage through Science to Solve Time's Greatest Mystery* (London: W. H. Allen, 1990); Dawkins, *The Blind Watchmaker*; Dawkins, *The Selfish Gene*; Stephen H. Kellert, *In the Wake of Chaos: Unpredictable Order in Dyanimical Systems* (Chicago: University of Chicago Press, 1993); Murray Gell-Mann, *The Quark and the Jaguar* (New York: Henry Holt, 1994); Marvin Minsky, *The Society of Mind* (New York: Simon & Schuster, 1985); Robert Ornstein, *The Evolution of Consciousness: Of Darwin, Freud, and Cranial Fire—The Origins of the Way We Think* (New York: Prentice Hall, 1991); Roger Penrose, *Shadows of the Mind: A Search for the Missing Science of Consciousness* (Oxford, UK: Oxford University Press, 1994); Roger Penrose, *The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics* (New York: Oxford University Press, 1989); Prigogine and Stengers, *Order out of Chaos*; Steven Rose, *The Making of Memory: From Molecules to Mind* (London: Vintage, 2003); David Ruelle, *Chance and Chaos*

concepts he had previously encountered returned and were integrated, and it provided him with a unified theory and indeed metaphor for explaining and expressing the dynamics of human conflict.

This literature told Boyd about the remarkable feature that different nonlinear systems have inherently identical structures. Whether it refers to biological evolution, the behavior of organisms in ecological systems, the operation of the mammalian immune system, learning and thinking in animals, the behavior of investors in financial markets, political parties, ant colonies, etc., the systems feature common processes.[53] They are systems that are networks of "agents" acting in parallel. In a brain, the agents are nerve cells, in ecologies the agents are species, in an economy the agents are firms and individuals or even nations. Each agent finds itself in an environment produced by its interactions with the other agents in the system. It is constantly acting and reacting to what the other agents are doing. And because of that essentially nothing is fixed in its environment.

A complex adaptive system has many levels of organization with agents at any one level serving as the building blocks for agents at a higher level. Cells will form a tissue, a collection of tissues will form an organ, organisms will form an ecosystem. There are intercommunicating layers within the hierarchy. Agents exchange information in given levels of the hierarchy, and different levels pass information between themselves, as well. Correspondingly, the complex system has a number of disparate time and space scales. Complex adaptive systems anticipate the future. They exhibit coherence under change, via conditional action and anticipation. For this they employ internal models of the world (as in systems theory).

Complex systems are robust (or fit). They resist perturbation or invasion by other systems and try to adapt to novelty and change. Murray Gell-Mann showed Boyd several levels of adaptation that may take place in complex systems. *Direct adaptation* takes place as a result of the operation of a schema that is dominant at a particular time (as in a thermostat or cybernetic device). None of the behavior requires any change in the prevailing schema. The next level in-

(Princeton, NJ: Princeton University Press, 1991); and Waldrop, *Complexity*.
[53] Gell-Mann, *The Quark and the Jaguar*, 17; and John H. Holland, "The Global Economy as an Adaptive Process," as cited in Waldrop, *Complexity*, 145.

volves *changes in the schema*, competition among various schemata, and the promotion or demotion depending on the action of selection pressures in the real world.[54] The third level of adaptation is the Darwinian *survival of the fittest*. An organization or society may simply cease to exist as a consequence of the failure of its schemata to cope with events.

The three levels of adaptation take place, generally speaking, on different time scales. An existing dominant schema can be translated into action right away—within days or months. A revolution in the hierarchy of schemata is generally associated with a longer time scale, although the culminating events may come swiftly. Extinctions of societies usually take place at still longer intervals of time. Obviously, the question whether adaptation is successful at any one level is in large part a function of the measure of the rate of change of the environment in relation to the rate of adaptation an organism is capable of, a theme close to Boyd's heart.

Importantly, complex systems operate in accordance with the second law of thermodynamics, exhibiting entropy and winding down over time unless replenished with energy. Interestingly, nonlinearity can stabilize systems as well as destabilize them: open systems can be driven to crises points where they will either bifurcate and self-organize again or go into a period of stochastic chaos (exhibiting erratic randomness).

Various authors argued that models of organization that are based on living systems are naturally organic and adaptive.[55] For

[54] Gell-Mann, *The Quark and the Jaguar*, 293, actually includes a military illustration here.

[55] See Michael Lissack, "Complexity: The Science, Its Vocabulary, and Its Relation to Organizations," *Emergence* 1, no. 1 (1999): 110–26, https://doi.org/10.1207/s15327000em0101_7. But authors such as Ilya Prigogine already made the connection in the early 1980s, as did Charles Perrow in his seminal work *Normal Accidents* (Princeton, NJ: Princeton University Press, 1984; 1999). The literature on complexity theory and its relevance for the humanities, social sciences, and management theory is burgeoning. See Shona L. Brown and Kathleen M. Eisenhardt, *Competing on the Edge: Strategy as Structured Chaos* (Boston, MA: Harvard Business School Press, 1998); Uri Merry, *Coping with Uncertainty: Insights from the New Sciences of Chaos, Self Organization, and Complexity* (Westport, CT: Praeger, 1995); Raymond A. Eve, Sara Horsfall, and Mary E. Lee, *Chaos, Complexity, and Sociology: Myths, Models, and Theories* (London: Sage, 1997); Kathleen Eisenhardt and Donald N. Sull, "Strategy as Simple Rules," *Harvard Business Review*, January 2001, 107–16;

organizations to survive, they need to coevolve with their environments while maintaining internal stability. This requires variety, creativity, and learning communities. An organization must embody enough diversity to provoke learning but not enough to overwhelm the legitimate system and cause anarchy. These studies maintain that, like ecosystems, organizations thrive when equipped with variety. Practically speaking, organizations (should) possess a range of coupling patterns that provide "glue" and coherence among the subsystems, from tight to loose. Loosely coupled structures allow an organization to adjust to environmental drift, and when environmental shocks are particularly severe, loose structures react sluggishly, thus buying time to recover. Moderate and tightly coupled structures prevent an organization from overresponding to environmental perturbation. Coupling patterns, then, allow organizations to maintain relative stability in most environments and protect the system even against severe shocks.[56]

"Robust" systems are characterized by rich patterns of tight, moderate, and loosely coupled linkages; chains of interdependency branch in complicated patterns across nearly every actor in a broad network of interaction. Such complex patterns of interaction protect the organization against environmental shock by providing multiple paths for action. If one pattern of interdependency in a network is disrupted, the dynamic performed by that subsystem can usually be rerouted to other areas of the network. Such robustness makes it difficult to damage or destroy the complex system, for complex interaction lends it amazing resilience.[57]

Structurally, the key theme is self-organization.[58] The optimal organizational form for adaptation in turbulent environments is seen

Eric D. Beinhocker, "Robust Adaptive Strategies," *Sloan Management Review* 40, no. 3 (Spring 1999): 95–106; and Michael Church, "Organizing Simply for Complexity: Beyond Metaphor Towards Theory," *Long Range Planning* 32, no. 4 (1999): 425–40, https://doi.org/10.1016/S0024-6301(99)00054-0.

[56] Russ Marion and Josh Bacon, "Organizational Extinction and Complex Systems," *Emergence* 1, no. 4 (1999): 76, https://doi.org/10.1207/s15327000em0104_5.

[57] Marion and Bacon, "Organizational Extinction and Complex Systems," 76.

[58] Susanne Kelly and May Ann Allison, *The Complexity Advantage: How the Sciences Can Help Your Business Achieve Peak Performance* (New York: McGraw-Hill, 1999), 5.

as the "cellular" form operating in a network, an idea included in Boyd's views on command and control. Small teams operating relatively autonomously pursue entrepreneurial opportunities and share know-how among each other.[59] Meanwhile, the shared values of corporate culture in belief systems provide tight but internal and perhaps even tacit control as a form of protocol. At the same time, loose-control comes from interaction between supervisor and employees that encourages information sharing, trust, and learning. The key to loose-control is management's trust in employees to act according to the shared values, therefore setting them free to search for opportunities, learn, and apply accumulating knowledge to innovative efforts.[60] Successful leaders of complex organizations allow experimentation, mistakes, contradictions, uncertainty, and paradox, so the organization can evolve. Managing an organization as a complex system means letting go of control and a focus instead on the power of the interconnected world of relationships and the feedback loops.

These insights show parallels with, for example, management practices in Japan that Boyd read about during the late 1980s and early 1990s, and with historical case studies of military command, as Boyd read in Martin van Creveld's *Command in War*. Several of these ideas surface in Boyd's vision on command and control, which hinges on trust, implicit communication, open flow of information, and a shared view on the organizational purpose. Boyd argues for a relaxed approach on command, allowing units and commanders sufficient latitude to respond to and shape their rapidly changing environment.

Boyd contributed to and read early articles in which the leap was made to military thought, such as Barry Watts's study on nonlinearity and strategy that appeared in the 1980s, Steven Mann's 1992 article on chaos theory and strategy, and Pat Pentland's paper, "Center of Gravity Analysis and Chaos Theory."[61] Based on the model of the

[59] Henry Coleman, "What Enables Self-Organizing Behavior in Businesses," *Emergence* 1, no. 1 (1999): 37, https://doi.org/10.1207/s15327000em0101_3.
[60] Coleman, "What Enables Self-Organizing Behavior in Businesses," 40.
[61] LtCol Barry D. Watts, USAF, *The Foundations of U.S. Air Doctrine: The Problem of Friction in War* (Maxwell Air Force Base, AL: Air University Press, 1984); Steven Mann, "Chaos Theory and Strategic Thought," *Parameters* 22, no. 2 (Autumn, 1992): 54–68; and Pat A. Pentland, "Center of Gravity Analysis

adversary and on the dynamics of chaotic systems, Pentland asserted that crises points can be precipitated by

- closing a system off from its environment and propelling it into equilibrium;
- eliminating feedback within the system;
- driving any of the dimensional dynamics to singularity by overloading or destroying it; and
- applying quantum amounts of broad external energy to the entire system.

Boyd also read Alan Beyerchen's important article "Clausewitz, Nonlinearity, and the Unpredictability of War," which emphasized the relevance of the new sciences for the study of war. It argued that core themes of chaoplexity have implicitly always been incorporated in the cornerstone of Western military thought: Clausewitz's *On War*.[62] Beyerchen asserted that Clausewitz understood that war is inherently a nonlinear phenomenon and perceived the nature of war as an energy-consuming phenomenon involving competing and interactive factors. Unpredictability is a key manifestation of the role that nonlinearity plays in Clausewitz's work. Unpredictability is caused by interaction, friction, and chance. A military action produces not a single reaction but dynamic interactions and anticipations that pose a fundamental problem for any theory. Such patterns can be theorized only in qualitative and general terms, not in the specific detail needed for prediction.

Metaphors in Boyd's Work

This eclectic multidimensional and holistic approach was essential to understand the complex behavior of complex systems and this mode of thinking became an argument in itself. Boyd wanted to inculcate his audience not so much with a doctrine as with an understanding of the dynamics of war and strategy and a style of thinking

and Chaos Theory" (paper, Air War College, Air University, April 1993). Interestingly, Pentland also incorporates Boyd's OODA loop, acknowledging that this model and the essay, although developed in the 1970s, anticipated many of tenets of chaos theory, and is consistent with it.

[62] Alan Beyerchen, "Clausewitz, Nonlinearity, and the Unpredictability of War," *International Security* 17, no. 3 (Winter 1992): 55–90. This section is a very concise summary.

about that dynamic that differed from the deterministic mindset that prevailed in the strategic discourse of the 1960s and '70s.

It also resulted in a unique set of terms and concepts, a new language, to express strategic behavior. Not only did he argue that a multidisciplinary approach informed by insights from a variety of scientific fields is a prerequisite for sound strategic thinking, but science also helped Boyd explain and connect in a novel way and lead him to new perspectives, hypotheses, and insights. Thus, he introduced into strategic theory the concept of open complex adaptive systems struggling to survive in a contested, dynamic, nonlinear world pregnant with uncertainty, constantly attempting to improve and update its schemata and repertoire of actions and its position in the ecology of the organization. Indeed, science provided him with novel metaphors, analogies, and illustrations—in other words, novel conceptual lenses—to approach and explain military conflict. Boyd hints at this in the assertion, "The key statements of these presentations, the OODA Loop Sketch and related insights represent an evolving, open-ended, far-from-equilibrium process of self-organization, emergence and natural selection."[63]

In general, we can discern two related metaphors in Boyd's work.[64] First, he employs the *organic metaphor*: armed forces are and behave like organisms. The OODA loop and Boyd's theory for success explain what is necessary to survive. The OODA loop can be compared with the genetic reproduction cycle of organic species. Instead of genes, an organization passes on ideas, orientation, and action repertoires from one to the next cycle, discarding those orientation patterns and actions that appeared to be dysfunctional. Like organisms, according to Boyd, armed forces compete, learn, evolve, and survive—or not. Military doctrine and strategic theory also are seen in this evolutionary theoretical light. The ones that work survive and will be retained (up to a point when it leads to dogma and specific effective counterdoctrines). Boyd adopted the idea that, like science, strategic theory develops according to a self-correcting

[63] Boyd, "The Essence of Winning and Losing," 5, as reprinted in Hammond, *John R. Boyd*, 385.

[64] On the merit of metaphors, see Gareth Morgan, *Images of Organization* (Bristol, UK: Sage, 1986), chap. 11. The first three metaphors mentioned here are directly from this book, chapters 3, 4, and 8.

mechanism. Strategic thinking and the development of strategic theory, to him, were quite similar to the growth of scientific knowledge and theories. Strategy and strategic theory are both mere hypotheses, based on a snapshot of reality, informed by assumptions and previous experience, and pregnant with uncertainty and awareness that the opponent would do his best to make sure those assumptions were false. Applying the theory would constitute the test.

The second metaphor lies in considering armed forces as open systems. Throughout his presentations, Boyd emphasizes connections, tendons, and relationships between various interdependent subsystems laterally and among hierarchical levels of organization and the need for continuous interaction with the environment. Extending this metaphor, Boyd also regarded armed forces as complex adaptive systems such as ecosystems. Here, the themes of nonlinearity, novelty, variety, levels of organized complexity, and different ways, modes, and timescales of adaptation and evolution are at play. War is like the nonlinear clash of two complex adaptive systems.

Units are filling niches in the ecosystem and should be able to operate with a sufficient level of autonomy yet in an interdependent way with other systems. Doctrines, procedures, tactics, and organizational culture are like mental models that provide coherent behavior. They are also like schemata that need to evolve. Armed forces are like autopoietic systems, continually making efforts to maintain their distinctive character despite the turbulent environment. Defeat, demoralization, and a disorganized retreat can be seen as symptoms of a system disintegrating, unable to cope in the available time with the radical changes imposed on it by the environment, unable to adjust the schemata or to speed up the rate of adjustment.

This has implications for the interpretation of Boyd's work, which revolves around the themes of organizational survival and its solution—adaptability. Boyd focuses on the factors that can impair an opponent's capability to adapt and those that preserve one's own capacity to do so. The system for which the strategic theory is designed will be the armed forces and its environment. An armed force is, by design, a fairly robust system. It is designed to cause change within an opponent's system and oppose the need to do so itself. It will equip itself with redundant connections, ample units of diverse nature, good sensors, relevant schema, and a supportive environ-

ment. It will do anything to ensure a modicum of coherence in its actions. The aim is therefore to push a system away from its ordered, disciplined state toward one where the several subsystems need to self-organize because of lack of higher direction, and then toward a state of randomness, but not necessarily in such a time-sequenced order. Randomness, the loss of cohesion, is the opposite of the capability to adapt. The units may still exist but not as part of a higher complex system. This mechanism of decreasing cohesion and fading capability to adapt can be applied to any system and subsystem to the lowest level that can be described as a system; in armed forces this is the individual soldier. But it is not necessary to have the system completely disintegrate in one massive blow. Because an error in response or a slower response will magnify in impact over time through the feedback loops, it is basically only necessary to create an initial advantage and prevent the opponent from compensating for it. The nature of a system can change from less complex to complex, or alternatively, to the point where there is hardly any connection anymore, where information is not shared and where cohesion of action ceases to exist. Then the different elements of a system act at random and do not constitute a part of a system. And this dynamic is at the heart of his work, as we will see.

Part III:
Snapshots of "A Discourse on Winning and Losing"
From Epistemology to Flying Fighters and Making Strategy

The previous section highlighted that there is actually quite some substance behind Boyd's ideas and not mere inductive thinking. A brief excursion into his work will further illustrate this and introduce several other ideas and lines of argumentation in his work, showing that there is more to the OODA loop, and more in his work than is often acknowledged. It is an ambitious work. The scope of "A Discourse on Winning and Losing" is:

> To flourish and grow in a many-sided uncertain and ever changing world that surrounds us, suggests that we have to make intuitive within ourselves those many practices we need to meet the exigencies of that world. The contents that comprise this "Discourse" unfold observations and ideas that con-

> tribute towards achieving or thwarting such an aim or purpose.[65]

The main vehicle to communicate his ideas is "Patterns of Conflict." His departure point in "Patterns of Winning and Losing" is the assumption that success in war, conflict, and competition—indeed, survival—hinges on the quality and tempo of the cognitive processes of leaders and their organizations and their ability to translate these into relevant responses to a dynamic, ambiguous, and threatening environment. His hypothesis is that if conflict is a permanent feature of society and adaptability is the key to survival, then "variety/rapidity/harmony/initiative seem to be key qualities that permit one to shape and adapt to an ever-changing environment."[66] In the end, he returns to these key qualities, asserting that his analysis in "Patterns of Conflict" has confirmed their importance. In between lies a conscious effort to uncover the dynamics of combat in which he fleshed out the details of what it means to "get inside the OODA loop" of the opponent at the various levels of war.

This point of departure is derived from the presentation "A New Conception for Air to Air Combat" that he developed in 1975 while working on "Patterns of Conflict" and "Destruction and Creation" simultaneously. As a reply to those who accuse Boyd of an unwarranted inductive approach, it is useful to see how Boyd made the radical jump from air-to-air combat to operational art and strategic behavior in the wider sense. In it he combined insights he had already developed in his research for "Destruction and Creation" with his knowledge of air-to-air combat and managed to articulate air-to-air combat in concepts that relate to adaptability and cognitive processes.

In "A New Conception for Air to Air Combat" he looked at the issue of maneuverability due to the fact that in the fly-off competition the General Dynamics YF-16 Fighting Falcon prototype had unexpectedly dramatically outperformed the YF-18 Hornet prototype while energy maneuverability diagrams had predicted a close contest. The cause was transition rate, and subsequently Boyd formu-

[65] Boyd, abstract, in "A Discourse on Winning and Losing," 1.
[66] Boyd, "Patterns of Conflict," 12.

lated the suggestion that "in order to win or gain superiority—we should operate at a faster tempo than our adversaries or inside our adversaries time scales . . . such activity will make us appear ambiguous (non predictable) thereby generate confusion and disorder among our adversaries."[67]

He adds that these suggestions are in accordance with Gödel's Proof, the Heisenberg principle, and the second law of thermodynamics, ideas central to "Destruction and Creation."[68] Thus, he continues, making the giant leap from air-to-air combat to warfare in general, "Fast transients (faster tempo) together with synthesis associated with Gödel, Heisenberg, and the Second Law suggest a New Conception for Air-to-Air Combat and for Waging War."[69]

Boyd next elaborates this new conception. With one's actions, one should "exploit operational and technical features to generate a rapidly changing environment (quick/clear observations, fast tempo, fast transients, quick kill)." Containing key themes that appeared also in later presentations, Boyd asserts that furthermore, one should "inhibit an adversary's capacity to adapt to such an environment (suppress or distort observations)." The goal of such actions is to "unstructure adversaries system into a 'hodge podge' of confusion and disorder by causing him to over or under react because of activity that appears uncertain, ambiguous or chaotic."[70] The last slide contains Boyd's (Darwinistic) message, one that similarly informs his later work: "He who can handle the quickest rate of change survives," an insight that could be applied to the dynamic of any combat at the tactical, operational, and strategic level of war.[71]

Thus, the overarching theme throughout Boyd's argument concerning winning and losing is not just rapid decision-making but, as he states, the "strategic aim" is to "diminish adversary's capacity to adapt while improving our capacity to adapt as an organic whole, so that our adversary cannot cope—while we can cope—with events/

[67] Boyd, "A New Conception for Air to Air Combat," Boyd and Military Strategy, Defense and the National Interest, 19.
[68] Boyd, "A New Conception for Air to Air Combat," 21.
[69] Boyd, "A New Conception for Air to Air Combat," 21.
[70] Boyd, "A New Conception for Air to Air Combat," 22.
[71] Boyd, "A New Conception for Air to Air Combat," 24.

efforts as they unfold."[72] Boyd explicitly expressed the aim of any organism and organization in neo-Darwinistic and systems-theoretical terms, and regarded the contestants—platoons, armies, their headquarters, businesses, and societies—in terms of living systems, as complex adaptive systems. All such systems strive, he asserts in "Patterns of Conflict," to "improve . . . fitness as an organic whole, to shape and cope with an ever-changing environment."[73]

Aiming for Organizational Collapse

In "Patterns of Conflict," the opus of Boyd's research on conflict and warfare, which in the end contained 195 slides, these themes are illustrated, confirmed, and elaborated in a (somewhat selective and biased) survey of the evolution of warfare and of theories for victory. His survey is limited in the sense that it does not cover specific areas such as air warfare, maritime strategy, and nuclear strategy. It is certainly not limited in its comprehensiveness in its exploration of land warfare (thus catering for the needs of his primary audiences, the U.S. Army and U.S. Marine Corps). The presentation represents, in Boyd's own words, "A compendium of ideas and actions for winning and losing in a highly competitive world."

It starts with an introduction that one could arguably consider akin to a number of hypotheses, namely the assertion that, if conflict is a permanent feature of society and adaptability is the key to survival, "variety/rapidity/harmony/initiative . . . seem to be key qualities that permit one to shape and adapt to an ever-changing environment."[74] In the end, he returns to these key qualities, asserting that his analysis in "Patterns of Conflict" has confirmed the importance of these qualities. In between lies a conscious effort to uncover the dynamics of combat in which he fleshes out the details of what it means to "get inside the OODA loop" of the opponent at the various levels of war.

A crucial and original section of "Patterns of Conflict" involves an exploration of three modes of conflict he has distinguished in his panorama of military history:

[72] Boyd, "Patterns of Conflict," 134.
[73] Boyd, "Patterns of Conflict," 141.
[74] Boyd, "Patterns of Conflict," 12.

- *Attrition warfare* as practiced by French emperor Napoléon Bonaparte, by all sides during the nineteenth century and during World War I, by the Allies during World War II, and by present-day nuclear planners.
- *Maneuver conflict* as practiced by the Mongols, Napoléon, American Confederate general Thomas J. "Stonewall" Jackson and Union general Ulysses S. Grant, Adolf Hitler's generals (in particular Erich von Manstein, Heinz Guderian, Hermann Balck, Erwin Rommel), and the Americans under Generals George S. Patton and Douglas MacArthur.
- *Moral conflict* as practiced by the Mongols, most guerrilla leaders, a very few counterguerrillas (such as Ramon Magsaysay), and certain others from Sun Tzu to the present.[75]

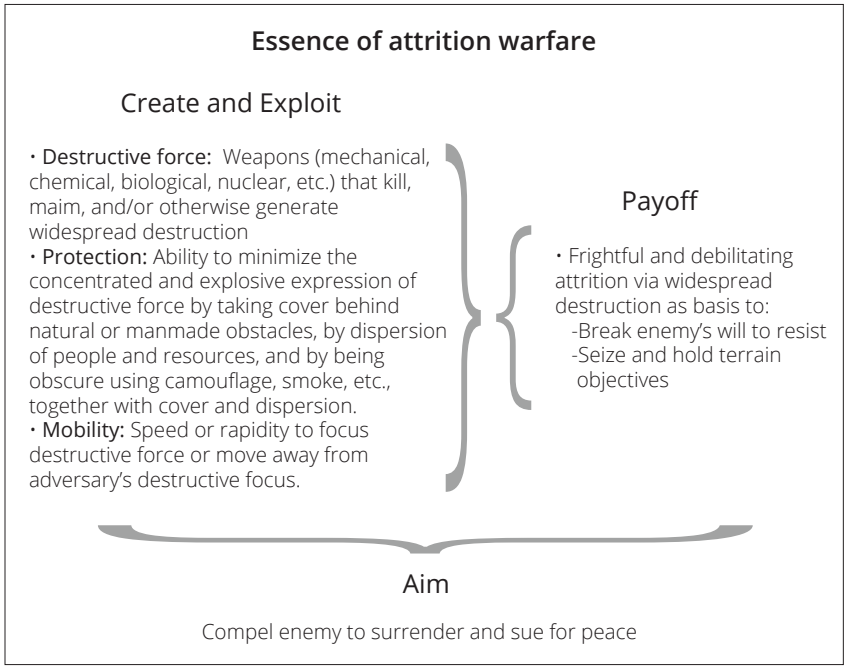
Contrary to what his critics assert, Boyd acknowledges the merits of attrition warfare in principle, and he is also keenly aware that blitzkrieg and guerrilla warfare are no guarantees for success as the history of warfare has shown that there are effective counters to both. "Patterns of Conflict" is filled with exactly that: elaborate sections showing the dialectic process of move and countermove. Yet, attrition warfare emphasizes mass and kinetic force and thus the physical domain. It is also deterministic and linear and bloody (figure 2).

Attrition warfare underutilizes leverages in the mental and moral domains, hence Boyd's preference for maneuver and moral conflict. These concepts are based on an original and innovative synthesis of the essences of guerrilla warfare and blitzkrieg. In both styles, he argues, battles are avoided. Instead, the essence of both is to:

- *penetrate an adversary* to subvert, disrupt or seize those connections, centers, and activities that provide cohesion (e.g., psychological/moral bonds, communications, lines of communication, command and supply centers).
- *exploit ambiguity*, deception, superior mobility, and

[75] Boyd, "Patterns of Conflict," 111.

Figure 2. Boyd's slide on attrition warfare



John Boyd, adapted by MCUP.

sudden violence to generate initial surprise and shock, repeatedly.

- *roll-up/wipe-out*, the isolated units or remnants created by subversion, surprise, shock, disruption, and seizure.[76]

These actions aim to "exploit subversion, surprise, shock, disruption, and seizure to generate confusion, disorder, panic, etc., thereby shatter cohesion, paralyze effort, and bring about adversary collapse."[77]

The reason for the extraordinary level of success, or in Boyd's words, "the message," lies in the fact that in both concepts "one operates in a directed yet more indistinct, more irregular and quicker manner than one's adversaries (and thus not just fast)." This enables one to "repeatedly concentrate or disperse more inconspicuously

[76] Boyd, "Patterns of Conflict," 98.
[77] Boyd, "Patterns of Conflict," 98.

and/or more quickly from or to lower levels of distinction (operational, organizational and environmental) without losing internal harmony." For the same reason one is able to "repeatedly and unexpectedly infiltrate or penetrate adversaries' vulnerabilities and weaknesses in order to splinter, isolate or envelop and overwhelm disconnected remnants of adversary organism." Or put in another way, one can

> operate inside [the enemy's OODA] loops or get inside their mind-time-space as a basis to penetrate the moral-mental-physical being of [one's] adversaries in order to pull them apart, and bring about their collapse. . . . Such amorphous, lethal, and unpredictable activity by blitz and guerrillas make them appear awesome and unstoppable which altogether produce uncertainty, doubt, mistrust, confusion, disorder, fear, panic . . . and ultimately collapse.[78]

They affect the connections and centers that provide cohesion, as Boyd explains in yet another slide on the same theme.[79]

These insights return in the concept of moral and maneuver conflict. Moral conflict leverages mistrust and disinformation to sever the bonds of an organization, while maneuver conflict aims to create and exploit an information differential, thus affecting the opponent's capacity to adapt. It not only regards disorientation as the only element affecting adaptability, but also the element of overload due to "a welter of threatening events."[80] Adaptability is affected not only by ambiguous information and uncertainty, but it is also compounded by fear due to threatening events. Interestingly, the employment of the various elements of maneuver conflict may not directly result in collapse. Instead, Boyd considers it equally valuable to aim for the creation of many isolated remnants of enemy forces that can later be mopped up. In light of the critique that Boyd expects victory through merely going through OODA cycles more rapidly, this is not a trivial transition. Thus, what Boyd called the "essence of maneuver conflict" can be viewed as depicted in figure 3.[81] In his slide on moral conflict,

[78] Boyd, "Patterns of Conflict," 101.
[79] Boyd, "Patterns of Conflict," 99.
[80] Boyd, "Patterns of Conflict," 117.
[81] Boyd, "Patterns of Conflict," 117.

Figure 3. Boyd's concept for maneuver conflict



John Boyd, adapted by MCUP.

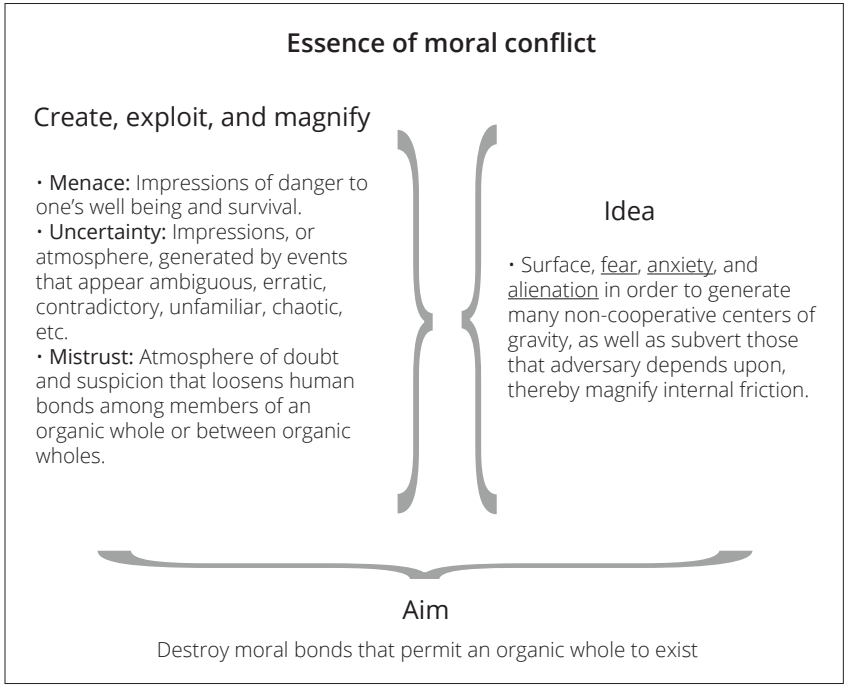
he includes ideas to counter mistrust, uncertainty, and danger, again demonstrating his emphasis on adaptability (figure 4). Synthesizing the essence of both modes of conflict, Boyd subsequently comes up with a plausible approach to induce what he calls "disintegration and collapse" (figure 5).[82] Clearly, there is more to Boyd than the simple OODA loop and more meaning behind that concept than is generally known. His reconceptualization of the meaning of tactics and strategy confirm this.

Redefining Tactics and Strategy

Having examined the inner workings of blitzkrieg and guerrilla warfare, Boyd offers original reconceptualizations of the dynamics at play

[82] Boyd, "Patterns of Conflict," 137.

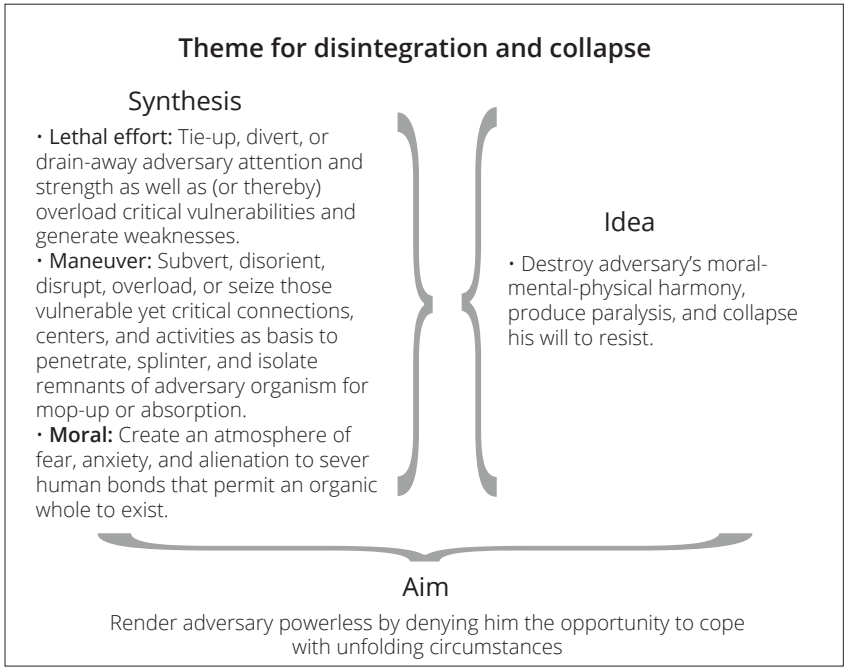
Figure 4. Boyd's concept for moral conflict



John Boyd, adapted by MCUP.

at the four levels of war, expressing them in relation to the theme of adaptation. At the tactical and grand tactical (i.e., operational) levels, adaptation can be seen as a function of speed of action and reaction and of information availability. Here, success can indeed be achieved by translating information into appropriate action faster than an adversary, as in aerial combat. However, even here speed of decision-making should also be linked to the deployment of a variety of actions, to irregularity and ambiguity, and to a high but varying pace, so predictability is prevented and the opponent is forced to react quickly and continuously. Boyd emphasizes a constant relationship between physical action, or threat thereof, and its effects on morale and the enemy command process. Rapid unexpected actions together in rapid succession have a great demoralizing effect and can disrupt the interaction capabilities between tactical units. Even at these levels of combat, merely rapid OODA looping is too

Figure 5. Inducing disintegration and collapse



John Boyd, adapted by MCUP.

simplified an interpretation of the meaning of the OODA loop concept. As Boyd explains in "Patterns of Conflict":

> Tactics
>
> [OODA] more inconspicuously, more quickly, and with more irregularity as basis to keep or gain initiative as well as shape or shift main effort: to repeatedly and unexpectedly penetrate vulnerabilities and weaknesses exposed by that effort or other effort(s) that tie-up, divert, or drain-away adversary attention (and strength) elsewhere.
>
> Grand Tactics
>
> Operate inside adversary's [OODA] loops, or get inside his mind-time-space, to create tangles of threatening and/or non-threatening events/efforts as well

as repeatedly generate mismatches between those events/efforts adversary observes, or imagines, and those he must react to, to survive; thereby

Enmesh adversary in an amorphous, menacing, and unpredictable world of uncertainty, doubt, mistrust, confusion, disorder, fear, panic, chaos . . . and/or fold adversary back inside himself; thereby

Maneuver adversary beyond his moral-mental-physical capacity to adapt or endure so that [he] can neither divine our intentions nor focus his efforts to cope with the unfolding strategic design or related decisive strokes as they penetrate, splinter, isolate or envelop, and overwhelm him.[83]

At the *strategic level*, Boyd notes, adaptation is more indirect and takes longer time intervals and it is clear that the rapid OODA construct is not sufficient and less applicable. At this level social systems are characterized by a wide variety of subsystems and layers and thus a greater ability to counter enemy actions. Here it is less about physical actions and maintaining a high pace and more about the ability to influence various dimensions of the opponent to respond to actions that affect both its system and its environment. At this level the game is to:

> Penetrate adversary's moral-mental-physical being to dissolve his moral fiber, disorient his mental images, disrupt his operations, and overload his system, as well as subvert, shatter, seize, or otherwise subdue those moral-mental-physical bastions, connections, or activities that he depends upon, in order to destroy internal harmony, produce paralysis, and collapse adversary's will to resist.[84]

At the *grand-strategic level* (a level that gets a somewhat superficial and perhaps naive treatment compared to the other levels) adaptability revolves around shaping the political and societal environment, including an attractive ideology, and adopting a mode of

[83] Boyd, "Patterns of Conflict," 134.
[84] Boyd, "Patterns of Conflict," 134.

warfare the opponent is ill-suited to wage. Leaders should develop attractive and inspiring national goals and philosophies that unite and guide the nation as well as attract the uncommitted. Meanwhile they should demonstrate the ruling government is corrupt, morally bankrupt, disconnected from the population, and provoke enemy actions that are considered disproportional and ineffective. Or, in Boyd's words:

> Shape pursuit of national goal so that we not only amplify our spirit and strength (while undermining and isolating our adversaries) but also influence the uncommitted or potential adversaries so that they are drawn toward our philosophy and are empathetic toward our success.[85]

Coming back to his hypothesis offered in the first slides, marrying epistemology to blitzkrieg and guerrilla warfare, according to Boyd, the message is that

> he who is willing and able to take the initiative to exploit variety, rapidity, and harmony—as the basis to create as well as adapt to the more indistinct—more irregular—quicker changes of rhythm and pattern, yet shape the focus and direction of effort—survives and dominates. . . . [The Game is to] create tangles of threatening and/or non-threatening events/efforts as well as repeatedly generate mismatches between those events/efforts adversary observes or imagines (*cheng*/*Nebenpunkte* [simultaneous attacks]) and those he must react to (*ch'i*/*Schwerpunkt*) as basis to penetrate adversary organism to sever his moral bonds, disorient his mental images, disrupt his operations, and overload his system, as well as subvert, shatter, seize, or otherwise subdue those moral-mental-physical bastions, connections, or activities that he depends upon, thereby pull adversary apart, produce paralysis, and collapse his will to resist.[86]

[85] Boyd, "Patterns of Conflict," 141.
[86] Boyd, "Patterns of Conflict," 174–75.

In a strategic sense, he continues,

> We need a variety of possibilities as well as the rapidity to implement and shift among them. Why? [The] ability to simultaneously and sequentially generate many different possibilities as well as rapidly implement and shift among them permits one to repeatedly generate mismatches between events/efforts adversary observes or imagines and those he must respond to (to survive). Without a variety of possibilities, adversary is given the opportunity to read as well as adapt to events and efforts as they unfold.[87]

Hence, Boyd asserts, "Variety/rapidity allow one to magnify adversary friction hence stretch-out his time to respond in a directed way." Harmony and initiative stand and work on the opposite side by diminishing one's own friction, compressing "one's own time to exploit variety/rapidity in a directed way. Altogether variety/rapidity/harmony/initiative enable one to operate inside adversary's observation-orientation-decision-action loops to enmesh adversary in a world of uncertainty, doubt, mistrust, confusion, disorder, fear, panic, chaos . . . and/or fold adversary back inside himself so that he cannot cope with events/efforts as they unfold."[88]

At the most abstract level, he concludes in "The Strategic Game," strategy thus aims "to improve our ability to shape and adapt to unfolding circumstances, so that we (as individuals or as groups or as a culture or as a nation-state) can survive on our own terms."[89]

Reflecting insights from systems theory, complexity theory, and evolution theory, he posits that strategy resembles a game of "interaction and isolation": isolate an opponent and in due course they will lose internal cohesion and external support, their delayed and misinformed reactions will be ineffective, and they will fail to adjust correctly to the changed environment. The aim is to change the opponent from an open system into a closed system that slowly suffers the fate of all closed systems and the second law of thermodynamics, notions that found their place in Boyd's work: entropy. The cor-

[87] Boyd, "Patterns of Conflict," 176.
[88] Boyd, "Patterns of Conflict," 177.
[89] Boyd, "Strategic Game of ? & ?," 58.

ollary is the imperative to maintain constant interaction between the units of an organization and between the organization and its environment.

Creating Agile Organizations

Boyd's advice for organizational culture, structure, leadership, and communication processes, elaborated in "Organic Design for Command and Control" and "The Conceptual Spiral," is consistent with this argument. The key challenge is maintaining cohesion while conducting fluid, varied, and rapid actions, despite uncertainty and threats. The solution comes from his essay, his study of blitzkrieg and guerrilla warfare, but also from organization theory and theories on organizational and individual learning and is supported by studies such as van Creveld's work *Command in War* (and recent works on organizational resilience and adaptability).[90] First, Boyd advocates a multispectral orientation: "We must interact in a variety of ways with our environment" and "examine the world from a number of perspectives so that we can generate mental images or impressions that correspond to that world."[91]

This can only be accomplished, he noted in "The Strategic Game," by a continuous process of "analysis and synthesis across a variety of domains."[92] This would produce a repertoire of "orientation patterns." "Orientation is the Schwerpunkt," he argued in "Organic Design for Command and Control": "It shapes the way we interact with the environment, the way we observe, the way we decide, the way we act."[93]

Second, he advocated creating adaptable, open, learning organizations with a large degree of decentralization that can comfortably operate in an insecure environment due to their reduced information requirements. The answer to uncertainty lies in a relatively large degree of autonomy of action at the tactical level of an organization. A high degree of mutual trust, shared orientation patterns created by shared experience and training, combined with

[90] See Martin van Creveld, *Command in War* (Boston, MA: Harvard University Press, 1987).
[91] Boyd, "Strategic Game of ? & ?," 10.
[92] Boyd, "Strategic Game of ? & ?," 58.
[93] Boyd, "Organic Design for Command and Control," 16.

clear objectives and common doctrine ensure that a minimum of communication suffices to maintain coherence between actions of various units.

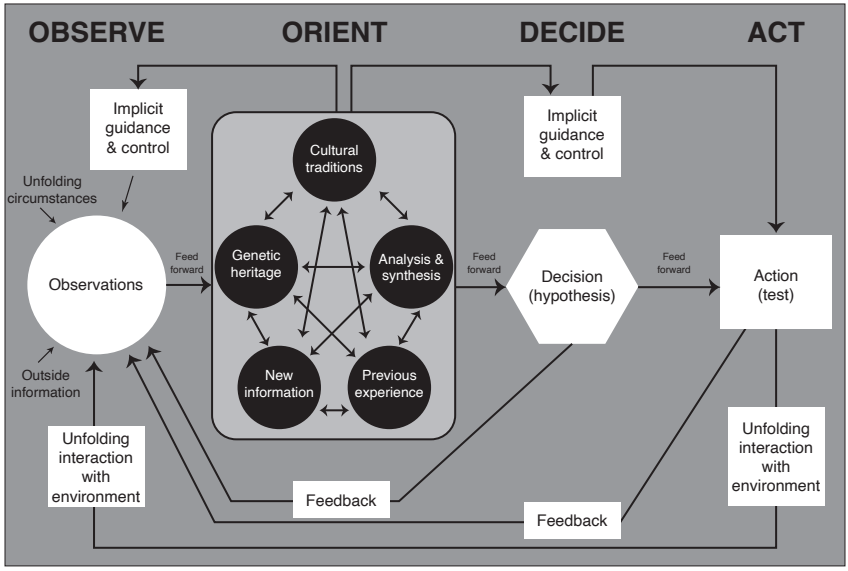
In contrast to standard military hierarchical cultures with top-down control, each level and each unit must have that degree of autonomy and repertoire of resources required to enable self-initiative and creativity, which in turn is driven by the need to deal with the degree of dynamism and uncertainty of the immediate organizational environment. Moreover, in direct reply to those such as Storr, who critique Boyd on the basis that there is not one OODA loop but multiple loops, Boyd is aware of the interaction of multiple and layered OODA loops in the various levels of the military organization.

As he explains in "Patterns of Conflict," blitzkrieg employs a concept for command and control in which each unit at the different levels of organization, from simple to complex, has its own specific OODA time cycle. The cycle of time increases commensurate with an increase in the level of organization, as one tries to control more levels and issues. As the number of events increase, the longer it takes to observe, orient, decide and act—thus "the faster tempo, or rhythm, at lower levels should work within the slower rhythm but larger pattern at higher levels so that overall system does not lose its cohesion or coherency."[94]

In such an organization, *command*, Boyd indicates, is a wrong term, as is *control*. Higher command levels must restrain themselves in their desire to know all that is going on at lower levels and to interfere. They must encourage cooperation and consultation among lower levels and be open for suggestions, bottom-up initiatives, and critique. It is thus more a question of leadership and appreciation of what is going on and comparing this to what is expected. This approach to organization and leadership would allow a high tempo of operations, the exploitation of opportunities limit the need for time-consuming detailed top-down guidance and hence facilitate rapid adaptation to changing circumstances. In line with literatures on Japanese management techniques and complex adaptive systems, this idea also surfaces in "The Conceptual Spiral," in which he argues that successful organizations survive because of their ability

[94] Boyd, "Patterns of Conflict," 72.

Figure 6. The real OODA loop



John Boyd, adapted by MCUP.

to continually innovate and experiment to deal with uncertainty and actually thrive because of their ability to introduce novelty into their environment. Interestingly, Boyd's arguments resonate closely with recent works on organizational resilience and adaptability.[95]

The Real OODA Loop

In "The Essence of Winning and Losing," these arguments are interwoven and condensed. This sketch depicts an elaborate double-loop cybernetic model, informed by models found in academic articles and books on cognitive science and systems theory and in works on complex and chaotic systems, areas he had studied in the previous decades. At heart, the OODA loop is much less a model of decision-making than an epistemological model that is informed by the likes of Heisenberg, Gödel, Popper, Bronowski, Kuhn, and Polanyi; anthropologists such as Geertz; information theorists and cyberneticists such as Wiener and Neumann; system theorists such

[95] See Andrew Zolli and Ann Marie Healy, *Resilience: Why Things Bounce Back* (New York: Simon and Schuster, 2012); and Max McKeown, *Adaptability: The Art of Winning in an Age of Uncertainty* (London: Kogan Page, 2012).

as Bertalanffy; and a host of others, including Darwin. It is a model of individual- and organizational-level learning and adaptation processes, or, following his own labels, a model of: a metaparadigm of mind and universe, a dialectic engine, an inductive-deductive engine of progress, a paradigm for survival and growth, and a theory of intellectual evolution.[96] As noted before, his academic Zeitgeist, and its influence on his thinking comes explicitly to the fore when he observes that "the OODA loop sketch and related insights represent an evolving, open-ended, far-from-equilibrium process of self-organization, emergence, and natural selection."[97]

Part IV:
Beyond the Rapid OODA Loop Idea

More than Speed

While this snapshot does not do justice to Boyd's work, it has at least disproved the common view that the OODA loop model, interpreted as an argument that victory goes to the side that can decide most rapidly, sufficiently captures the meaning and breadth of Boyd's work. Instead, they suggest that Boyd's work constitutes a theory of considerable sophistication, consistency, and persuasiveness, as well as originality. It is also more comprehensive, subtle, and complex than the common rendering and the general perception of what he argues. It also is clear that the commonly held view on the meaning of the OODA loop is incomplete.

First, the illustration of the OODA loop that is featured in a host of publications is actually a very simplified rendering of a much more complex and informative graphic Boyd developed and included in his work. This simplified version indeed tends toward an exclusive focus on speed of decision-making, while obscuring various other themes, theories and arguments that lie behind and are incorpo-

[96] See his remarks in Conant, *Two Modes of Thought*, 78; Joseph Chilton Pearce, *The Crack in the Cosmic Egg* (Rochester, VT: Park Street Press, 2002), 95; Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: Chicago University Press, 1970), 64, 66, 86, and 162; and in Michael Polanyi, *Knowing and Being*, ed. Marjorie Grene (London: Routledge and Kegan Paul, 1969), 155. Boyd's personal papers and his library can be found at the Marines Corps University Library.

[97] Boyd, "The Essence of Winning and Losing," 5.

rated in it. Simply put, the OODA loop idea as advanced by Boyd depicts much more than just going through the decision cycle more rapidly than one's opponent, and subsequent critique on Boyd's work should therefore be based not on the simplified model but on the comprehensive picture he painted, as well as through the discussions that preceded the birth of this complex picture.

There is no doubt that the OODA loop is a very important element of Boyd's work. As an abstract model, the OODA loop can be used as a framework to explain his thoughts. It runs through all the levels of military operations and aggregation levels of social systems. Nevertheless, the comprehensive overview of Boyd's work shows that the OODA loop represents and means more than a decision process and in Boyd's hands the model contains more elements for victory than information superiority and speed.

The first misconception about the OODA loop concerns the element of speed. The rapid OODA looping idea suggests a focus on speed of decision-making, and "out-looping" the opponent by going through consecutive OODA cycles faster. This is not incorrect, indeed, Boyd frequently suggested as much. However, he also addressed the aspect of altering the tempo. Tempo makes it hard for the opponent to adequately adapt to the fast-changing situation, including the element of speed. It is not absolute speed that counts; it is the relative tempo or a variety in rhythm that counts. The OODA speed is a parameter to vary, for it is also a pattern one can give away.

Second, and related to the previous observation, rapid OODA looping should not be equated with merely going through the decision cycle faster than the opponent and/or accomplishing this process with more information, for such a view ignores the close interrelationship between physical action and the mental and moral component. One can have a distinct advantage in timely and accurate information, but if this cannot be translated into meaningful action, this "information superiority" is useless. Boyd instead argues that the aim is to create and perpetuate a highly fluid and menacing state of affairs for the enemy, and to disrupt or incapacitate his ability to adapt to such an environment. Thus, the psychological (mental/moral) and temporal mechanisms come into play only if and when the physical and spatial dimensions are also adequately manipulated. Physical lethal and threatening actions interact with mental and

moral effects. Although it is perception and thus the psychological dimension that is the heart of the theory, this does not mean physical aspects are less important. He shows how they are closely related, and he highlights the effectiveness of the synthesis of actions in the physical, mental, and moral dimensions.

Third, while tempo is important, it is also just one dimension among a significant number of other control dimensions in this theme. And it is probably important in particular at the tactical level as a factor directly influencing chances of success. At the grand tactical level Boyd is more concerned with "operating inside adversary's mind-time-space" and with generating "mismatches between those events/efforts adversary observes, or imagines, and those he must react to."[98] At this level, as well as at the strategic and the grand-strategic there are other dimensions that can be manipulated.

This also surfaces when he discusses the three categories of conflicts. Negating time and information is perhaps the necessary mechanism that leads to inadequate reactions, but not sufficient. Other factors need to combine with lack of time to induce a moral, mental, and physical incapability to react. Physical as well as non-physical connections must be severed through the game of isolation and interaction. Conspicuous and varied actions are necessary, and it is these, combined with the menacing aspect of those actions and impressions, that produce paralysis, disintegration, and noncooperative centers of gravity and that shatter cohesion. The aim of the theme of disintegration and collapse is rendering the adversary powerless by denying him the opportunity to cope with unfolding circumstances. The temporal dimension plays a large role, but rather within the context of the organism's ability to adapt.

The Centrality of Orientation

The narrow interpretation of the OODA loop also deemphasizes another essential feature of Boyd's theory: developing, maintaining, and reshaping one's orientation, the box around which the loop graphically revolves. Speed, or rather tempo, is not very useful if one cannot adequately react to incoming information or if one's interpretation of events is flawed. Orientation shapes the way we interact

[98] Boyd, "Patterns of Conflict," 131.

with the environment. It determines how and what we observe, decide, and act. It determines the character of the present OODA loops, while the present OODA loops shape the character of future orientation. It feeds forward and backward. Orientation is the key phase in the OODA loop. Brave decisions and heroic actions are pointless if the observation is inaccurate because of our inadequate orientation. Orientation is made up of genetic heritage, cultural tradition, experience, and unfolding circumstances. Orientation is shaped by the interplay of these factors. It is the "genetic code" of an organism or organization. For any command concept, then, orientation is the *schwerpunkt*.

Second, to avoid predictability and ensuring adaptability to a variety of challenges, just having one common orientation, one thought pattern, one belief system, or one military doctrine to solve all operational contingencies will not suffice. It is essential to have a repertoire of orientation patterns and the ability to select the correct one according to the situation at hand while denying the opponent the latter capability. To maintain variety in response one should have variety built into the making of orientation patterns. Apart from combining an analytic with a synthetic approach, the way to accomplish this is by involving people with varying backgrounds and experience and confronting them as a group with varying situations. This will build trust and variety in response and communication about each other's way of looking at situations. Boyd is very much aware that one needs to take care when selecting people in command but also in operational headquarters. This concept in turn requires a common outlook and doctrine, otherwise units may respond in totally unexpected ways.

At the same time, one wants to keep the opponent in the dark or bewildered. This will make it hard for them to read the strategic environment correctly, thus making any selection of orientation pattern and subsequent set of responses guesswork. Here, the idea of creating many noncooperative centers makes good sense. Without the ability of proper communication, the isolated and/or disoriented units send contradicting, incomplete, inconsistent, outdated, or no information at all. This denies a commander the capability to form a balanced judgment that is based on various perspectives on the same situation. Boyd calls this a situation in which a

command-and-control system is turned inward. Such a situation will always lead to dissolution and disintegration.

The third aspect Boyd argues for in relation to orientation is the insistence to have a repertoire of relevant schemata combined with a capability to validate the schemata before and during operations and the capability to devise and incorporate new ones, if one is to survive in a rapidly changing environment. Indeed, learning is essential for adaptation. One may react very fast to unfolding events, but if one is constantly surprised nevertheless, apparently one has not been able to turn the findings of repeated observations and actions into a better appreciation of the opponent, i.e., one has not learned but instead continued to operate on existing orientation patterns. Verifying existing beliefs and expectations and, if necessary, modifying these in a timely manner, is crucial. The way to play the game of interaction and isolation is to spontaneously generate new mental images that align with an unfolding world of uncertainty and change, Boyd asserted in "The Strategic Game."

So, the abstract aim of Boyd's method is to render the enemy powerless by denying them the time to mentally cope with the rapidly unfolding, and naturally uncertain, circumstances of war. Only in the most simplified way, or at the tactical level, can this be equated with the narrow, rapid OODA loop concept. Indeed, it is only at the tactical level that Boyd actually refers to OODA "more inconspicuously, more quickly, and with more irregularity."[99] So, the view that the rapid OODA loop idea captures Boyd's work is valid only if one confines oneself to the tactical level, but it leaves unaddressed the fact that he also dealt with the other levels of war and that he dealt with other subjects such as organizational culture, as well as the fact that at the other levels of war, he focused on other factors relevant for adaptability.

Adaptability versus Organizational Collapse

Indeed, the comprehensive drawing of the OODA loop and a complete reading of his work suggests strongly that the broad theme of adaptation is actually the one that is at the heart of Boyd's work. Maintaining the ability to adapt while denying that to the opponent

[99] Boyd, "Patterns of Conflict," 141.

is the all-embracing theme connecting the various parts of "A Discourse on Winning and Losing." "Adaptability is the power to adjust or change in order to cope with new or unforeseen circumstances," he noted in "Patterns of Conflict," and "in dealing with uncertainty [it] seems to be the right counterweight."[100] The dominant and overarching theme is not the narrow interpretation of rapid OODA looping, or "decision superiority," but rather the ability to adapt to the unfolding, multidimensional events, which occur at different time scales. The rapid OODA looping idea, in the narrow sense, fits in the larger theme of adaptation, and even this narrow view gains meaning if it is expressed within the context of organizational adaptation.

Boyd regarded the contestants, the armies, and their headquarters and societies as living systems, as organisms, that aim to survive and prosper. To that end, they—individuals, platoons, brigades, divisions, army corps, nations, and any other type of social system—observe, learn, and adapt. His theory is about interacting processes of thought, anticipation, and feedback loops, about learning and adaptation, and about the fatal consequences of not learning or being constrained in one's efforts. The OODA loop stands for such a process of learning, of evolving.

Adaptation naturally follows from Boyd's view of war as being about survival. The strategic aim, he asserts in "Patterns of Conflict," is "to diminish adversary's capacity while improving our capacity to adapt as an organic whole, so that our adversary cannot cope—while we can cope—with events/efforts as they unfold."[101] He deliberately adopts a neo-Darwinist/complex adaptive systems perspective. He seeks to create organizations that are adaptive. The themes of interaction-isolation, mismatches, initiative, harmony, variety, rapidity, ambiguity, novelty, uncertainty, and the dynamic in war of doctrine/counterdoctrine development must be seen within this context.

Boyd argues that adaptation occurs across various timescales, and he develops a view on what adaptability means and requires at each level. Each level knows its specific "name of the game." At the tactical level and operational level, actions, movements, attacks, feints, threats, etc., disrupt the enemy's organizational processes, confuse commanders and personnel, attrit his forces, and dislocate

[100] Boyd, "Patterns of Conflict," 124–25.
[101] Boyd, "Patterns of Conflict," 134.

his units. Confusion, fear, and lack of information or the ability to react on correct perception of the threats degrade trust, cohesion, and courage, and thus the ability to cohere and respond collectively and to take the initiative, i.e., to adapt adequately as an organization. Adaptation is rather direct.

At the strategic level, adaptation is more indirect and takes longer time intervals. It revolves around adjusting doctrines and force structures and disorienting the opponent's orientation patterns, or mental images. At the grand-strategic level it revolves around shaping the political and societal environment, including an attractive ideology and selecting a form of warfare. The theme for vitality and growth lists as the aim improving fitness as an organic whole to shape and expand influence or power through the course of events in the world. This also surfaces as the national goal in which the emphasis is on the effective combination of isolation and preservation strategies in all the dimensions, the mental-moral and the physical. Another major issue is the absence of emphasis on the temporal aspect because success here is not (only) overloading the opponent's OODA system but derives from the interplay of leveraging across multiple dimensions. Success is the result of playing the game of interaction and isolation well.

Boyd thus left us with war construed as a clash between two or more complex adaptive systems composed of many interconnected layers of subsystems. The aim is to drive the opponent toward a closed condition, fully aware that the opponent will try to do likewise. In a sense, Boyd aims for organizational paralysis. His slides include references to various stages of degradation of organization effectiveness. To repeat, the game is "to penetrate adversary organism to sever his moral bonds, disorient his mental images, disrupt his operations, and overload his system, as well as subvert, shatter, seize, or otherwise subdue those moral-mental-physical bastions, connections, or activities that he depends upon thereby pull adversary apart, produce paralysis, and collapse his will to resist."[102] Expressed in generic terms, in Boyd's work we find the following set of actions that social systems can employ to accomplish their aims when in conflict (box 1).

[102] Boyd, "Patterns of Conflict," 175.

Box 1. Generic methods to influence complex adaptive systems

1. Use multiple strategies/avenues.
2. Affect the accuracy of the cognitive/feedback process. If comprehension helps to achieve cohesion and maintain purposeful behavior, the corollary is that confusion helps to create collapse.
3. Overload adversary cognitive capacity.
4. Eliminate (and/or threaten) particular crucial (real or imaginary) subsystems.
5. Diminish the variety of subsystems (affecting the capability to respond to a variety of threats, and diminishing the decision or adaptation space) alternatively achieving and maintaining a relative and relevant advantage in variety.
6. Disrupt the moral, physical, and/or informational vertical and horizontal relations (i.e., cohesion) among subsystems.
7. Close the enemy off from his physical/social environment.
8. Shape the environment of a system faster than the opponent's capability to cope with it.
9. Disrupt the information flow between the environment and the system.
10. Ensure the irrelevance of the schemata of the opponent, or the inability to validate those while ensuring sufficient accuracy of one's own schemata.
11. Change the nature of war: waging a form of warfare that does not correspond to the opponent's doctrine and strategic preference (schemata).
12. Change the environment in terms of alliances, location, and/or stakes involved.

Parting Shot

"A Discourse on Winning and Losing" is not a theory of everything but rather what Colin Gray called a "partial theory," with some elements of a general theory.[103] It has little to say about current security prob-

[103] Gray, *Modern Strategy*, 124–26, distinguishes four levels to categorize strategic theories: 1) a level that transcends time, environment, political and social conditions, and technology (e.g., Clausewitz and Sun Tzu); 2) a level that explains how the geographical and functional complexities of war and strategy interact and complement each other (Corbett on naval warfare); 3) a level that explains how a particular kind or use of military power strategically affects the course of conflict as a whole (Mahan, Douhet, Schelling

lems, such as fragile states, the proliferation of weapons of mass destruction, nuclear strategy, or maritime or air warfare (indeed, "Patterns of Conflict" comes almost entirely down to an analysis of land warfare), nor was it intended to do so. Yet, it contains insights that have a generic applicability beyond military battle and beyond interstate warfare. It is strongest as an exploration of operational art but also offers novel, highly conceptual generic interpretations of the nature of tactics and strategy.

The OODA loop, including the simple model, has turned out to signify a rich array of ideas and levers to manipulate beyond speed and information superiority. The comprehensive drawing of the OODA loop and a complete reading of his work suggests strongly that maintaining the ability to adapt while denying that to the opponent is the theme connecting the various parts of "A Discourse on Winning and Losing." "Adaptability is the power to adjust or change in order to cope with new and unforeseen circumstances," Boyd noted in "Patterns of Conflict," and "in dealing with uncertainty it seems to be the right counterweight."[104]

Critique is warranted, up to a point. Boyd certainly was not a trained academic in political science or military history, but most definitely a serious scholar of war and warfare. His work may not stand up to the standards of social science, yet it is rather solidly grounded in history and a host of other scientific disciplines. His use of history was biased but also was more comprehensive and less preconceived than, for example, Basil Liddell Hart's. He may have applied insights from epistemology, biology, physics, or mathematics that seem improper, but in doing so at the time, he was merely following in the footsteps of intellectual giants such as Werner Heisenberg, Ludwig von Bertalanffy, Nobel prize-winners Ilya Prigogine and Murray Gell-Mann, accomplished economists Kenneth Arrow and Brian Arthur, and many others (including contemporary social scientists, historians, and leading management consultants). Apart from tan-

on the role of maritime power, airpower, and nuclear power, respectively); and 4) a level that explains the character of war in a particular period, keyed to explicit assumptions about the capabilities of different kinds of military power and their terms of effective engagement (the use of airpower as a coercive tool).

[104] Boyd, "Patterns of Conflict," 124–25.

gible doctrinal influence, Boyd certainly has given scholars new and fruitful perspectives on the dynamics of armed conflict.

In the end, Boyd's work constitutes an eclectic search for patterns of winning and losing through a survey of military history; an argument against technofetishism and an attritionist, deterministic military mindset; a rediscovery of the mental/moral dimensions of war; a philosophy for command and control; a redefinition of strategy; a search for the essence of strategic interaction; a plea for organizational learning and adaptability; and, finally, an argument on thinking strategically. By giving epistemology, uncertainty, and cognitive processes central stage, as argued elsewhere, he is the first postmodern strategist.[105]

[105] See Osinga, *Science, Strategy and War*, 106–11, 242–43.

CHAPTER



"A Discourse on Winning and Losing" and an Abstract for "Destruction and Creation"

Introduced by Frans P. B. Osinga

"A Discourse on Winning and Losing" begins with an abstract in which Boyd lays out the aim and main idea, which is: "to flourish and grow in a many-sided uncertain and ever changing world that surrounds us, suggests that we have to make intuitive within ourselves those many practices we need to meet the exigencies of that world." The concise 16-page essay "Destruction and Creation" formed the foundation of "A Discourse on Winning and Losing." Completed in September 1976, its central theme is epistemological in nature: the question of how we comprehend and cope with our environment and develop mental patterns or concepts of meaning. The purpose of the essay is to sketch out how we destroy and create these patterns to permit us to both shape and be shaped by a changing environment, a topic that would resurface throughout his subsequent presentations.

The essay consists of an abstract and eight paragraphs. The heart of the essay is the discussion about the nature of knowledge that explores highly abstract concepts from the fields of mathematical logic, physics, and thermodynamics. John Boyd links Kurt Gödel's incompleteness theorem, Werner Heisenberg's uncertainty principle,

and the second law of thermodynamics, concepts he would often refer to in his later presentations. With explicit and implicit references to epistemological theorists such as Michael Polanyi, Karl Popper, and Thomas S. Kuhn, the essay is highly philosophical and obviously rooted in the epistemological debates that raged in the 1960s. All point to the unavoidable and all-pervasive presence of uncertainty in scientific discovery, and by extension, Boyd observes, for any attempt to understand and respond to real-world developments.

For Boyd, there is an obvious connection between these fundamental epistemological issues and struggles for survival. Survival and growth of any organism, Boyd concludes, depends on the ability to learn, to develop adequate mental models, and to continually assess the adequacy of these models, what cognitive scientists (which feature in Boyd's bibliography) would call double-loop learning. This continuous process requires both analysis and synthesis, both induction and deduction, as well as a multispectral approach.

Boyd returned to the notions laid down in this essay when developing his ideas about the character of a good command and control system and the essence of the strategic game. In 1995, he condensed his ideas in his final presentation, and in the five slides that make up that briefing he returns again to themes introduced in the essay.

A Discourse on Winning and Losing

By John R. Boyd

Abstract

To flourish and grow in a many-sided, uncertain and ever-changing world that surrounds us, suggests that we have to make intuitive within ourselves those many practices we need to meet the exigencies of that world. The contents, hence the five sections, that comprise this "Discourse" unfold observations and ideas that contribute toward achieving or thwarting such an aim or purpose. Specifically:

- "Patterns of Conflict" represents a compendium of ideas and actions for winning and losing in a highly competitive world;
- "Organic Design for Command and Control" surfaces the implicit arrangements that permit cooperation in complex, competitive, fast moving situations;

- "The Strategic Game of ? and ?" emphasizes the mental twists and turns we undertake to surface appropriate schemes or designs for realizing our aims or purposes;
- "Destruction and Creation" lays out in abstract but graphic fashion the ways by which we evolve mental concepts to comprehend and cope with our environment;
- "Revelation" makes visible the metaphorical message that flows from this "Discourse."

As one proceeds from "Patterns" through "Organic Design," "Strategic Game," and "Destruction and Creation" to "Revelation" he or she will notice that the discussion goes from the more concrete and obvious to the more abstract. In this sense, one will notice the rise away from many particular actions and ideas to fewer and more general concepts to account for these many actions and ideas. In this context, "Patterns" emphasizes historical readings, primarily military, as the backdrop for its discussion while the final four sections draw away from the historical framework and increasingly emphasize theory spread over a scientific backdrop as the medium for discussion.

Yet, the theme that weaves its way through this "Discourse on Winning and Losing" is not so much contained within each of the five sections, per se, that make up the "Discourse," rather, it is the kind of thinking that both lies behind and makes-up its very essence. For the interested, a careful examination will reveal that the increasingly abstract discussion surfaces a process of reaching across many perspectives; pulling each and every one apart (analysis), all the while intuitively looking for those parts of the disassembled perspectives which naturally interconnect with one another to form a higher order, more general elaboration (synthesis) of what is taking place. As a result, the process not only creates the "Discourse," but it also represents the key to evolve the tactics, strategies, goals, unifying themes, etc., that permit us to actively shape and adapt to the unfolding world we are a part of, live-in, and feed-upon.

Destruction and Creation

By John R. Boyd

[Note: The footnote style within "Destruction and Creation" has been modified to conform to scholarly footnoting standards using a consecutive numbering system and placement at the ends of sentences, but the order of the notes and their associated references reflect the original. Further, modern styles for spelling, punctuation, and capitalization have been applied to improve clarity and ease of reading.]

Abstract

To comprehend and cope with our environment we develop mental patterns or concepts of meaning. The purpose of this paper is to sketch out how we destroy and create these patterns to permit us to both shape and be shaped by a changing environment. In this sense, the discussion also literally shows why we cannot avoid this kind of activity if we intend to survive on our own terms. The activity is dialectic in nature generating both disorder and order that emerges as a changing and expanding universe of mental concepts matched to a changing and expanding universe of observed reality.

Destruction and Creation

Goal

Studies of human behavior reveal that the actions we undertake as individuals are closely related to survival, more importantly, survival on our own terms. Naturally, such a notion implies that we should be able to act relatively free or independent of any debilitating external influences—otherwise that very survival might be in jeopardy. In viewing the instinct for survival in this manner we imply that a basic aim or goal, as individuals, *is to improve our capacity for independent action*. The degree to which we cooperate, or compete, with others is driven by the need to satisfy this basic goal. If we believe that it is not possible to satisfy it alone, without help from others, history shows us that we will agree to constraints upon our independent action—in order to collectively pool skills and talents in the form of nations, corporations, labor unions, mafias, etc.—so that obstacles standing in the way of the basic goal can either be removed or over-

come. On the other hand, if the group cannot or does not attempt to overcome obstacles deemed important to many (or possibly any) of its individual members, the group must risk losing these alienated members. Under these circumstances, the alienated members may dissolve their relationship and remain independent, form a group of their own, or join another collective body in order *to improve their capacity for independent action*.

Environment

In a real world of limited resources and skills, individuals and groups form, dissolve and reform their cooperative or competitive postures in a continuous struggle to remove or overcome physical and social environmental obstacles.[1] In a cooperative sense, where skills and talents are pooled, the removal or overcoming of obstacles represents an improved capacity for independent action for all concerned. In a competitive sense, where individuals and groups compete for scarce resources and skills, an improved capacity for independent action achieved by some individuals or groups constrains that capacity for other individuals or groups. Naturally, such a combination of real-world scarcity and goal striving to overcome this scarcity intensifies the struggle of individuals and groups to cope with both their physical and social environments.[2]

Need for Decisions

Against such a background, *actions* and *decisions* become critically important. Actions must be taken over and over again and in many different ways. Decisions must be rendered to monitor and determine the precise nature of the actions needed that will be compatible with the goal. To make these timely decisions imply that we must be able to form mental concepts of observed reality, as we perceive it, and be able to change these concepts as reality itself appears to change. The concepts can then be used as decision-models for im-

[1] Nicholas Georgescu-Roegen, *The Entropy Law and the Economic Process* (Cambridge, MA: Harvard University Press, 1971); and Robert L. Heilbroner, *An Inquiry into the Human Prospect* (New York: W. W. Norton, 1974).

[2] Georgescu-Roegen, *The Entropy Law and the Economic Process*; and Heilbroner, *An Inquiry into the Human Prospect*.

proving our capacity for independent action. Such a demand for decisions that literally impact our survival causes one to wonder: How do we generate or create the mental concepts to support this decision-making activity?

Creating Concepts

There are two ways in which we can develop and manipulate mental concepts to represent observed reality: We can start from a comprehensive whole and break it down to its particulars or we can start with the particulars and build towards a comprehensive whole.[3] Saying it another way, but in a related sense, we can go from the general-to-specific or from the specific-to-general. A little reflection here reveals that deduction is related to proceeding from the general-to-specific while induction is related to proceeding from the specific-to-general. In following this line of thought can we think of other activities that are related to these two opposing ideas? Is not analysis related to proceeding from the general-to-specific? Is not synthesis, the opposite of analysis, related to proceeding from the specific-to-general? Putting all this together: Can we not say that general-to-specific is related to both deduction and analysis, while specific-to-general is related to induction and synthesis? Now, can we think of some examples to fit with these two opposing ideas? We need not look far. The differential calculus proceeds from the general-to-specific—from a function to its derivative. Hence, is not the use or application of the differential calculus related to deduction and analysis? The integral calculus, on the other hand, proceeds in the opposite direction—from a derivative to a general function. Hence, is not the use or application of the integral calculus related to induction and synthesis? Summing up, we can see that: *general-to-specific* is related to *deduction*, *analysis*, and *differentiation*, while, *specific-to-general* is related to *induction*, *synthesis*, and *integration*.

Now, keeping these two opposing idea chains in mind let us move on a somewhat different tack. Imagine, if you will, a domain (a

[3] Michael Polanyi, *Knowing and Being*, ed. Marjorie Green (Chicago: University of Chicago Press, 1969); and Alex F. Osborne, *Applied Imagination* (New York: Charles Scribner's Sons, 1963).

comprehensive whole) and its constituent elements or parts. Now, imagine another domain and its constituent parts. Once again, imagine even another domain and its constituent parts. Repeating this idea over and over again we can imagine any number of domains and the parts corresponding to each. Naturally, as we go through life, we develop concepts of meaning (with included constituents) to represent observed reality. Can we not liken these concepts and their related constituents to the domains and constituents that we have formed in our imagination? Naturally, we can. Keeping this relationship in mind, suppose we shatter the correspondence of each domain or concept with its constituent elements. In other words, we imagine the existence of the parts but pretend that the domains or concepts they were previously associated with do not exist. Result: We have many constituents, or particulars, swimming around in a sea of anarchy. We have uncertainty and disorder in place of meaning and order. Further, we can see that such an *unstructuring* or *destruction* of many domains—to break the correspondence of each with its respective constituents—is related to *deduction*, *analysis*, and *differentiation*. We call this kind of unstructuring a *destructive deduction*.

Faced with such disorder or chaos, how can we reconstruct order and meaning? Going back to the idea chain of specific-to-general, induction, synthesis, and integration the thought occurs that a new domain or concept can be formed if we can find some common qualities, attributes, or operations among some or many of these constituents swimming in this sea of anarchy. Through such connecting threads (that produce meaning) we synthesize constituents from, hence across, the domains we have just shattered.[4] Linking particulars together in this manner we can form a new domain or concept—providing, of course, we do not inadvertently use *only* those "bits and pieces" in the same arrangement that we associated with one of the domains purged from our imagination. Clearly, such a synthesis would indicate we have generated something new and different from what previously existed. Going back to our idea chain, it follows that *creativity* is related to *induction*, *synthesis*, and

[4] Osborne, *Applied Imagination*.

integration since we proceeded from unstructured bits and pieces to a new general pattern or concept. We call such action a *creative* or *constructive induction*. It is important to note that the crucial or key step that permits this creative induction is the separation of the particulars from their previous domains by the destructive deduction. Without this unstructuring the creation of a new structure cannot proceed—since the bits and pieces are still tied together as meaning within unchallenged domains or concepts.

Recalling that we use concepts or mental patterns to represent reality, it follows that the unstructuring and restructuring just shown reveals a way of changing our perception of reality.[5] Naturally, such a notion implies that the emerging pattern of ideas and interactions must be internally consistent and match-up with reality.[6] To check or verify internal consistency, we try to see if we can trace our way back to the original constituents that were used in the creative or constructive induction. If we cannot reverse directions, the ideas and interactions do not go together in this way without contradiction. Hence, they are not internally consistent. However, this does not necessarily mean we reject and throw away the entire structure. Instead, we should attempt to identify those ideas (particulars) and interactions that seem to hold together in a coherent pattern of activity as distinguished from those ideas that do not seem to fit in. In performing this task we check for reversibility as well as check to see which ideas and interactions match-up with our observations of reality.[7]

Using those ideas and interactions that pass this test together with any new ideas (from new destructive deductions) or other promising ideas that popped out of the original destructive deduction we again attempt to find some common qualities, attributes, or operations to re-create the concept—or create a new concept. Also, once again, we perform the check for reversibility and match-up with reality. Over and over again, this cycle of *Destruction* and *Creation* is

[5] Polanyi, *Knowing and Being*.

[6] Werner Heisenberg, *Physics and Philosophy: The Revolution in Modern Science* (New York: Harper Torchbooks, 1962); and Werner Heisenberg, *Across the Frontiers* (New York: Harper and Row, 1974).

[7] Jean Piaget, *Structuralism* (New York: Harper Torchbooks, 1971); Heisenberg, *Physics and Philosophy*; and Heisenberg, *Across the Frontiers*.

repeated until we demonstrate internal consistency and match-up with reality.[8]

Suspicion

When this orderly (and pleasant) state is reached the concept becomes a coherent pattern of ideas and interactions that can be used to describe some aspect of observed reality. As a consequence, there is little, or no, further appeal to alternative ideas and interactions in an effort to either expand, complete, or modify the concept.[9] Instead, the effort is turned inward towards fine tuning the ideas and interactions in order to improve generality and produce a more precise match of the conceptual pattern with reality.[10] Toward this end, the concept—and its internal workings—is tested and compared against observed phenomena over and over again in many different and subtle ways.[11] Such a repeated and inward-oriented effort to explain increasingly more subtle aspects of reality suggests the disturbing idea that perhaps, at some point, ambiguities, uncertainties, anomalies, or apparent inconsistencies may emerge to stifle a more general and precise match-up of concept with observed reality.[12] Why do we suspect this?

On one hand, we realize that facts, perceptions, ideas, impressions, interactions, etc. separated from *previous* observations and thought patterns have been *linked* together to create a new conceptual pattern. On the other hand, we suspect that refined observations now underway will eventually exhibit either more or a different kind of precision and subtlety than the previous observations and thought patterns. Clearly, any anticipated difference, or differences, suggests we should expect a mismatch between the new observations and the anticipated concept description of these observations. To assume otherwise would be tantamount to admitting that previous constituents and interactions would produce the same synthesis as any newer constituents and interactions that exhibit either

[8] Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1970); Heisenberg, *Physics and Philosophy*; and Heisenberg, *Across the Frontiers*.
[9] Kuhn, *The Structure of Scientific Revolutions*.
[10] Kuhn, *The Structure of Scientific Revolutions*.
[11] Kuhn, *The Structure of Scientific Revolutions*.
[12] Kuhn, *The Structure of Scientific Revolutions*.

more or a different kind of precision and subtlety. This would be like admitting one equals two. To avoid such a discomforting position implies that we should anticipate a mismatch between phenomena observation and concept description of that observation. Such a notion is not new and is indicated by the discoveries of Kurt Gödel and Werner Heisenberg.

Incompleteness and Consistency

In 1931, Kurt Gödel created a stir in the world of mathematics and logic when he revealed that it was impossible to embrace mathematics within a single system of logic.[13] He accomplished this by proving, first, that *any consistent system*—that includes the arithmetic of whole numbers—*is incomplete*. In other words, there are true statements or concepts within the system that cannot be deduced from the postulates that make-up the system. Next, he proved *even though such a system is consistent its consistency cannot be demonstrated within the system*.

Such a result does not imply that it is impossible to prove the consistency of a system. It only means that such a proof cannot be accomplished inside the system. As a matter of fact, since Gödel, Gerhard Gentzen and others have shown that a consistency proof of arithmetic can be found by appealing to systems outside that arithmetic. Thus, Gödel's proof indirectly shows that in order to determine the consistency of any new system we must construct or uncover another system beyond it.[14] Over and over, this cycle must be repeated to determine the consistency of more and more elaborate systems.[15]

Keeping this process in mind, let us see how Gödel's results impact the effort to improve the match-up of concept with observed reality. To do this, we will consider two kinds of consistency: The consistency of the concept and the consistency of the match-up

[13] Kurt Gödel, "On Formally Undecidable Propositions of the Principia Mathematica and Related Systems," in *The Undecidable: Basic Papers on Undecidable Propositions, Unsolvable Problems, and Computable Functions*, ed. Martin Davis (New York: Raven Press, 1965), 3–38; and Ernest Nagel and James R. Newman, *Gödel's Proof* (New York: New York University Press, 1958).
[14] Jagjit Singh, *Great Ideas of Modern Mathematics: Their Nature and Use* (New York: Dover, 1959); and Piaget, *Structuralism*.
[15] Singh, *Great Ideas of Modern Mathematics*; and Piaget, *Structuralism*.

between observed reality and concept description of reality. In this sense, if we assume—as a result of previous destructive deduction and creative induction efforts—that we have a consistent concept and consistent match-up, we should see no differences between observation and concept description. Yet, as we have seen, on one hand, we use observations to shape or formulate a concept; while on the other hand, we use a concept to shape the nature of future inquiries or observations of reality. Back and forth, over and over again, we use observations to sharpen a concept and a concept to sharpen observations. Under these circumstances, a concept must be incomplete since we depend on an everchanging array of observations to shape or formulate it. Likewise, our observations of reality must be incomplete since we depend upon a changing concept to shape or formulate the nature of new inquiries and observations. Therefore, when we probe back and forth with more precision and subtlety, we must admit that we can have differences between observation and concept description; hence, we cannot determine the consistency of the system—in terms of its concept, and match-up with observed reality—within itself.

Furthermore, the consistency cannot be determined even when the precision and subtlety of observed phenomena approaches the precision and subtlety of the observer—who is employing the ideas and interactions that play together in the conceptual pattern. This aspect of consistency is accounted for not only by Gödel's proof but also by the Heisenberg uncertainty or indeterminacy principle.

Indeterminacy and Uncertainty

The indeterminacy principle uncovered by Werner Heisenberg in 1927 showed that one could not simultaneously fix or determine precisely the velocity and position of a particle or body.[16] Specifically, he showed, due to the presence and influence of an observer, that the product of the velocity and position uncertainties is equal to or greater than a small number ([Max] Planck's constant) divided by the mass of the particle or body being investigated. In other words

$$\Delta V * \Delta Q \geq h/m$$

where ΔV is velocity uncertainty

[16] Heisenberg, *Physics and Philosophy*; and George Gamow, *Thirty Years That Shook Physics* (New York: Anchor Books, 1966).

ΔQ is position uncertainty and
h/m is Planck's constant (h) divided by observed mass (m).

Examination of Heisenberg's principle reveals that as mass becomes exceedingly small the uncertainty, or indeterminacy, becomes exceedingly large. Now—in accordance with this relation—when the precision, or mass, of phenomena being observed is little, or no different than the precision, or mass, of the observing phenomena the uncertainty values become as large as, or larger than, the velocity and size frame-of-reference associated with the bodies being observed.[17] In other words, when the intended distinction between observer and observed begins to disappear, the uncertainty values hide or mask phenomena behavior; or put another way, the observer perceives uncertain or erratic behavior that bounces all over in accordance with the indeterminacy relation.[18] Under these circumstances, *the uncertainty values represent the inability to determine the character or nature (consistency) of a system within itself*. On the other hand, if the precision and subtlety of the observed phenomena is much less than the precision and subtlety of the observing phenomena the uncertainty values become much smaller than the velocity and size values of the bodies being observed.[19] Under these circumstances, the character or nature of a system can be determined—although not exactly—since the uncertainty values do not hide or mask observed phenomena behavior nor indicate significant erratic behavior.

Keeping in mind that the Heisenberg principle implicitly depends upon the indeterminate presence and influence of an observer, we can now see—as revealed by the two examples just cited—that the magnitude of the uncertainty values represent the degree of intrusion by the observer upon the observed.[20] When intrusion is total (that is, when the intended distinction between observer and observed essentially disappears), the uncertainty values indicate er-

[17] Gamow, *Thirty Years That Shook Physics*.
[18] G. Spencer Brown, *Laws of Form* (New York: Julian Press, 1972).
[19] Gamow, *Thirty Years That Shook Physics*.
[20] Heisenberg, *Physics and Philosophy*.

ratic behavior.[21] When intrusion is low, the uncertainty values do not hide or mask observed phenomena behavior, nor indicate significant erratic behavior. In other words, the uncertainty values not only represent the degree of intrusion by the observer upon the observed but also the degree of confusion and disorder perceived by that observer.

Entropy and the Second Law of Thermodynamics

Confusion and disorder are also related to the notion of entropy and the second law of thermodynamics.[22] Entropy is a concept that represents the potential for doing work, the capacity for taking action or the degree of confusion and disorder associated with any physical or information activity. High entropy implies a low potential for doing work, a low capacity for taking action or a high degree of confusion and disorder. Low entropy implies just the opposite. Viewed in this context, the second law of thermodynamics states that all observed natural processes generate entropy.[23] From this law, it follows that entropy must increase in any closed system—or, for that matter, in any system that cannot communicate in an ordered fashion with other systems or environments external to itself.[24] Accordingly, whenever we attempt to do work or take action inside such a system—a concept and its match-up with reality—we should anticipate an increase in entropy hence an increase in confusion and disorder. Naturally, this means *we cannot determine the character or nature (consistency) of such a system within itself*, since the system is moving irreversibly toward a higher, yet unknown, state of confusion and disorder.

Destruction and Creation

What an interesting outcome! According to Gödel, we cannot—in general—determine the consistency, hence the character or nature, of an abstract system within itself. According to Heisenberg and the second law of thermodynamics, any attempt to do so in the real

[21] Brown, *Laws of Form*.
[22] Georgescu-Roegen, *The Entropy Law and the Economic Process*; and David Layzer, "The Arrow of Time," *Scientific American*, December 1975.
[23] Layzer, "The Arrow of Time."
[24] Layzer, "The Arrow of Time."

world will expose uncertainty and generate disorder. Taken together, these three notions support the idea that any inward-oriented and continued effort to improve the match-up of concept with observed reality will only increase the degree of mismatch. Naturally, in this environment, uncertainty and disorder will increase as previously indicated by the Heisenberg indeterminacy principle and the second law of thermodynamics, respectively. Put another way, we can expect unexplained and disturbing ambiguities, uncertainties, anomalies, or apparent inconsistencies to emerge more and more often. Furthermore, unless some kind of relief is available, we can expect confusion to increase until disorder approaches chaos—death.

Fortunately, there is a way out. Remember, as previously shown, we can forge a new concept by applying the destructive deduction and creative induction mental operations. Also, remember, in order to perform these dialectic mental operations we must first shatter the rigid conceptual pattern, or patterns, firmly established in our mind. (This should not be too difficult since the rising confusion and disorder is already helping us to undermine any patterns.) Next, we must find some common qualities, attributes, or operations to link isolated facts, perceptions, ideas, impressions, interactions, observations, etc. together as possible concepts to represent the real world. Finally, we must repeat this unstructuring and restructuring until we develop a concept that begins to match-up with reality. By doing this—in accordance with Gödel, Heisenberg, and the second law of thermodynamics—we find that the uncertainty and disorder generated by an inward-oriented system talking to itself can be offset by going outside and creating a new system. Simply stated, uncertainty and related disorder can be diminished by the direct artifice of creating a higher and broader more general concept to represent reality.

However, once again, when we begin to turn inward and use the new concept—within its own pattern of ideas and interactions—to produce a finer grain match with observed reality we note that the new concept and its match-up with observed reality begins to self-destruct just as before. Accordingly, the dialectic cycle of destruction and creation begins to repeat itself once again. In other words, as suggested by Gödel's proof of incompleteness, we imply

that the process of structure, unstructure, restructure, unstructure, restructure is repeated endlessly in moving to higher and broader levels of elaboration. In this unfolding drama, the alternating cycle of entropy increase toward more and more disorder and the entropy decrease toward more and more order appears to be one part of a control mechanism that literally seems to drive and regulate this alternating cycle of destruction and creation toward higher and broader levels of elaboration.

Now, in relating this deductive/inductive activity to the basic goal discussed in the beginning, I believe we have uncovered a dialectic engine that permits the construction of decision models needed by individuals and societies for determining and monitoring actions in an effort to improve their capacity for independent action. Furthermore, since this engine is directed toward satisfying this basic aim or goal, it follows that the goal seeking effort itself appears to be the other side of a control mechanism that seems also to drive and regulate the alternating cycle of destruction and creation toward higher and broader levels of elaboration. In this context, when acting within a rigid or essentially a closed system, the goal seeking effort of individuals and societies to improve their capacity for independent action tends to produce disorder towards randomness and death. On the other hand, as already shown, the increasing disorder generated by the increasing mismatch of the system concept with observed reality opens or unstructures the system. As the unstructuring or, as we will call it, the destructive deduction unfolds it shifts toward a creative induction to stop the trend toward disorder and chaos to satisfy a goal-oriented need for increased order. Paradoxically, then, an entropy increase permits both the destruction or unstructuring of a closed system and the creation of a new system to nullify the march toward randomness and death.

Taken together, the entropy notion associated with the second law of thermodynamics and the basic goal of individuals and societies seem to work in dialectic harmony driving and regulating the destructive/creative, or deductive/inductive, action—that we have described herein as a dialectic engine. The result is a changing and expanding universe of mental concepts matched to a changing and

expanding universe of observed reality.[25] As indicated earlier, these mental concepts are employed as decision models by individuals and societies for determining and monitoring actions needed to cope with their environment—or to improve their capacity for independent action.[26]

[25] Polanyi, *Knowing and Being*; and Piaget, *Structuralism*.

[26] In addition to the footnotes throughout, Boyd included a more complete bibliography at the end of his essay, herein provided: W. I. B. Beveridge, *The Art of Scientific Investigation*, 3d ed. (New York: Vintage Books, 1957); John R. Boyd, "Destruction and Creation," 23 March 1976; James Bryant Conant, *Two Modes of Thought: My Encounters with Science and Education* (New York: Simon & Schuster, 1970); Edward DeBono, *New Think* (New York: Avon Books, 1971); Edward DeBono, *Lateral Thinking: Creativity Step by Step* (New York: Harper Colophon Books, 1973); David Foster, *The Intelligent Universe* (New York: Putnam, 1975); Erich Fromm, *The Crisis of Psychoanalysis* (Greenwich, CT: Fawcett Premier Books, 1971); Howard Gardner, *The Quest for Mind: Piaget, Lèvi Strauss and the Structuralist Movement* (New York: Vintage Books, 1974); Fred Hoyle, *Encounter with the Future* (New York: Simon & Schuster, 1968); Fred Hoyle, *The New Face of Science* (Cleveland, OH: World Publishing, 1971); Edna E. Kramer, *The Nature and Growth of Modern Mathematic*s (Greenwich, CT: Fawcett Premier Books, 1974); Harry Levinson, *The Exceptional Executive* (Harvard, MA: Harvard University Press, 1971); Maxwell Maltz, *Psycho-Cybernetic*s (Chatsworth, CA: Wilshire Book, 1971); Joseph Chilton Pearce, *Exploring the Crack in the Cosmic Egg* (New York: Pocket Book, 1975); B. F. Skinner, *Beyond Freedom and Dignity* (New York: Bantam/Vintage Books, 1972); William Irwin Thompson, *At the Edge of History* (New York: Harper Colophon Books, 1972); William Irwin, *Evil and World Order* (New York: Harper and Row, 1976); Mao Tse-Tung, *Four Essays on China and World Communism* (New York: Lancer Books, 1972); Friedrich Waismann, *Introduction to Mathematical Thinking* (New York: Harper Torchbooks, 1959); Alan Watts, *The Boo*k (New York: Vintage Books, 1972); and Hideki Yukawa, *Creativity and Intuition* (Tokyo: Kodansha International, 1973).

CHAPTER



Patterns of Conflict

Introduced by Frans P. B. Osinga

"Patterns of Conflict" contains the main body of John Boyd's thoughts and formed the primary instrument Boyd employed to communicate his ideas and convince his audience that U.S. military thinking needed to change. It is a massive presentation set that grew from an initial limited number of slides to a set totaling 193 pages. Wide ranging and complex, it is a discourse on the events, people, issues, social forces, political motivations, and technologies of the past and how they affect the process of winning and losing.[1] The intent, he states at the beginning, is to unveil the character of conflict, survival, and conquest.

Echoing "Destruction and Creation," Boyd constructs "Patterns of Conflict" using an inductive-deductive approach, offering an initial suggestion, argument, or insight, which he subsequently illustrates, substantiates, refutes or affirms, or modifies, taking into account the additional findings this exercise has generated. In that sense, the essay forms an inductive part, after which "Patterns of Conflict"

[1] Grant Hammond, *The Mind of War: John Boyd and American Security* (Washington, DC: Smithsonian Books, 2001), 122.

seeks to affirm and/or refute these findings through a survey of military history and existing strategic theories. Having found sufficient grounds for accepting the validity of his initial arguments, he then proceeds to take the insights gained to explore their ramifications for military command—the presentation "Organic Design for Command and Control"—and to tease out the essence of strategic confrontations, which resulted in a unique reconceptualization of strategy in the presentation "Strategic Game of ? and ?."

Yet, while informed by and entirely consistent with the abstract argument from the essay, "Patterns of Conflict" must be read as an argument in its own right. In "Patterns of Conflict," Boyd develops and substantiates his main arguments concerning warfighting—or rather operational art and strategy. In the first 12 pages, Boyd introduces the core of his theory, or what he calls "an impression," referring to "A New Conception of Air-to-Air Combat," a short briefing in which he explains success in air-to-air combat in terms of fast transients and adaptability. These notions indicate to Boyd that in order to win we should operate at a faster tempo or rhythm, or better yet, operate inside an adversary's OODA time cycle. Following these initial impressions, Boyd presents the audience with a chronological survey of military history in a series of historical snapshots. Gradually during the briefing, the initial "impression" is expanded to become the key for grand strategy, but by then the concept of fast transients has gained in dimensions and layers. From this broad survey, he distills three distinct categories of conflict (attrition warfare, maneuver conflict, and moral conflict) as well as a synthesis of the essence—the core elements—that characterize these categories.

The list of sources reveals his deep study of military history and strategic theory and the burgeoning interest in various nonmilitary subjects, such as the developments in the "new sciences." In the first half of the presentation, Boyd takes his audience first through the exploits and ideas of Sun Tzu, Alexander the Great, Hannibal, Belisarius, Genghis Kahn, and Tamerlane. He also discusses the eighteenth-century French theoreticians Maurice de Saxe, Pierre-Joseph Bourcet; Jacques Antoine Hippolyte, Comte de Guibert; and Jean-Pierre du Teil. His study of Napoléon and his interpreters brings him to the disastrous developments in the nineteenth century. This

investigation then leads him to World War I and German infiltration techniques; T. E. Lawrence's theory of guerrilla warfare; the revolutionary warfare theories of Marx, Lenin, and Mao; J. F. C. Fuller's work on maneuver warfare; the German blitzkrieg doctrine; modern guerrilla and finally to counterguerrilla and counterblitz methods, indicating his view on strategy as a dialectic interactive process.

Boyd recognized a fundamental similarity among the processes that produced success at the tactical level and at the grand tactical level (what we would call the operational level) in guerrilla warfare in the swarms of Genghis Kahn that raided Europe and in the blitzkrieg concept. Regarding these concepts as superior he uses them as contrasts to the developments in the nineteenth century and World War I, the "attritionist" era.

Near the end, he condenses the various insights into an original reconceptualization of the essence of grand strategy, strategy, grand tactics, and tactics, all infused with the theme of adaptability: maintaining it and eroding the enemy's capacity for adapting to unfolding circumstances. These insights return in two slides that amount to another effort to extrapolate from history patterns for winning and losing, one titled "Theme for Disintegration and Collapse" and into another one titled "Theme for Vitality and Growth." By then, Boyd had moved from the descriptive into the prescriptive/suggestive sphere and attempted to condense his thoughts in a more universal model.

In "Patterns of Conflict," Boyd presents his audience a new look at military history. The conceptual lenses science offered him, with uncertainty as the key problem organisms and organizations have to surmount, enable him to uncover patterns in the dynamics of war that explain and may predict winning and losing. Gradually, in particular in the second half of the presentation, following the process of destruction and creation, he uncovers underlying dynamics of each category of warfare and expresses these in an increasingly abstract and conceptual way. He addresses the intimate connection between the physical, mental, and moral dimensions of war and the dynamic of action-reaction, emphasizing the critical element of organizational cohesion and highlighting various methods to decrease enemy cohesion at the different levels of war. Expressed within the context of

adaptation, he shows conceptual similarities between very distinct modes of warfare. The theme of adaptability also connects novel conceptualization of tactics, grand tactics, strategy, and grand strategy: while at each level the systems contain different layers, organizational elements, and interdependencies, each novel and unique definition revolves around the process of adaptation in which open, complex adaptive systems are constantly engaged.

Presentation: "Patterns of Conflict"
Place: Command and Staff College, Marine Corps University, Marine Corps Base Quantico, Virginia
Date: 25 April / 2 May / 3 May 1989
Transcriber's notes:

1) Aside from Colonel Michael Wyly, the transcriber could not identify by name or branch of Service any of the audience members (no class roster is included in the archived material). Individual speakers are identified by "audience." Based on audience interaction with Boyd during the course of the three days recorded, the transcriber estimates an audience size of approximately 10 members.
2) Boyd refers several times to "John." This is most likely Captain John Schmitt, who was the author of *Warfighting*, Fleet Marine Force Manual (FMFM) 1. Schmitt was not present in this audience, but Schmitt used Boyd's presentations as a primary reference for writing *Warfighting*, and the two men knew and interacted with each other from the late 1980s until Boyd's death in 1997.

[Begin tape 1, side 1]

John Boyd: You have your own copy. Can you all read it? If you can't, pass the other copy around. It's kind of close here. What we can do—Why don't we get smart.

Michael **Wyly:**[2] Do you want to move it back? [unintelligible]

Boyd: No, that's all right. That's fine—I think that's good right there. [Cross talking] Did you get a pointer there, Mike?

Wyly: He's getting one—

Boyd: Okay, has everybody read the abstract?[3] What'd you get out of it? The most important paragraph is the second paragraph. Excuse me, the last paragraph. The last paragraph on the second page is the most important paragraph. Because that's what this all—what we're going to be talking about today is all about.

Let me tell you something, preliminary before I get into the presentation. You know, some people like to be regarded as being an analyst. They think that's a term of endearment. I treat it as a personal insult if somebody calls me an analyst. A personal insult. If you've read the last paragraph, I've showed there are two things you have to be able to do: analyze and synthesize. Analysis and synthesis. And if you can do that in many different areas, tactics, strategies, goals, unifying theme, you can run businesses, you can do any goddamn thing you want. And so when a person calls you an analyst, you're really only a half-wit. You only got half. Idiot. So, there's two things that I don't like being called, one an analyst, and the other is an expert.

[2] At the time this brief was presented, Col Michael Wyly was a staff member of Marine Corps University at Marine Corps Base Quantico, VA. Wyly was a key member of the maneuver warfare movement within the Marine Corps during the 1980s. He wrote many articles on the subject in the *Marine Corps Gazette*, the Corps' professional journal. His passion for the subject came from his experiences during the Vietnam War as an infantry platoon commander. Prior to the creation of Marine Corps University by Gen Alfred M. Gray, Wyly had lectured about maneuver warfare at the Amphibious Warfare School in Quantico, where he became familiar with Boyd's work through William Lind and often invited Boyd to lecture. Lind was a civilian military reformer who also wrote extensively on maneuver warfare and was a friend of Boyd's. Wyly's lecture notes on maneuver warfare were included by Lind in the *Maneuver Warfare Handbook*. See William S. Lind, *Maneuver Warfare Handbook* (Boulder, CO: Westview Press, 1985).

[3] Boyd is referring to a two-page abstract he wrote for his "Discourse on Winning and Losing"; see page [in this work] 62. The "Discourse" was a collection of briefing slides from several of Boyd's presentations, which were assembled and bound in the "Green Book" due to Col Wyly's efforts (so-named for the publication's green cloth covers). The "Discourse" included the essay "Destruction and Creation" and the briefs "Patterns of Conflict," "Organic Design for Command and Control," "The Strategic Game of ? and ?," and "Revelation."

Because an expert means he knows everything and can't learn anything new. He's rigid. And boy, if you're an analytical expert, you're really in deep trouble.

So, some of you people may feel a little bit uncomfortable with my presentation, because I don't start out with an executive summary. And then after, we say, "here it is," now we're going to pack in only that data that supports it and summarily reject everything else. That's how we get ourselves into problems. We're going to go through this whole presentation—"Patterns of Conflict"—going back in history that I've laid out here in the outline we're going to go through. And we're going to pull things apart, put them back together, pull things apart, put them back together all the way through. Now why in hell are we going to do that for? Should drive you batty. The very simple reason, and what you're trying to find out if we're going to talk about conflict, you want to reach back, you want to find out those things we call the "invariants," the constancies, or what the physicists like to call the symmetries. Where you can look at things from different points of view, and you keep seeing the same thing popping out.

Example: let's assume you people here in this room—and it's an idiotic example but it makes my point—were taught all your life, or you only had the opportunity to see pyramids from the side. Only from the side. You'd go through life thinking pyramids are triangles. Now let's say we got another group, different from our group here, and they only got to see pyramids from the top. They'd think there were rectangles with intersecting diagonals. A square. So now let's say this group then interacts with the other group, and they start talking about pyramids, and say "These guys are goddamn idiots." And it's you he's talking about, and he thinks you're an idiot. But you're both talking about the same thing from what? A different point of view. You're both correct, partially. But from a different point of view.

And so, what you want to do is, you want to examine these things from these different angles or points of view, and find those things that tend to keep holding up. You've got a goddamn gem that you find. They're hard to find. You've got a gem, an invariant, a constancy, what the physicists call symmetry. Symmetry is the ability to find those same things that hold up, that don't change when you look at it from different points of view. Any physicists in here, anybody study

physics? Ever heard that term symmetry? Well, I ask you, what's pure or perfect symmetry? Give me an object, an example of perfect symmetry, where you examine from different points of view, a physical object. Doesn't change no matter how matter you examine it.

Audience: Sir, a sphere?

Boyd: That's right a sphere. Not a circle, a circle you don't [unintelligible]. *[05:00]* A sphere, no matter how you examine it from different angles, perfect symmetry. Unfortunately, that's a physical object; now we're going to look at moral, mental, and physical. When you go off the physical, you start looking at mental, it gets a little bit more difficult. So, we're going to go through, and basically we're trying to find those invariants.

We're going to go from Sun Tzu to the present, what kind of things still hold together? And that's why you don't just take Sun Tzu and say "kkkkkkk," template him today, you're going to do that, or you take Clausewitz and you're going to template him today, or [Antoine-Henri] Jomini or who else [unintelligible] you're going to make a horrible mistake if you do that. But there are certain things they said that still hold true, if we uncover them. The answer is there. And you're going to see how that's done. So, we're not going to start with the answer. We're going to start with a confusing bunch of goddamn data and we're going to try to pull it together.

We're going to do both. Breakdown, which is the analysis, pulling it back together with synthesis, pull that apart, breakdown, bring it back together and pull it apart, always feeding in more and more stuff and rejecting more and more stuff as we go along. To find those things that hold true, whether in the past, today, and also in the future. For those people that study Clausewitz, think that we're just going to use Clausewitz as the lens filter to look at the problem, you're going to make a horrible mistake. It's a disaster. Because all you've told me is your thinking hasn't proceeded beyond 1832, and a lot of things have happened since 1832. [unintelligible]

So, I can't overemphasize it. Now I want to talk about one other thing before I hop into the presentation. One thing I want to point out, and I'm going to make it again and again. Terrain does not fight wars. Machines don't fight wars. People do it and they use their minds. So, you better understand the people, because if you don't understand them, you ain't going to make it, period. Now it doesn't mean you

don't pay attention to terrain, you don't pay attention to machines but: person, the human being, and the people are what counts. Top and foremost priority. The terrain is just the means through which you operate. The machines are just tools that you use. All they are. Of course, you can use them badly or use them well. But the point is, that's all it is. I want to drive that home. I'll show you, when you make that mistake, when you begin to think that terrain is the most important thing, you're going make some very serious mistakes.

Okay, how many people here have read the book, *The 25-Year War*?[4] Anybody read it? By Bruce Palmer. Anybody read *The Army and Vietnam*, by Andrew Krepinevich?[5] I understand he's been here, as a matter of fact. Anybody read it? Let me tell you what they—I want to bring it out. The reason why I take those two is they're sort of—in a sense diametrically opposed, but I'll show in a way they aren't. Bruce Palmer—and I'm not saying in a pejorative sense—has written his book from what I call more of a conventional mindset. And it's not pejorative, in other words I'm not talking down. In other words, he's looking from a more conventional viewpoint.

Whereas Krepinevich is the radical, the young radical, looking at it through counterinsurgency, guerrilla warfare, and that thing. So, they come in from two, remember I said, two different points of view. They're looking at the pyramid from different sides, is what I'm trying to tell you. Looking at that pyramid from different sides. But interestingly enough, if you read both books very carefully, guess what? They both come up with the same conclusion, and I'll lay them out to you.

Item one: Palmer says, "We didn't understand our adversary." He quotes Sun Tzu. Same thing Krepinevich said. Item two: he didn't say directly, but infers it: we didn't even understand ourselves! Remember Sun Tzu: "Know your enemy, know yourself, you win a hundred battles." Krepinevich says the same thing. Totally different viewpoint. Item three, in terms of tactics: Palmer didn't address the tactics, he said, "I don't want to address that, that's not the scope of my book." He went off on the strategic level. Krepinevich does, and he says, as

[4] Gen Bruce Palmer Jr., *The 25-Year War: America's Military Role in Vietnam*, 4th ed. (Lexington: University Press of Kentucky, 2002).
[5] Andrew F. Krepinevich Jr., *The Army and Vietnam* (Baltimore, MD: Johns Hopkins University Press, 1988).

a corporate body we didn't understand the tactics that should have been used over in Vietnam, southeast Asia.

However, he did say there were people that did understand it, but they were swept aside. Get them the hell out of here, you know, they're not going to let us do the war the way we want to do it. In terms of strategy, both of them said we didn't understand the strategy. Palmer and Krepinevich. And both of them said we didn't understand the nature of that war. Christ, if you don't understand your enemy, you don't understand yourself, you don't understand strategy, you don't understand the nature of the war, of course, it raises the question: what the hell did we understand? Anybody know? Logistics.

[10:00] Do you know how I know that? Because everybody was living off our logistics system, Viet Cong, everybody was living off of it, including ourselves. That means you've got a goddamn good logistics system. Now I'm coming down hard, and the reason I'm coming down hard, people don't like to talk about Vietnam. Well, you don't want to talk about it, you're not going learn any new lessons. You're going to continue to think the same old way, and your adversary will take you apart the same old way.

If you recall, that was what Wellington said at Waterloo. Remember what he said? Napoléon came on the same old way, and we beat him the same old way. Because he figured out the tactics that had to be used against Napoléon down in Spain. And so guess what: Napoléon saw those tactics didn't work, he still used them at Waterloo, and he got hammered one more time.

Audience: The book, *25-Year War*, uh—

Boyd: by Palmer—

Audience: —talked about the Marine Corps for a short period there, where [unintelligible] the NCO strength and everything was good in the Marine Corps, however the officers, the senior officers were not professionals with the reality of what was going on there.[6] He says—

[6] NCO refers to noncommissioned officer. NCOs fall into a middle bracket of most nations' enlisted rank structures, normally occupying positions of tactical leadership overseeing subordinate groups of more junior enlisted servicemembers. In the Marine Corps, corporals and sergeants are considered noncommissioned officers and are employed as tactical leaders and advisors for infantry squads and platoons or equivalent tactical levels in noninfantry units.

Boyd: —as a matter of fact, since you wanted to pin it down, what he really comes down very hard on *is* the senior leadership in all the services. In fact, that's what he pinned down, except I wanted to talk about, all I was trying to show you was the points of agreement between he and Krepinevich, even though they came in from two different viewpoints. That's exactly right. Remember, he took after senior leadership in the Army and elsewhere too.

Audience: Yes, sir.

Boyd: And what was the Marine Corps? He says it was a disaster. That's right. And, you know, look at Krepinevich, he said there are some guys that understood what had to be done. Not only in the Marine Corps; in fact, he gave the Marine Corps high grades, particularly with their CAP teams and that.[7] Also gave the Green Berets, the Special Forces, high grades initially, except they were siphoned off and had to do other things that were wasting their time. And there were some other instances too. But I don't want to get into that.

I was trying to show you the point that even though they were coming from different viewpoints, we find that their conclusions, [unintelligible] the same way, and that's the point I want to drive home, that they came out the same way. Now some of you might have one more persuasive than the other and I don't want to dictate one way or the other. But I want to show you it's very interesting, when you come in from different viewpoints and the conclusions come out the same, you're on to something. That's what I want to bring in [unintelligible].

[7] CAP refers to the Combined Action Program. This was a counterinsurgency program run by the Marine Corps during the Vietnam War, or roughly 1965–71. It involved the deployment of Marine Corps infantry squads to rural South Vietnamese hamlets to partner with local defense units. These bilateral teams were called Combined Action Platoons. These platoons were intended to provide a persistent security presence outside of major South Vietnamese urban centers, denying North Vietnamese regular and irregular forces the ability to operate freely in the countryside. While the CAP seemed to have positive successes in the places it was employed, its broader impact on America's conduct of the Vietnam War is inconclusive.

Another example is the Packard Commission.[8] Remember when they had that big commission, how they were going to remanage the Defense Department? It didn't get any better. It's not going to get any better that way. And I know Mr. Packard, he's a nice person, I know him very well as a matter of fact. Because of my design work in the building. And I've talked to him since. He agreed, I said, "Here's what has to be done," he said, "Well, we can't get that done." Well, it's not going to get any better. He agreed with me.

But one of the things they talked about: command and control. Remember the thing, they're always knocking that in the JCS, we got to smooth out the lines of command and control, streamline command and control.[9] What's wrong with that? It's a buzzword. Washingtonian buzzword. Because if you read it very carefully, it's only top-down, they're only looking top-down. They want to get you under control so you can do it just the way they want you to do it, understand? That's what they're thinking about. They don't even look at the goddamn bottom-up. How can you decide what's going be top-down until you understand what's bottom-up? You have to gather it in first, figure out what the hell you're going do.

Like for example, you got to know your people, you know, a few minor things like that. I might add I'm being facetious, they're

[8] Shorthand name for the President's Blue Ribbon Commission on Defense Management. This commission was created in 1985 by executive order of President Ronald W. Reagan and chaired by David Packard. Packard was a cofounder of the Hewlett-Packard information technology company and had previously served as the deputy secretary of defense under President Richard M. Nixon. When the commission was chartered, Packard acted as an advisor to the Reagan White House on defense procurement and management. The commission was created to address problems identified in the budgeting and procurement of defense materiel. President Reagan implemented several of the commission's recommendations via executive order, and other recommendations were implemented via the legislation that became the Goldwater-Nichols Act, which reformed the Joint Chiefs of Staff system.

[9] JCS = Joint Chiefs of Staff. This organization consists of the most senior military leaders within the U.S. Department of Defense and advises the president and other leaders in the executive branch on military issues. Among the military reforms undertaken by the Goldwater–Nichols Department of Defense Reorganization Act of 1986 was removing the Joint Chiefs of Staff from operational military command authority, and—in addition to their advisory role to the executive branch—giving them oversight of the readiness, policies, and training of their respective military Service branches.

SLIDE 1

OUTLINE

- POINT OF DEPARTURE
- HISTORICAL SNAPSHOTS
- CATEGORIES OF CONFLICT
- SYNTHESIS
- APPLICATION
- WRAP-UP
- EPILOGUE
- SOURCES

not minor. Major. And the techniques you use for gathering information up are totally different than going down. And they even had the thing in there that we should address bottom up, and they never did. We should look at that in the future. And of course that's the crucial part of the argument. That is a crucial part. And that's why I bring that up.

So, we're going to look into those kinds of things. I'm just trying to clean that up. But we're not going to start with the answers. I'm going to show you the outline for the presentation. I might add, this is not patterns of war, it's not patterns of maneuver, or patterns, it's patterns of conflict. We look at it in different ways. It's not "pattern," it's "patterns." You know, there's different kinds of things going on.

[slide 1] Here's the outline of the presentation. Got to get my glasses, I'm getting to be old. Point of departure: turned out I really

didn't intend to do this kind of stuff. Actually, I was worried about fighter airplanes, I didn't do it when we were designing the F-16, F-17, then -16 and -18. We found out certain kinds of phenomenon, and if you generalized that phenomenon, it seemed, it would apply to more than just air-to-air combat. It would apply not only to conflict; but as it turns out now there are uses in business and elsewhere, it's coming out in business. It's used in many different areas. And we'll bring that out here. But that was the point where I started.

[15:00] As a result of that, knowing that it looked like it could be generalized, I was forced to go into history, what I call "historical snapshots." And you'll see I go all the back to Sun Tzu, up to the present and then other people. Since I can't look at the whole goddamn realm of military history, since you know I'd be dead before I ever do that, I take snapshots of very key areas, and then as we said before, we're going to pull them apart and then bring them back together. In fact, this is the longest portion of my presentation, historical snapshots, to show you how different things and different episodes, and how many of these ideas are flowing through to the present time.

As a result of this, you can lay out what I call "categories of conflict," which we'll show you soon, three categories on the next chart. Doesn't mean you have to lay them out this way. They're dynamic, some people like to categorize conflict, when they do they really only stay in one department, they just got three different features in one department. We're going to operate in three different departments, totally different. We'll show you what they are, and they're very dynamic. And then finally, as you're pulling all this apart and putting it back together, you go into what I call super-synthesis. Put it *all* together.

In a modern sense, what are the kind of things we're really worried about? In order to gain leverage over our adversaries as opposed to having him gain leverage over us. And what do we mean by that? And then finally, [unintelligible] if we believe these ideas, then we should be applying them in a certain way, and I'm going to show you some of the application. As a matter of fact since I put the application, I've since modified [unintelligible] it's even more crisp, even more powerful than the way I got it in here. And then finally I go into what I call, I say okay, let's just boil it down into five charts, wrap the whole thing up into five charts, really super-condensed and com-

SLIDE 2

FOCUS AND DIRECTION

Mission

- To make manifest the nature of Moral-Mental-Physical Conflict
- To discern a Pattern for Successful Operations
- To help generalize Tactics and Strategy
- To find a basis for Grand Strategy

Intent

- To unveil the character of conflict, survival, and conquest.

press all the information. [unintelligible] because you can't, these books they write on managing a crisis, got to have a checklist here, a checklist there, you can't remember all that crap, you shouldn't try to remember. Just like you won't remember all these pages, but there are certain key ideas you can remember, then you can [unintelligible] in your own mind. If you're going use this for checklists, [unintelligible] matter of fact, some guys, they wanted to use this as a sort of a checklist, I say, "I got a recommendation for you". He says, "What?" I say: "Burn the son of a bitch." And then an epilogue.

[slide 2]

And the reason why I took on the epilogue, I'll preempt myself a little bit, is I keep seeing these principles of war. Everyone talks about the principles of war. And as a result of going through this presentation, I don't understand what the hell they're talking about, so I take on the principles of war [unintelligible]. Now today what we'll do, we'll go through all the way up to World War I, tomorrow we'll pick it up and take it the rest of the way. Okay?

With that in mind, then, here's what I call a "focus and direction." First of all, to make manifest what I call the nature of moral-mental-physical conflict. We're just not talking about people out there, it's bodies, either be killed or kill somebody else, but the mor-

al and mental features as well. Remember what Napoléon said: the moral is to the physical as three is to one. Now whether it's 3:1 or 10:1 or 5:1 or 2:1, or whatever you want, the point is the moral is much more important than the physical.

And you better understand that, because that's where you're going to gain enormous leverage on your adversary. Now what we want to do is, instead of having a statement, let's put flesh around this. Part of this presentation is to get flesh [unintelligible]. Not only do we want to understand the physical, the mental, and the moral, but how they interplay with one another.

Next, discern a pattern for successful operations. We get back into synthesis, okay, this is a category. Remember these are the three categories: moral, mental, and physical. Categories of conflict [unintelligible]. Back into synthesis, discern a pattern for successful operations, in other words, those kinds of things we can do to gain leverage over our adversaries, and deny him that same thing against us. Not only gain leverage, but what do we mean by that though? And help us in a sense generalize what I call tactics and strategy.

Now, you know you see many people, they got this tactic and that tactic, this strategy, these checklists of tactics and strategy. But it turns out you can subsume them under a more general notion, of a very general notion of tactics and strategy. In a sense, let me dwell on that right now, I'll give you a very simple way to think of it right now, for now. The way I look at tactics and strategy, some people say means and ends, that's a way of doing it when you get into it, but basically tactics to me means for the execution, the dynamics of action. Whereas strategy is related to the scheme, the design, the architecture.

Or you can think of the tactics as being the means toward the strategic end. And I wouldn't get any tighter, because if you make it too tight, then what you're going to do is eliminate possibility. One thing you don't want to do is eliminate possibility. Because then you become rigid, [unintelligible] and of course that's exactly what your adversary wants you to be, rigid, [unintelligible]. But in any case, we'll show you we can generalize those principles.

[20:00] And finally, also in the synthesis, find a basis for grand strategy. Now it turns out, because the way I evolved it—you don't have to do it this way—in a sense I looks at the grand strategy as the

connecting link between my destructive behavior on one hand and my constructive behavior on the other. I find certain kinds of behavior destructive and other kinds of behavior constructive. It's just sort of a fall, I didn't mean to do it this way. [unintelligible] And the intent's quite clear. In some sense we want to understand the character of conflict, survival, conquest, [unintelligible] and you don't have to think of it harshly. You can think of [unintelligible] it softly. As an administrator you have to worry about conflict, survival and conquest too. Or with your peers. So, you have to worry about that. We certainly want to address that.

Okay, with that in mind, now what I want to do is, let's go into our first bullet. Point of departure, air-to-air. Any pilots in here or anything, any fighter pilots? You're going be familiar with some of the stuff I'm talking about. The other people you'll understand the [unintelligible]. Air-to-air. Now as I'd already indicated in the beginning these ideas actually came out as a result of our investigations and studies pertaining to the YF-16, YF-17.[10] And what we found out after going through things, well, in fact that was the beginning of the supercomputer program, to decide air-to-air combat on the computer, who had the better airplane. And of course, then, we're going to pick airplane A as opposed to B, C, or D, because it's a better airplane that we run it through the computer.

[slide 3]

Of course, the idea being that those simulations, in a sense, you would like to think they sort of represent what actually takes place in the air. If they don't represent, they're not too useful. So that's always the question. So, we had what you'd call a "fly before buy" program. So, I made the people at that time, I said okay, if you think your goddamn computer, so everybody came with their computer program with their own simulations, so we used them all. I said we'll

[10] The YF-16 and YF-17 were prototype fighter aircraft that were later produced as the General Dynamics F-16 Fighting Falcon and the McDonnell-Douglas F-18 Hornet, respectively. Boyd was directly responsible for the YF-16 program, and the flight tests between the two prototypes generated insights to decision making and gaining asymmetric advantage against an opponent that Boyd explored more deeply in "Patterns of Conflict." See Ian T. Brown, *A New Conception of War: John Boyd, the U.S. Marines, and Maneuver Warfare* (Quantico, VA: Marine Corps University Press, 2018), 22–23, 86–88, 93–94, https://doi.org/10.56686/9780997317497.

SLIDE 3

POINT OF DEPARTURE

AIR-to-AIR

run them all, I don't give a crap. Because I don't know what's the best one. Everyone says theirs is the best, so we'll run it all up. Christ, it's only the electric bill anyway. And so I said fine, if you're going to do that, now I want you to—here's the catch, you tell me which one's the better airplane before we run the flight data. We're going to find out what the predictability of the program is, if it's so damn good.

And so they did that, and then we run the flight data. In some areas they were right, in other areas they were wrong. And other than that, they couldn't understand why they were wrong, they knew they were wrong, so we're going to try to educate you why [unintelligible]. What wasn't in those programs, what people hadn't thought of before, which leads to many of the ideas [unintelligible] in my presentation.

So, what did we find out? Turned out to be something very simple, and so I used to call it a generalization. In a sense, at that time I said we needed a fighter that can both lose energy and gain energy more quickly while out-turning an adversary. So, you'll understand what I'm saying, I'll tell you what I mean by energy.

[slide 4]

Energy, I want to talk about energy. You can think of potential energy, and kinetic energy. Potential being related to what—altitude—and kinetic related to what? Velocity or speed. So therefore, if I'm going gain more energy than my adversary, I'm either going to gain altitude, airspeed, or some combination thereof. If I'm going to lose energy, I'm either going to have to give up altitude, airspeed, or some combination thereof, to lose energy. The reason why we use it, because there's a nice, neat expression, it shows you how one's

SLIDE 4

GENERALIZATION

- Need fighter that can both lose energy and gain energy more quickly while outturning an adversary.
- In other words, suggests a fighter that can pick and choose engagement opportunities—yet has fast transient ("buttonhook") characteristics that can be used to either force an overshoot by an attacker or stay inside a hard turning defender.

related to the other, it's convenience is why we use it, while out-turning an adversary.

You say, well, my God, Boyd, that's a trivial statement. It is today, it wasn't then, because the perception at that time was that you either want to conserve or gain energy while trying to outmaneuver an adversary. But sometimes you may want to dump it overboard very quickly if you want to gain leverage on him. And other times you might want to add it very quickly, or maybe not so quickly depending on the circumstances.

But the prevailing dictum at that time was gain energy or conserve it. They didn't even want to talk about losing it. So, what we found out though, when we saw the guys doing the flight test, they were doing that kind of stuff. Quite different [unintelligible]. In other words, suggest a fighter that can pick up and choose engagement options. There was a pilot then annoying [unintelligible] express what do you want, the answer was, well, I want an airplane that I have the choice of engagement opportunities over an adversary, I can pick and choose. Not bad. He might not understand it, but he's right.

But now he gives that to the designer, and the designer starts fretting, who the hell's this guy talking about? Doesn't know. But if you push the argument, he says he doesn't say it this way, he said really what I want is an airplane that I can either force an overshoot by an attacker or stay inside a hard-turning defender. So let me use

my hands here like a pilot does. I'm going to make an attack on him. So, someone's making an attack on you, in the rear, what you want is the ability to bend that airplane, shove him out in front, get in behind him, hose the son of a bitch down.

[25:00] Or contrary-wise, if you're making an attack, guess what: you don't want to be in the same position. Well, what does that suggest? That if both guys know that, they're going to pull the crap out the airplane under certain circumstances, right? Hold onto it. So, if you just pull, you know, turn tight, well, if you turn tight, Christ, literally you spiral yourself into the ground, you can't do that. Pilot's not going to do that. So, that's why he wants to pick and choose engagement opportunities. He wants to get in, get out, get in, and get out.

Why does he want to do that? Because it's not just one-to-one air-to-air combat up here. It's what the pilots like to say, many-up-on-many. In other words, if you're working over one guy, somebody else is going come in and blindside you. So, you want to spend as little time with a guy as possible. You need to get in, gun him, and get the hell out. Because otherwise you get tunnel vision, blindsided, you become a statistic at that point. If you knew there was nobody else there, nope, you don't. You got to be very careful. So, a one-to-one joust is quite different than a melee of many airplanes going against many airplanes. Just like ground warfare. You're trying to protect yourself one way, you can get taken out from a different direction. Same way.

So, they know they want to get in there fast and get out. Need a hard turn for a very short period of time, add it back on the energy, take it off, put it on, whatever the case may be. So, they can get their leverage and knock out the adversary. So, what does this suggest? It suggests something like what I call "fast transients." Today we'll call it "agility," which I'll define for you later. Hoppy, skippy, jerky kind of maneuver, where the other guy obviously can't do it as rapidly. So, what does that suggest?

[slide 5]

A couple of things. Think of it in space and time. In space, you're trying to stay inside his maneuver; in time, you want to do it over a very short period of time, otherwise you're going to become vulnerable to somebody else. So, if you think about it in that sense, you say, hey, wait a minute, maybe we can generalize that whole notion.

SLIDE 5

IDEA EXPANSION

- Idea of fast transients suggests that, in order to win, we should operate at a faster tempo or rhythm than our adversaries—or, better yet, get inside adversary's Observation-Orientation-Decision-Action time cycle or loop.
- Why? Such activity will make us appear ambiguous (unpredictable) thereby generate confusion and disorder among our adversaries—since our adversaries will be unable to generate mental images or pictures that agree with the menacing as well as faster transient rhythm or patterns they are competing against.

Expand upon it and generalize the whole notion, not just air-to-air combat. Because you begin to think, geez, if I can operate at a faster tempo than somebody in business or elsewhere, you know, that could be a very useful thing. So, let's expand upon that.

And when we look at that, we begin to see, we say, the idea of fast transients, I guess, in order to win we should operate at a faster tempo or rhythm in a very general sense over our adversary. Or pinning it down. Or better yet, get inside what I call observation-orientation-decision-action time cycle or loop, or we'll say later on loops, time cycles or loops, because you do it more than once, obviously. It's a feedback loop, and that's why I use the word loop.

It doesn't make any difference whether you're a Russian, you're an Englishman, an American, Chinese or what. You have to observe what the hell's going on here. Then you have to, as a result of that, looking at the world, you generate images, views, and impressions in your mind. That's what you call orientation. Then as a result of those images, views, and impressions, you're going have to make a selection, what you're going to do or what you're going to do, that's a decision. And then you're going to have to implement or take the action. Then you're going to have to observe the consequences of

that action, plus you're dragging peripheral information all the time, and roll back through that loop again.

And as you well know, we call it O-O-D-A, "OODA" loop.[11] It's easier to say right now, otherwise we have to say every one of those terms. You have to do it, I have to do it, everybody has to do it. And it's all human. Machine. You know, human beings [unintelligible] they orient, they decide, they act. Human trait. It makes no difference if you're back in the fifteenth century up to the twenty-first century. We do that thing. But note what it says. We want to be able to do it quicker than an adversary. In other words, we want to get inside his OODA loop, not him inside ours.

Why? Very simple. If we can do that, in a sense we at that point become unpredictable to him, we become ambiguous, hence unpredictable. We generate confusion and disorder in our adversary. Why is that the case? Because he's going to be generating mental images or impressions that don't match up to that continually, what, unfolding environment. They don't match up.

In other words, we're deliberately trying to generate a mismatch between that which he observes and what's really going on out there. He can't keep up. Because it generates confusion. Because as he tries to get that mental event, we shift to a new event, new event, new event, so as he falls back further and further and gets more and more out of tune with his environment, what's going to happen?

[30:00] Have you ever been in a situation sometime where you've been overloaded with something and you can't keep up? What does it do to you? We've all experienced something before.

Audience: —frustrates you.

Boyd: Not only frustrates you, but if your life's at stake, you start coming unglued. And that's exactly what you want to do, you want to pull that guy apart. Let's say I put you in a competitive environment, as an example. You're here, I'm picking on you, because you happen to be up front, that's all, nothing against you.

Let's say I put you in a competitive environment. And let's say I'm your boss for this academic argument. And I give you a task, and

[11] Boyd's shorthand for the observation-orientation-decision-action loop he developed as an output of his life-long exploration of conflict and competition. See Brown, *A New Conception of War*, 116–19, 140–45.

you're worried about, boy, how do I do this task, because I'm going to write your OER, or you're going to get promoted, or I'm going to give you a shitty assignment if you don't do it right.[12] And then when you're about halfway through it, about 80 percent loaded now, and I give you another task, and I say, well listen, you still got to do the other one too. And now I got you a hundred percent loaded, and you're still not done and I say oh, you got one more to do.

And now you're trying to figure out, what the fuck do I do, I can't do it all. In the meantime, can he get it all? No, you got to do it. Very uncomfortable. You're going to grind yourself doing it. And that's why you also should know your people. You shouldn't give more than they can handle at certain times, too. You've probably faced that time in life and God, it's a very uncomfortable feeling. And we're all vulnerable to it. Particularly when your life's at stake.

So, the key idea, what you want to do is generate a mismatch between that which he perceives and that which he must react or adapt to. Note the key word: mismatch. We'll get to that later on. It's a very key idea. Menacing and faster. And there's evidence of it over and over again. I'll give you some examples here right now.

Audience: Sir, one thing going along here, this does not imply that you have to act first.

Boyd: Nope. Remember, overall view. I'm glad you brought that up because sometimes I forget. You bring up an associated point. When I bring this up, some people go, "you go fast, you go fast," and Christ, we'll all drive each other nuts. You don't have to do that. We're going to see in a minute. All I have to do is be faster than my adversary. I can be slow as long as I slow his down even more. So, if I'm slow, as long as he's slower, so it just doesn't have to speed. It can be ambiguity, deception, many other things you can do. That's what I'm saying.

That's why the guerrillas, in a sense, were in effect operating at a faster tempo than we were over in Vietnam. They were operating very slow, but Christ, we were blundering all over and couldn't even

[12] OER refers to officer effectiveness report. This was an annual administrative evaluation report of officer performance used by several U.S. military Services, including the Air Force, which was Boyd's military background. The current terminology for this is officer evaluation report; the Marine Corps equivalent is the fitness report, or FITREP.

SLIDE 6

EXAMPLES

- Blitzkrieg vs. Maginot Line Mentality (1940)
- F-86 vs. MiG-15 (1951–53)
- Israeli Raid (1976)

operate at their pace. We were doing things all disoriented. So, we can slow the other guy down. You've seen it in basketball. Ever see a team when they start doing, Christ, the other guy slows them down so they get them out of their rhythm, they can't function. You see it in many other areas. So remember, don't think just speed, it's what: relative speed, or relative tempo, or pace, whatever you want to use.

[slide 6]

Okay. Note this. Blitzkrieg versus Maginot Line mentality. They were wedded to old ideas, they were operating at a very slow rhythm or tempo. The Germans were operating fast, and they couldn't keep up and eventually couldn't cope. You read it, been written up over and over again. It's not that the Maginot Line per se was so bad, it's the mentality associated with it. They just, slow tempo, slow pace.

F-86 versus MiG-15.[13] As they were used in Korea. Let me examine that and give you a case. This is an interesting case. Most people thought, and they don't now, they learned better, for a long period of time that the MiG could outmaneuver the -86. And if you use sort of contemporary measures, it could.

For example: before I go through it, though, they thought the MiG was a more maneuverable airplane. But let me go through it and show you that in a sense the -86 was a better airplane, particularly if you examine them through the OODA loop. Remember, we've got an OODA loop, so let's use that as a frame of reference.

So, the first O, observation. The -86 had a super bubble canopy; the MiG had a very constrained one. So the -86 had the advantage, even though the MiG was a smaller airplane, from a size viewpoint.

[13] F-86 refers to the North American F-86 Sabre; MiG-15 refers to the Soviet Mikoyan-Gurevich MiG-15.

The -86 had a super bubble canopy, it was easier for an -86 pilot to see a MiG as opposed to the other way around. If you flew both airplanes, you know that. Well, if you're going to get a better image of what's going on, then your orientation's going to be better. That's one way you're going to get a better orientation. Plus the fact that your orientation also depends upon what? Not just the events that happen there, but your previous experiences, previous training and that. So, that also gives you better orientation, so our training was also better. So better observation-orientation.

So then you make a decision. Better basis for your decision. Now what about the action? And the action was where people thought the MiG was better than the -86, it was more maneuverable. If you examine it a certain way, it is. But if you examine it in a much fuller way, it goes just the other way.

Example, let me illustrate. The MiG could out-climb, out-accelerate the F-86, throughout the entire envelope, accelerate quite a bit better. Its sustained turn was better, its instantaneous turn in some areas it was better, in other areas it wasn't as good. So, you sort of group those things together, you say on that basis then, *[35:00]* if you're using those as the elements or features of maneuverability, you'd say the MiG is proven superior. However, there's another feature that's not brought in there. The -86 had what we called, for the first time, fully powered hydraulic flight controls. And so it turned out, you could take that stick, just like power steering in a car, you could take that stick, move it, and make that airplane flip back and forth very quickly and the MiG couldn't, much longer lag time to maneuver.

And one of the things the pilots found out, for example, is when a MiG made an attack you slide right, *thung*, you flip it quick into another turn the MiG would have a hard time, you flip it quickly very rapidly movement what we call a scissor maneuver, and stuff the guy forward and hose him down. So, if he would stay in the turn, [unintelligible] then the MiG could win, but if you keep shifting directions, then the -86 just pushes the other guy right out front. So, any kind of maneuver where you're doing these very wild kind of maneuvers, and shifting from one direction to another, and you maneuver more rapid than me, you're going to gain leverage on me.

You see, that wasn't in the initial part of maneuverability, which

we call the "fast transient" part. And what occurred to me is after we did the YF-16, YF-17, we found that out, this was thing that was allowing these guys to do better, and it wasn't coming out in the simulations. It wasn't brought about. So in that sense, when you bring it all together, the -86 was a better maneuvering airplane, providing you use those transient capabilities. So, we can stuff the MiG out front.

Another one you're familiar with is the Israeli raid, 1976, Entebbe. They were in and out and Christ, the other guys didn't know what the hell was going on. [unintelligible] they were totally behind the problem all the way through. If you recall, they got everybody but one person out. Then you can think of many other examples. I'm just citing three.

So, it's not a bad thing to use. Not a bad thing to use when you think about it. And it's not only that, you go back to World War II. Some people were already on to it, guy by the name of Jintal [PH] whose book [unintelligible] World War II. He talked about one day, he was fighting this one German, this Kraut, two different time he's talking about, and he said the Kraut did initially pretty good, but as he began to get leverage, he said he could almost see his mind exploding from his maneuvers, [unintelligible] he was coming totally apart. And he said one day it sort of happened to him, except somebody else bailed him out. In other words, he was under pressure, he couldn't cope, couldn't keep up. And he was, he remembered that, and he actually wrote it in his book. And you've seen it before.

Audience: Sir, one statement you made on the -86 and the -15, you said that the -86 had a better basis, I believe, for a decision. I'm trying to relate this to the term—

Boyd: Yeah, you're talking about, because the observation—

Audience: I'm trying to relate this to the term to be able to see and feel the battlefield, so if you don't have that intuition or that experience or that knowledge—

Boyd: What did the Germans call it? What's the word, anybody?

Audience: *Coup d'oeil*?

Boyd: What do they call that? You said a very important thing, what do they call it?

Audience: I'm not sure of the pronunciation, but is it *coup d'oeil*?

Boyd: No, no, *fingerspitzengefühl*. You ever heard that term, *fingerspitzengefühl*? General Balck, you heard of Balck, Rommel used

it, Rommel, he kept talking about *fingerspitzengefühl*.[14] This famous Stuka pilot, Rudel; what it means, literally, finger—it's just like in English, it's all one word—finger, *spitzen* is tip, and *gefühl* is feeling.[15] "Finger-tip feeling," that's the literal. What it means is that intuitive feeling, you can just see into things and know what's going on. It's what we call instinctive or intuitive feel but then you're talking about battlefield feel. They call it *fingerspitzengefühl*. They talk about it all the time.

How do you get that? You don't get that easy, you know. Look at Gretzky, Wayne Gretzky, I'd say he's got that in hockey, don't you? Oh yeah, Gretzky's got it in hockey. Any hockey fans here?

Audience: Yeah, but that goes back to the question, how much is acquired? Yes, sir.

Boyd: Yeah, how long did it take? Some of it is natural, also a lot of training and experience before he can get that. And you can think of other people that have it.

Wyly: Rudel is a good example of somebody that didn't have it in the beginning, and he began to get it slowly. And of course, there's going to be a special on NBC tonight that is going to be interesting, I don't know if you heard about that.

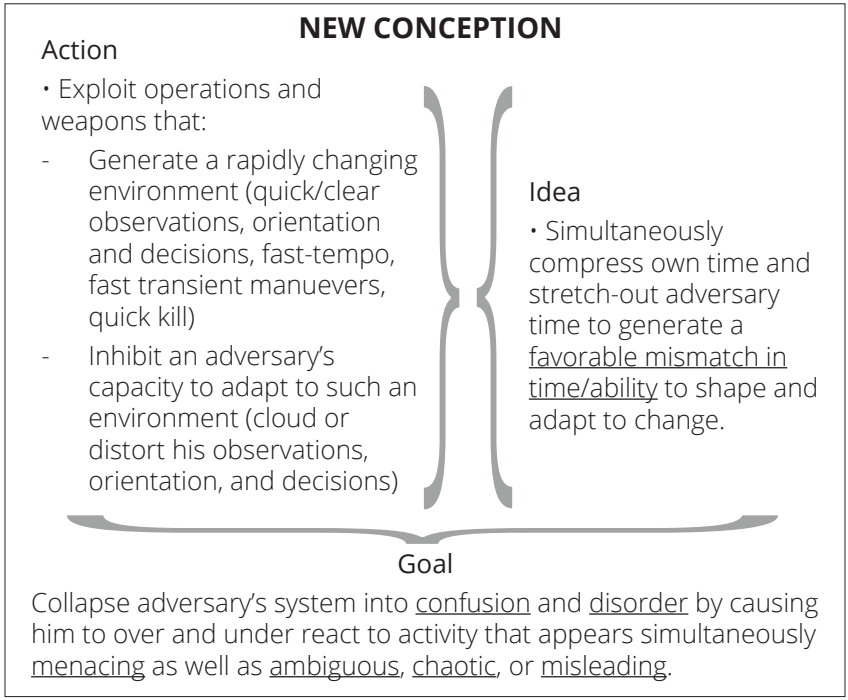
Boyd: What's that?

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[14] Gen Hermann Balck was a highly decorated German officer who commanded multiple *panzer* forces on both the western and eastern fronts during World War II. He was one of several former German officers with whom Boyd talked while Boyd was assigned to the Pentagon during the late 1970s and early 1980s. Boyd frequently references the book *Panzer Battles*, which recounts several armored engagements in which Balck was involved. Erwin Rommel is one of the most famous German generals of World War II. Although he commanded a panzer force during the invasion of France in 1940 and was later placed in charge of the defense of the French coast in anticipation of the Allied invasion of 1944, he is best known for his exploits in North Africa during 1941–43. His ability to move rapidly and appear in unexpected places earned him the nickname "Desert Fox."

[15] Hans-Ulrich Rudel was a preeminent *Luftwaffe* pilot on the eastern front in World War II. Flying close-air support missions in both the Junkers Ju 87 Stuka dive bomber and Focke-Wulf Fw 190 fighter, Rudel was credited with the destruction of more than 500 tanks and hundreds more vehicles, artillery pieces, and other ground targets. When Boyd collaborated on the development of the Fairchild Republic A-10 Thunderbolt ground attack aircraft, he spoke with several *Luftwaffe* pilots about their close-air support experiences during World War II, including Rudel.

SLIDE 7



Audience: Brokaw, going back to the Black versus Caucasian in the athletic gifted.

Boyd: Okay. And some of us are gifted in different directions. You know, my *fingerspitzengefühl* in one area may suck compared to you, but in another area I may be way better than you.

Audience: And the importance is putting the teams—

Boyd: And putting the teams together, what you want to do is so that it compliments one another. That's exactly right.

[slide 7]

Audience: Goes back to your people point.

Boyd: That's right, it's always people. Machines don't fight wars, terrain doesn't fight wars, people do and they use their what? Minds. So, you keep track of that all the time. So, if you got their minds, or you get inside the other guy's mind, you pull his socks down. He gets inside yours, he pulls your socks down. Now true,

use menace, use threat, use weapons, different ways of doing it, in a very subtle, subtle way. But nevertheless, that's a key thing. That's exactly right.

[40:00] Okay. So, what happens then, when you do that, you come up with a new conception. In a sense it isn't new, it's always been there. In a sense what you want to do, is you want to generate as rapid a change in the mind of your adversary. Quick, clear observations, orientation, decisions, fast tempo, fast transient maneuvers, quick kill, et cetera, et cetera.

In other words, for yourself, what are you trying to do? Compress the time over which you can do these things. You want to compress your time for doing it. Turning the argument around, inhibit his capacity to adapt to such an environment, cloud and distort his observations, orientation, decision, all the kinds of things you can do to him. In other words, you want to stretch out his time, take him longer than you.

And that's the key idea. Compress own time, stretch out his, so you gain a favorable—note that word again, favorable—mismatch in time and ability to shape and adapt to change. Not just adapt, but shape too. And if you can get a favorable mismatch, you're going pull his socks down, rather than him pull your socks down.

You know, back in 1929, people started jumping out windows when the stock market crashed because they couldn't keep up with events. And here's your goal; and the goal, when you think of it that way, then there's a natural consequence, it comes out as a natural consequence. Because if you can't keep up, I'll tell you one goddamn thing, you end up very confused, very disordered, and if it's a life threatening situation, pretty soon doubt, uncertainty, et cetera.

Audience: Going on in my mind, sir, that has a connotation of it being offensive, when you go to the athletic field of endeavor, sometimes it can be defensive—

Boyd: You can do it on defense too. We'll get to that later on—

Audience: Yes, sir. You're not compressing your own time necessarily, you're trying to get him in a situation that he isn't, uncontrollable—

Boyd: Where you want to get him doing something where he thinks he knows what's going on, he really doesn't know, and he thinks he's winning the thing, and then you pull his socks down. But

SLIDE 8

A-to-A and A-to-G

RECIPE FOR GENERATING CONFUSION AND DISORDER

Observations

- Quick/Clear Scanning Sensors
- Suppressed/Distorted Signatures

Activity

- Fire
  - Quick shoot fire control systems and high speed weapons
- Movement
  - High Speed (supercruise)
  - Rapid energy gain and rapid energy loss coupled with high turn rates and low turn radii
  - High pitch rates/high roll rates/high yaw rates coupled with ease of control

he's got an erroneous impression, he's got a fast OODA loop and he's really not reading events correctly because here's what you've done to him, see what I'm saying?

See, what happens is, what happens is people become doubt, uncertain. Let's say you put a group of people here, and when people have doubts and uncertainties, and then they start transmitting those doubts and uncertainties to one another, it begins to well up into what? Confusion, disorder, panic, and chaos. Groups start coming apart. Some very powerful notions.

[slide 8]

I'll skip the next chart. We don't have to go through that one. So with that in mind, now, let's look at some historical snapshots. Before we do that, I want to come back to my statement: terrain doesn't wage war, machines don't wage war, people do and use their minds. Well, if that's the case, then perhaps we should start from the people perspective.

SLIDE 9

HISTORICAL SNAPSHOTS

SLIDE 10

HUMAN NATURE

Goal

- Survive, survive on own terms, or improve our capacity for independent action.

The competition for limited resources to satisfy these desires may force one to:

- Diminish adversary's capacity for independent action, or deny him the opportunity to survive on his own terms, or make it impossible for him to survive at all.

Implication

- Life is conflict, survival, and conquest.

[slide 9]
[slide 10]

So, what, in the nature of what people think is what they want, comes their goals; so, what does a goal mean? Look at human nature. As human beings, what do we want? First of all, we want to survive. Otherwise, jump out the goddamn window. Now some people do that, but as a corporate body we normally don't do that. And you

tend to want to survive on your own terms. You don't want to have to survive where you're getting beat up by somebody else, and have to do what he wants to do, you want to have some freedom of your own, some dignity in your own survival. Which suggests you want to improve your own capacity for independent action.

Okay. But remember we live in a world in which we have limited resources. So, if you improve your capacity for independent action, by taking resources from somebody else, he may not like that too much, and vice versa. So what happened, we tend to diminish his capacity for independent action or deny him the opportunity to survive on his own terms, or if it gets particularly hard, make it impossible for him to survive at all. In other words, it's a natural human condition, it's just the way it is.

Like in the Marine Corps, there's only so many promotion slots, like say 10 for some, and if 50 guys compete, somebody's going to lose out. So, I'm not talking about survival just in terms of physical, but moral-mental, more subtle aspects too.

And the implication is clear: life is conflict, survival, and conquest, what is soft, moderate—

[44:32]

[End of tape 1, side 1]

[Begin tape 1, side 2]

Boyd: —operates as an automaton, squeeze them and it's all going to come unglued, and won't be able to adapt. Got different mindsets. American industry's proven that's exactly what they had relative to the Japanese. They're kicking us in the balls every goddamn day without a doubt, you should see it. We say, "goddamn, we know we're better," so we can hang on to the same old view, get hammered one more time. We had our [unintelligible] in Vietnam, but they don't believe it yet. Okay? So, what I want to do now, is I want to show you some impressions that came out of my, well before I do that, I want to make one more comment, excuse me.

[slide 11]

When you start addressing conflicts around conquest, you begin, two things begin to surface. The idea of evolution by natural selection, the Darwinian concept, and the conduct of war. Now I know

SLIDE 11

COMMENT

In addressing any questions about conflict, survival, and conquest one is naturally led to the

Theory of Evolution by Natural Selection
and
The Conduct of War

since both treat conflict, survival, and conquest in a very fundamental way. In this regard, many sources (a few on natural selection and many on war) are reviewed; many points of view are exposed.

that some of this stuff is a challenge, but there's some great points of view in there that are quite valid. Like [unintelligible] war. So, if you can blend these together, pretty soon you're going to get insight into why you get hammered.

You can't know military history by only looking at military history. Now I know you're all looking at me kind of strange. There was a proof, which I'll talk about, talk about in another [unintelligible] by a [unintelligible] named Gödel in 1931. Kurt Gödel.[16] He said you cannot determine the consistency of system within itself, or you can't determine the character and nature of a system within itself. So, you just can't understand military history by only looking at military history. You got to look at related kinds of things too. You know, a military historian may take exception to that, but that's tough, that's life. Of course they're still back in the seventeenth, eighteenth century.

[16] Kurt Gödel (1906–78) was an Austrian logician, mathematician, and philosopher. His incompleteness theorem posited that the consistency of any system cannot be proved from within the system.

If they'd look and study some of this twentieth century stuff, they'd understand this.

Now I got this idea that Gödel, Heisenberg, the second law and many other people can be applied today, where you can pull the other guy's socks down if you do things a certain way.[17] And as a matter of fact, as I was explaining to the colonel back here, I ran the experiment on myself, an unwilling participant. And I'll tell you, you never want to go through it. Very, very bad thing to go through. I'll try to say more about that later on. I was an unwilling participant, but I didn't know it at the time.

What I'm trying to tell you, these things are very powerful, there's some very powerful stuff here and there are some things we found out in the twentieth century we're still not applying. We still look back in the seventeenth, eighteenth, and nineteenth century. I'd like to think we at least understand the twentieth century before we depart into the twenty-first. And if you're going to say, "Well, Clausewitz is my model," Christ, that means you haven't gone much beyond 1832. And some people don't realize they're using Clausewitz as their model, they're making a big mistake even though they haven't read him. But I look and [unintelligible] gee, this is Clausewitzian. [unintelligible] in the meantime they're getting cut to ribbons. I'm not just talking about Clausewitz. I don't care whether you take Jomini as your model, or whether you take only Sun Tzu. There's other ways to look at it. Remember we said we're looking for those invariants that crisscross among many of those things. Okay?

[slide 12]

So knowing that, then, here's an impression that I form. An initial impression. I'll let you read it, then I'll comment. [long pause as audience reads slide] Note the underlining, it's very important, the underscoring. Let's hit the first one. Note what I'm saying: variety and rapidity. You can avoid danger, diminish adversary's capacity for independent action, and gain leverage over him et cetera. Why is

[17] Werner Heisenberg (1901–76) was a German physicist who influenced a number of modern scientific theories, including quantum theory, ferromagnetism, and subatomic particles. His uncertainty principle stated that the very presence of someone observing a system introduced an element of uncertainty into the system being observed. Boyd refers to the second law of thermodynamics, which states that the entropy or disorder of a closed system will always increase over time.

SLIDE 12

IMPRESSION

- In examining these many points of view one is bombarded with the notion that:
  - It is advantageous to possess a variety of responses that can be applied rapidly to gain sustenance, avoid danger, and diminish adversary's capacity for independent action.
  - The simpler organisms—those that make-up man as well as man working with other men in a higher level context—must cooperate or, better yet, harmonize their activities in their endeavors to survive as an organic synthesis.
  - To shape and adapt to change one cannot be passive; instead one must take the initiative.
- Put more simply and directly: the above comments leave one with the impression that variety/rapidity/harmony/initiative (and their interaction) seem to be key qualities that permit one to shape and adapt to an everchanging environment.
- With this impression in mind together with our notion of getting inside an adversary's O-O-D-A loop we will proceed in our historical investigation.

that important? Very often you understand how important it is when you turn the argument around, come in from the back side.

Let's assume we don't have variety and rapidity, what's that mean? It means you can't adapt and you become predictable. And in conflict that's the worst position to be in, where you can't adapt and you're predictable. The reason why you want variety and rapidity, is it allows you to adapt and remain unpredictable to your adversary, which gives you leverage. That's the reason why. So, if you have a very narrow response repertoire, they're going get wise to you pretty soon and they're going to kick you in the [unintelligible] over and over again.

Okay, and this one here, the second one. Note then: not only that, you're working with other people, so you're going to have to be able to cooperate with them and vice versa. Or what I call, harmonize your activities. So you can have focus, you can have direction, you can gain leverage. If everybody wanders off by themselves,

all you've got is mass entropy, or internal friction. The whole thing comes unglued, and you'll be scarfed up as individuals. So without it, you're going get leveraged by other people who know how to cooperate. You'll be isolated.

[05:00] And note this one. Even if you have the harmony, you can't just sit there and have these other three and let the world take care of you. You got to take initiative. You know how I define initiative? Very simple: the ability to think and take action without being urged. The ability to think and take action without being urged, that's the key thing. Very simple.

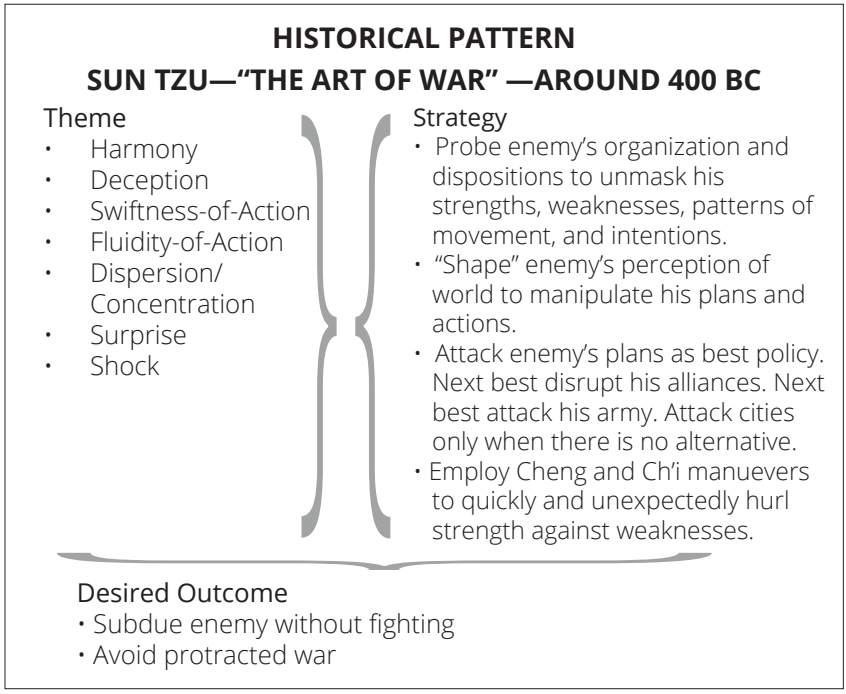
So, these are very important qualities: variety, rapidity, harmony, and initiative. So put more simply, if you can get that, then that's going to permit you to do that, and later on I'll show you how we take these two things and throw them together, variety and initiative, OODA loop, and see how they play upon one another, how one works with the other.

[unintelligible] We'll be building up to that. Sort of give you these initial impressions, I just want you to get a feel for this kind of stuff. Everybody wants the perfect maneuver, there are no perfect maneuvers. In fact, I remember when I was out in Nellis in the 50s, guys had this so-called "last ditch" maneuver, but what if that doesn't work?[18] What are you going to do, die? You've got your favorite maneuver, it didn't work. I said, Christ, that's narrow, guys, you better have a repertoire of maneuvers. If that didn't hammer him, you pull the son of a bitch apart. So, if you only got one thing you can do and the guy gets wise, that's the end of the line for you, if he gets wise. It's over. You've been had.

For you people in communications, any communications people here? Nobody? If you have a narrowband radio, you can't examine the other bands, can you? If he's got a wideband, he can examine yours, plus he can operate the other stuff and be hosing you and you

[18] Nellis Air Force Base is a major U.S. Air Force installation located near Las Vegas, NV. Boyd served as an instructor for the Fighter Weapons School at Nellis during the 1950s; it was in this capacity that he first began to think more deeply about the need to construct new mental frameworks to deal with real-world challenges. He captured this framework in the context of air-to-air combat in his 1963 *Aerial Attack Study*, written for the Fighter Weapons School. See Brown, *A New Conception of War*, 14–17.

SLIDE 13



don't even know it. Same thing. So it's like, variety and rapidity are like having a wideband filter and the other guy has a narrowband filter. You want the wideband filter. And if you're only using Clausewitz, you got a narrowband filter through which you're looking at the world of conflict. That's what I'm trying to tell you.

[slide 13]

Okay, with that in mind, now let's go through the history. I'm sure many of you have read, Sun, how many people read Sun Tzu? I'm sure a lot of you have read Sun Tzu. And you'll get some arguments about when he wrote the thing, or whether he or somebody else wrote it before him, I'm not going to go through all that. You know, 400 BC, 500 BC, if I took the average around 400.

But his theme, harmony. How many people saw that? In his very first chapter, what is he talking about? The citizens have to be in accord with the, the subjects have to be in accord with the rulers of the

state, you have to be in harmony with the rulers. In other words, if you can't get the people working with the rulers, you can't go to war. As a matter of fact, that's what the Vietnamese did to us. They got us so we weren't in accord with one another, and we had to depart from that war in Vietnam.

Deception, and more than once, it's laced through, all war, his famous statement, is based on deception. We're going to look at that detail later on, how that plays with other stuff. And the idea of speed, rapidity, or swiftness of action. In fact, he says the essence of war is speed, rapidity, swiftness of action. Brings that up. And then in a very indirect way, brings this thing, what I call fluidity of action. Remember he said an army should behave like water going downhill, seeking the crevices, avoids the gaps, and strength against weakness. That's the fluidity argument.

Now if you recall, when you first read the thing, if you never read it before, first thing you do, you say, what's this guy saying? Looks like he's saying some important stuff, but he's using metaphors, analogies, and aphorisms, and you got to read, pretty soon, it's a polite way of discussing conflict. In other words, the Chinese are bending themselves at the knees [unintelligible].

Fluidity of action. Why? Three things you can get advantage of from that, what do you get? One, gives you the opportunity to do what? Strength against weakness. That's one idea that comes out of it. The idea of moving along paths of least resistance. And the third idea from fluidity is what? The idea of being fluid and you're what? You're adapting. Adaptability. Strength against weakness, paths of least resistance, adaptability. All three of those in [unintelligible]. So, we take all these together—harmony, deception, swiftness of action, fluidity—then with those four together, you can play the so-called dispersion/concentration game. Not just concentration, but also dispersion.

So, what do we have in our principles of war? Concentration, no dispersion. But Sun Tzu had both. How many people are infantrymen here? How would you like to take a bunch of guys, nice and concentrated, and attack against a machine gun? It'd clean your ass out. It's concentrated. You say, wait a minute. I want to spread them out a little bit. Yeah.

So, what about that? You know, we say, well, we got a caveat;

when you keep caveating the principle of concentration, pretty soon there's no meaning. That's just one example.

Okay then, by playing all these together, you can generate what I call surprise and shock. Too often, we treat surprise as input and shock as input. *[10:00]* I don't surprise you, you don't surprise me. I do certain things, you can't keep up. You become surprised. Surprise is an output, not an input. It's a reaction, because you couldn't keep up, you didn't pay attention, whatever the case may be. Or you're overwhelmed by what has happened.

The only difference between surprise and shock, as I'll bring out later on, shock is just a hard form of surprise, it's also an output. You get paralyzed, knocked so hard you can't cope. But they're both output. And they're both, I might add, in conflict, very desirable features to have the other guy have, not you.

You don't surprise me. I'm really surprised when you do certain things and I don't react, I'm surprised. [unintelligible] Output. You look at the principles of war, they got them all screwed up. They got input mixed in with output, that's another bad thing about them. They can't even get the goddamn thing sorted out right.

So, you want to ask yourself, what kind of things do I do besides these, if I want to look at a deeper sense later on, that permit me to get that thing we call surprise out of our adversary? In other words, where he is not able to react, or keep up with events, so he can do the right kind of thing?

What do you want to call it? Surprise, if it's a softer form, or a harder form, we call it shock. You don't give shock, it's a state of shock you put the guy in. So, that's his theme.

And his strategy, you all heard this, probe enemy's organization, disposition, strength against weakness, patterns of movement, et cetera. All those kinds of things. Not only that, he had in the last chapter, remember, he talked about all the uses of spies. In fact, he used the term "double agents" in his day. We thought we invented it, it goes all the way back to 400, 500 BC. He's talking about double agents. In fact, that was his most valuable agent, if you recall.

So get inside, know your adversary, that's the thing. Know your enemy. Any way you can. As a result of that, then you can shape his perception of the world, so you can manipulate his plans and actions, or his strategy and tactics. Or undermine his plans, undermine

his strategy. If you don't have this, then how are you going to shape his perceptions? You can't do it. That's why it's important.

Of course, obviously you want to give him a rather incorrect or corrupt perception of the world so he can't cope. Then, attack enemy's plans is the best policy. Or attack his strategy is the best policy. Next best is disrupt his alliances, in other words split him up, another variation of what? Split him up, another variation of strength against weakness. Third best is attack his army. In any case, before you attack his army, you want to do all the other things, because then you put the army in what? A weakened condition, so it comes unglued. And then attack cities only when there's no alternative. For anybody who's fought in a city, infantrymen, oh, that's mean stuff. It was mean in his day, it still is today, even though the instruments have changed.

And then he talks about these *cheng/ch'i* maneuvers, as the basis of throwing your strength against his weaknesses. So, it raises the question, what do I mean by *cheng*? Well, he used some gifted language there, you read into it though, one's the ordinary, and the other's extraordinary. *Cheng* is the ordinary, *ch'i* is the extraordinary. You can also think of *cheng* as being the direct, and *ch'i* as being the indirect. *Cheng* is being the obvious, *ch'i* is being the hidden. More in that sense: *cheng* being the deception, *ch'i* is being the surprise. [unintelligible]

Different ways you can think about it. Think of physical, the moral and the physical. In other words, it's the combination that permits you to get leverage. If you don't have the *cheng*, then how are you going to be able to set up the *ch'i*? Think, when you're trying to use the *cheng* to get them to expose themselves, so you can run through that exposure.

In other words, it's like a variation of what we call today, what? Anybody? Combined arms. What's the virtue of combined arms, in the physical sense? You use one arm, so a guy tries to defend himself against one arm, it makes him vulnerable to another arm. Or vice versa. There may be a better term than combined arms, I don't think we'll use them. They're complimentary arms, you're really talking about complimentary arms. Use one, it acts as the *cheng* to get his attention, as a result, by trying to deal with one, he makes himself vulnerable to another one.

So, when you're using combined arms, in a sense if you do it correctly, you're doing the *cheng/ch'i* game. And the desired outcome: you want to win the whole nine yards without fighting. Subdue the enemy without fighting. In any case, avoid a protracted war. You should see all the reasons why he wanted to avoid a protracted war. But then you got to give Mao credit. I'll preempt myself, he understood it, as we'll see.

Obviously, the regime doesn't want a protracted war, but what about the people going against the regime? If they can promote a protracted war, and the regime can't handle it, they're going to come unglued. Beautiful logic. That's why it's the guerrillas' point to run a protracted war, if you can run a protracted war, Christ, they say the goddamn regime's corrupt, incompetent, can't even put these guys down, they're supposed to be defending it. *[15:00]* Just pulling the regime's socks down, drop by drop, piece by piece.

Remember, that's from the regime's viewpoint, avoid protracted war. From the other guy's viewpoint, not the regime, the other part say, hey, that's good, they can't handle it, we'll embarrass them, looks like they don't know what the hell they're doing.

Audience: Sir, clarification so you don't lose me, your comment on dispersion and concentration.

Boyd: I'll get into it deeper later on, but go ahead.

Audience: Looking at it as viewed from the commander, if he concentrates his force, that implies mass, but if you're looking at concentrating forces, that could imply dispersion then. That's a different—

Boyd: Yeah, but you didn't say "force," you said "forces."

Audience: Yes, sir, but then you directly said, do concentration to the principles of war, mass, and if you look at—

Boyd: No, you said, principles of war, mass. I didn't, so therefore why use it then? You just use the term.

Audience: But concentration to me, looking at a commander, if you look at concentration of "forces," that implies maybe a mass, maybe the mass of the entire force, or a dispersion. If that's where I'm wrong, I'm trying to follow—

Boyd: That's alright. But I prefer not to use the word "concentration" because of the excess baggage it carries to this day. It carries a lot of excess baggage.

What's the virtue of multiple thrusts, since we're on this? Why do you want multiple thrusts? What if everybody goes up in the line together? Like we were just discussing before we came in here, since you raised the point. If everybody moves together forward, they're all in line together, how, if the whole line moves forward, how can you get at the other guy's flank? You're just going push his line back. He says, we're going to attack his flank. No, all you do is just push him back and have casualties.

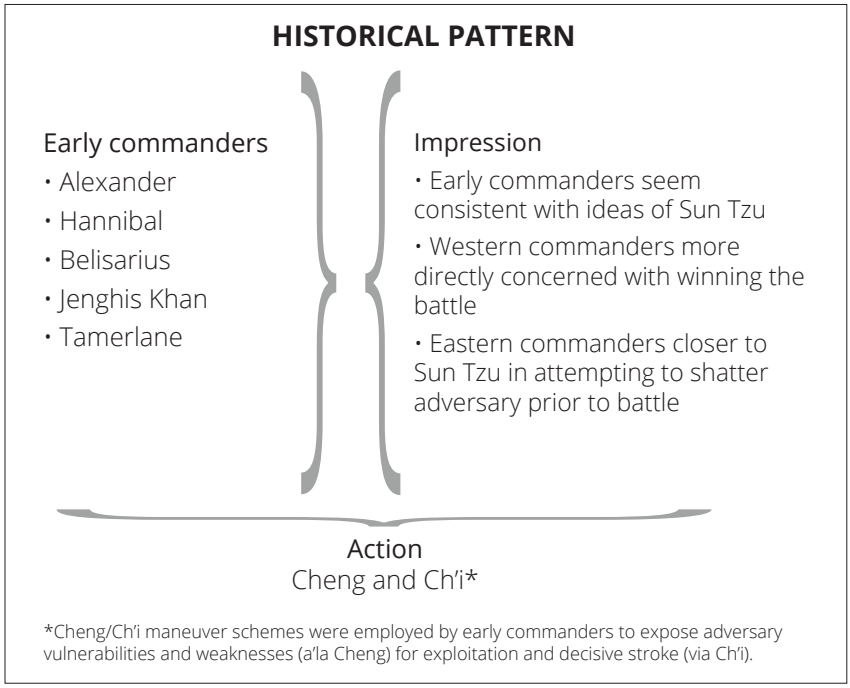
So, you want these thrusts going in there, because wait a minute, you got a flank too, you're trying to get at his flank. That's right. It's true you got a flank. It's not that you're trying to get at a flank, the key thing is an exposed flank. If I got a tempo or rhythm faster than my adversary, and I'm penetrating, he doesn't know where the flanks are, you do, you're carving him up, he can't carve you up. The issue's not flanks, exposed flanks are the issue.

And so, if you have a lot of ambiguity and deception, you're running on through there, you're going pull him apart. Go look at the German campaigns or Russian campaigns, et cetera, all those thrusts that are going in there. And then look at the reaction of the people: they come unglued, they don't know what the hell's going on. Very powerful.

As a matter of fact, so I won't forget it, the initial plan for Normandy, you only had three thrusts going in there. Montgomery, to his credit, complained like hell.[19] People got mad at Montgomery, but he said, "Hey, wait a minute, this is pretty goddamn risky," he forced them to add two more. They had five going in there. Because what you do is you generate what? More and more ambiguity in the adversary's mind of what's going on. You slow down his tempo to respond to that correctly, even on the spot, let alone in the fact that, we'll talk about later on, the tremendous deception campaign where they locked up a lot of the Germans at Pas-de-Calais area. Very important.

[19] Field Marshal Bernard Law Montgomery was one of the most famous senior British generals of World War II, known for his defeat of German forces in Africa under Gen Rommel in the Battle of El Alamein in 1942, and proponent of the failed Market-Garden airborne assault in 1944. He was the designated commander of all Allied ground forces for the invasion of Normandy in June 1944.

SLIDE 14



[slide 14]

Okay. With that in mind, let's start stepping forward here in time. So here we have some early commanders: Alexander, roughly around 300 BC, Hannibal around 200, Belisarius around 500 AD, Chinggis [or Genghis] Khan around 1200, Tamerlane around 1400. [unintelligible] The key thing I'm trying to bring up with all these people, seemed whether they read Sun Tzu or not, were consistent with his ideas, they were very extraordinary commanders. However, there was a difference: the Western commanders were more directly concerned with winning the battle, while the Eastern commanders were closer to Sun Tzu, in that they wanted to have their adversary shattered even prior to the battle so they came totally unglued.

You have to understand Chinggis Khan and Tamerlane had access to Sun Tzu's ideas, remember they conquered the Chinese empire state which had access to him, so it's not surprising. And all of

them, whether they knew this term or not, were playing a *cheng*/*ch'i* game. So, you tend to see that kind of thing. Okay?

[slide 15]

So then looking at historical patterns, let's keep in mind the ideas of Sun Tzu and let's see if we can find out those situations where this *cheng*/*ch'i* game has been played, tactical theme and the grand tactical and the operational, as we use that term today.

[slide 16]

First let's look at the tactical theme, early tactical theme. And you'll notice I truncated at 1400. The reason why I truncated it there is because of weaponry.

And they talk about two kinds of troops, light troops and heavy troops. We have those today. Look at the role of light troops, and look how they interact with heavy troops. And if you read that very carefully what you're seeing, the light troops, in a sense, in some sense sometimes they're acting as a *cheng*, and the heavy troops are the *ch'i*. Or it swings back the other way, see it right down here. You're combining operations. [unintelligible] Use one, so when a guy tries to defend himself against one, he sets himself up against the other.

[20:00] So in combination, they're able to play this game, so they employ the maneuver action with the light troops and the thrust action, the hammer action with the heavy. We see that all the way back. So, in a sense, it's the *cheng*/*ch'i* game.

[slide 17]

Okay, now let's go in the battles. And here's—you may have seen this schematic before—the battle of Marathon. We have the Greeks up here, thinned out center and stronger wings, going against the Persians in a tightened-up formation, and the Persians pushed back the center, the wings came in and attacked the flanks, they tried to reorganize themselves to deal with it, they become totally confused, and of course they take them out. It's also an example, an early example of what we call the double envelopment scheme, whether they intended it or not, there's a lot of argument on that. But you can see that kind of thing.

Okay, that's all I wanted to [unintelligible] there. Then we see the Battle of Leuctra, where we have the Spartans on top here, and the Thebans making the attack under their commander Epaminondas.

SLIDE 15

HISTORICAL PATTERN

Keeping in mind the ideas of Sun Tzu and our comments about early commanders, let's take a look at an early tactical theme and some battle (grand tactical) situations to gain a feel for the different ways that the Cheng/Ch'i game has been (and can be) played.

SLIDE 16

HISTORICAL PATTERN

Tactical Theme (from about 300 BC to 1400 AD)

• Light troops (equipped with bows, javelins, light swords, etc.) perform reconnaissance, screening, and swirling hit-and-run actions to:

- Unmask enemy dispositions and activities.
- Cloud/distort own dispositions and activities.
- Confuse, disorder enemy operations.

• Heavy troops (equipped with lances, bows, swords, etc.) protected by armor and shields:

- Charge and smash thinned-out/scattered or disordered/bunched-up enemy formations generated by interaction with light troops; or
- Menace enemy formations to hold them in tight, or rigid, arrays thereby make them vulnerable to missiles of swirling light troops.

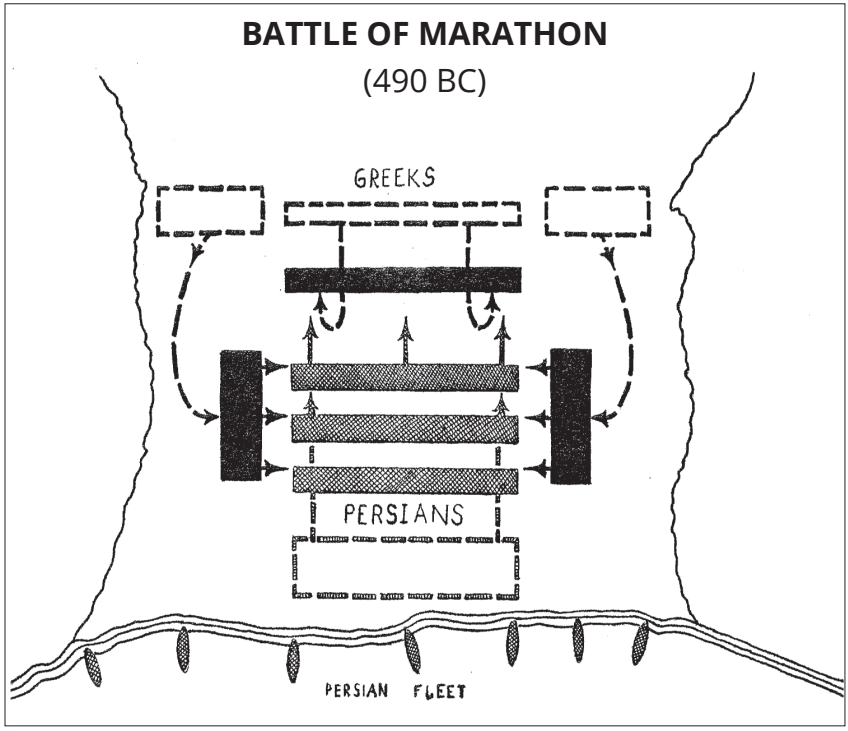
• Light and heavy troops in appropriate combination pursue, envelop, and mop-up isolated remnants of enemy host.

Idea

• Employ maneuver action by light troops with thrust action of heavy troops to confuse, break-up, and smash enemy formations.

In fact, they were outnumbered almost two to one. But note what he did, he thinned out his center and right wing, refused them or pulled them back, put the stronger troops in here, so at the point of contact he had strength against weakness. In other words, the guy

SLIDE 17



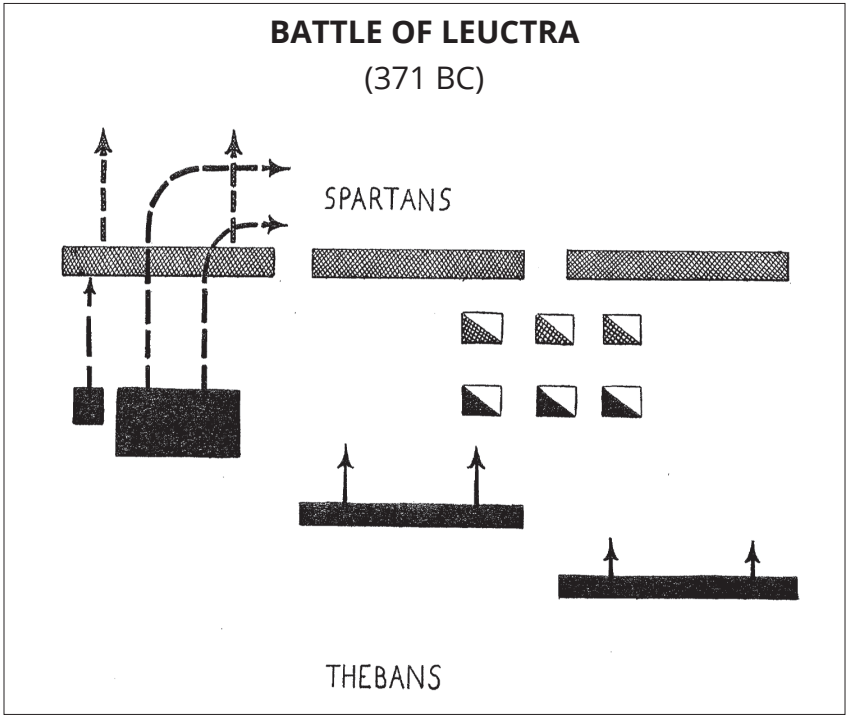
was weaker than he was, even though they had more troops. And of course [unintelligible] stretched out, and it's a single envelopment scheme.

[slide 18]

In fact, how many people have read Liddell Hart's book, *Strategy*?[20] I don't necessarily recommend it too highly, but one of the things he said was that this was a good example of the oblique order, he called it oblique order, you want to keep that in mind. Well, you can't think that schematic anymore, that doesn't do it. But there is a good idea in it, if you think about it correctly.

[20] B. H. Liddell Hart, *Strategy*, 2d ed. (New York: Meridian, 1991). Hart was a British infantry officer in World War I. His experiences in the trenches of the western front influenced his later writings on military theory, in which he explored methods for victory that did not require bloody frontal assaults. *Strategy* discussed this "indirect approach," which Hart refined throughout his writings during his lifetime.

SLIDE 18



[slide 19]

And the Soviets, particularly Marx-Engels, understood what he meant, though it's not in his book. Unequal or uneven distribution is the basis for getting at it. If you remember, for you people Sun Tzu even said before these people, remember what he said: he who tries to prepare and reinforce everywhere, is everywhere weak. And later on, Frederick the Great said he who defends everywhere defends nowhere. And Napoléon another [unintelligible]. And that might be where they come up with the idea of concentration, in other words we're going to concentrate, we don't want to [unintelligible]. You got to be very careful when you do something like this. There's another way of looking at it here, I'll show you in a minute.

[slide 20]

In any case, moving on, [unintelligible, slide transparencies shuffling constantly] the Battle of Leuctra, excuse me, the Battle of

SLIDE 19

V. YE. SAVKIN—"THE BASIC PRINCIPLES OF OPERATIONAL ART AND TACTICS"—1972
pages 7 and 203

Battle of Leuctra (371 BC)
At this battle Frederick Engels (according to Savkin) credited Epaminondas for having first discovered and employed an unequal or uneven distribution of forces across a front as basis to concentrate forces for the main attack at the decisive point.

Arbela. Where we saw Alexander going against Darius, where he's greatly outnumbered, put his weight over on his right, and he made his attack in here. In the meantime, Darius' troops thought they saw weakness here, there was a gap in the front, so Alexander strode toward the gap, also in the direction of Darius, Darius, he and the troops saw that, Christ, picked the wrong chart here. And of course, then he went through the center and pulled him apart. So, it's an inside out, single envelopment scheme, what he was doing. Okay?

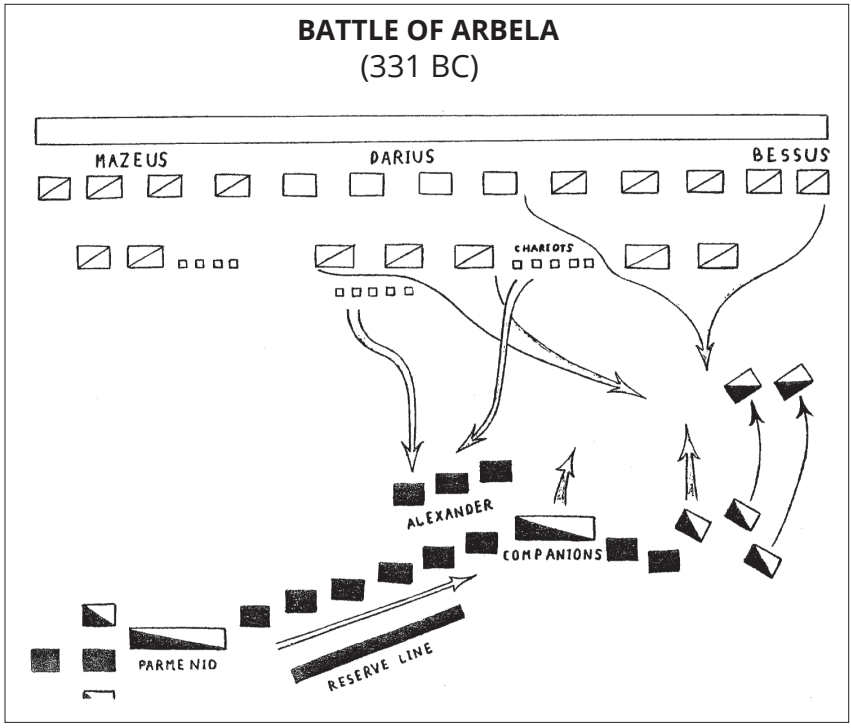
[slide 21]

[slide 22]

Now we look at the famous Battle of Cannae. [unintelligible] Okay, the Romans outnumbered the Carthaginians and what they did, what Hannibal did, is he put his weakest troops forward here, and the Romans pushed them back. He had his stronger troops in between the wings, heavy cavalry on the left and light cavalry on the right, and as they walked into the sack, the wings closed in.

In the meantime, the Roman cavalry, excuse me, the Carthaginian cavalry had driven the Roman cavalry off the field, they came back, and of course then they fought a battle of encirclement and annihilation. Here they are trying to reorganize themselves, [unintelligible] formation, of course they were slaughtered. And depending upon whose account you read, the Carthaginians lost about 7,000

SLIDE 20



troops, the Romans lost between 50–70,000. So, it was a rather dramatic victory.

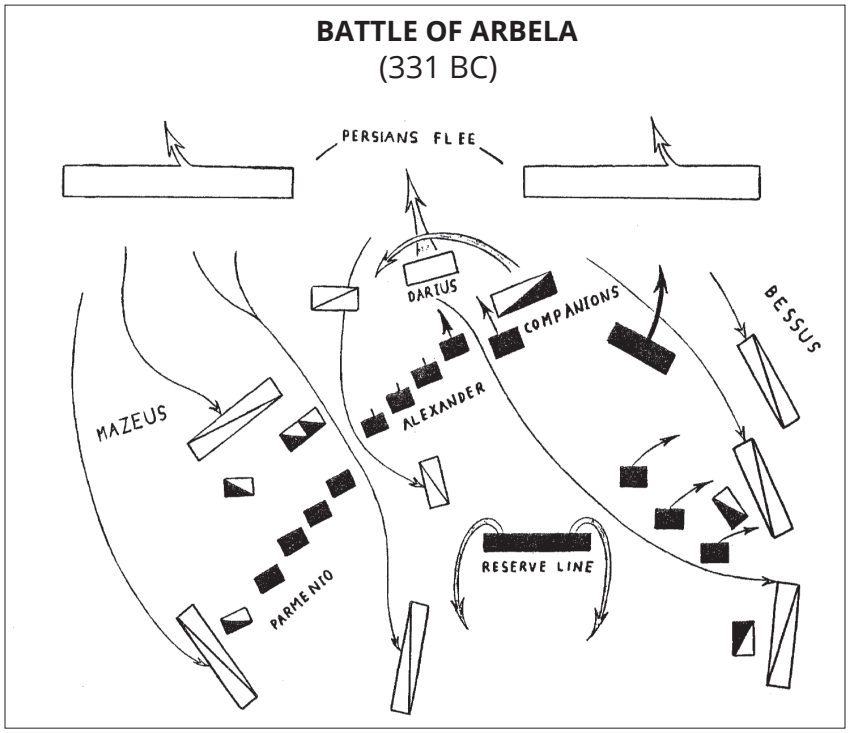
[slide 23]

[slide 24]

What's my point of all that? That those weren't—concentration wasn't necessarily the principle. Unequal distribution, you talk about unequal distribution, you talk about strengthening up some sectors, thinning out other sectors. So you actually, in a sense, have both the idea of dispersion and concentration there, when you start doing that. Some areas are thinned out, other areas are concentrated. And all of them [unintelligible]. And we'll see how as we come up to the present day, it's a very important idea, unequal distribution, it's a very important idea, unequal distribution. [unintelligible]

Also, they talk about, even though they talk about moral factors,

SLIDE 21



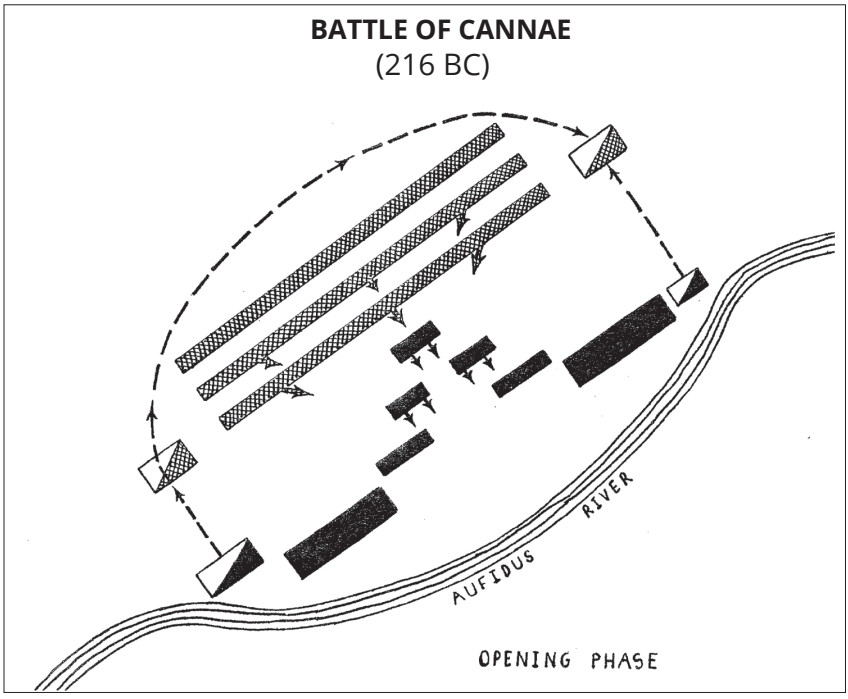
and so forth, *[25:00]* we don't get a very deep insight into that, so we're going to look at that more as we come up to the present time. Okay?

[slide 25]

So moving forward, let's go up to Chinggis Khan and [unintelligible]. Incidentally, you might think I misspelled it, in the books it's spelled differently, and I don't know who's right. So, I just spell it all different ways. So here it's called Chinggis Khan, in other words Chinggis Khan with a J, and then you see Genghis Khan with a G, and I don't know. So, I didn't misspell it, it's just the way it is.

Okay. Key asymmetries: the idea that they had superior mobility over their adversaries, superior communication, superior intelligence. We're not talking about intelligence here but intelligence service, and superior leadership. The kind we call more today by

SLIDE 22



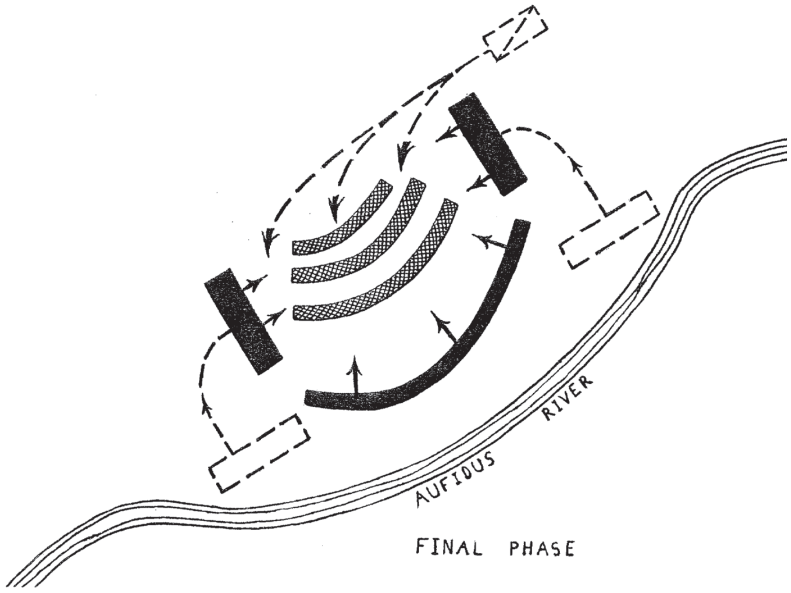
general intention, instead of having detailed orders, general intention of what's to be done, and the local commanders on the spot decide *how* it's going to be done. Okay, very modern in that sense.

So, with these concepts, these themes, note all this kind of thing he's doing, in other words literally trying to pull his adversary apart. You see that. In conjunction with propaganda and terror, used it very cleverly. In fact, one of the things they would do, if they had to take the city, which they didn't like to do, it would cost a lot of troops, and they'd slaughter all the people and let a few of the people go, so you tell the other cities what's going to happen to them if they didn't surrender. So you see they got a combination of propaganda and terror.

Another thing they would pull off if they wanted to take a city, they'd gather all the subjects out from the outlying areas and they'd march them in front of the Mongol troops, so if the city had to de-

SLIDE 23

BATTLE OF CANNAE
(216 BC)



SLIDE 24

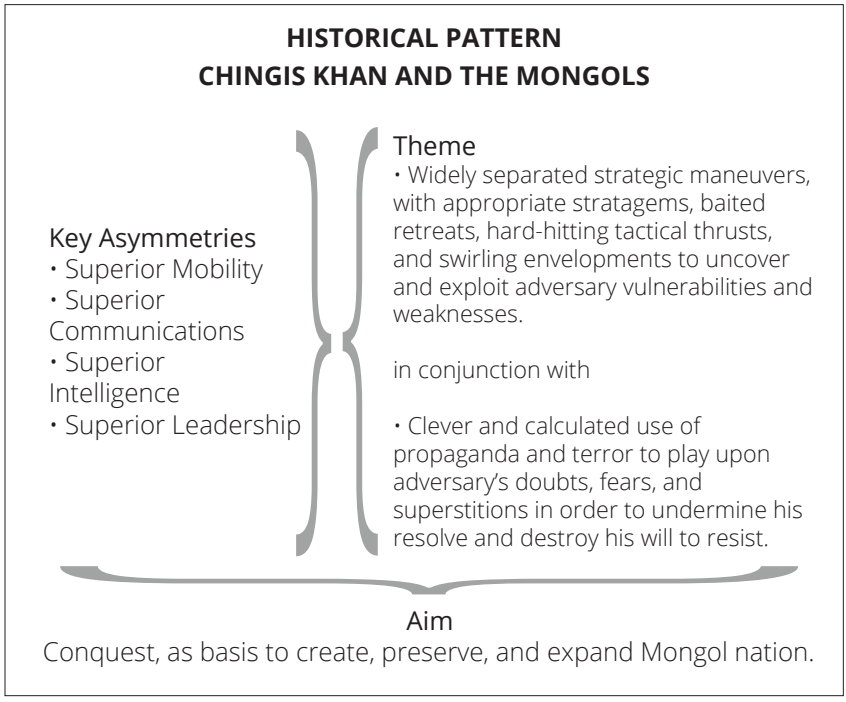
IMPRESSIONS

- Battles of Marathon, Leuctra, Arbela, and Cannae emphasize an unequal distribution as basis for local superiority and decisive leverage to collapse adversary resistance.

on the other hand

- The discussion (so far) provides little insight on how these battle arrangements and follow-on maneuvers play upon moral factors such as doubt, fear, anxiety, etc.

SLIDE 25



fend itself it had to clean out their own people first. These were nice guys.

And of course this is the basic idea. Okay? Now, let me give an example here in a sense of how they operated. They were not too concentrated, they were almost always outnumbered by their adversaries. Look at this schematic: the date, going into the Kyzylkum Empire, in fact that's found in the Afghanistan area today. And we see here, take the scale models, for example. They're superimposed, you find out they're coming on a front over 500 miles wide, 100,000 troops on a front 500 miles wide. They're outnumbered by their adversaries, so they're spread out [unintelligible]. So, concentration didn't seem to bother them too goddamn much. Initial column here, came in here, and they fought a lot of skirmishes on this front, and [unintelligible] roll them up, Persian guides, they would stretch their force out along the river, in the meantime Chinggis Khan would

command this column, finally they would all come together and conquered the whole Kyzylkum Empire. Multiple thrusts. They did almost all their campaigning. So, they weren't as concentrated as their adversaries. And not only that, but they were outnumbered.

[slide 26]

[slide 27]

So, it raises an interesting question: what's going on here, can we apply these ideas today? So, it raises a rather interesting question. Even though outnumbered, why were the Mongols able to maneuver in widely scattered arrays without being defeated separately or in detail? They did that, over and over again. And we'll come up on an answer, I'll use some present-day data to support that. I'll let you read this, and I'll comment on it.

[slide 28]

So, if you can have all these kinds of things and your adversary doesn't, you get inside his OODA loop here, they don't get inside yours. You know what he's about, he doesn't know what you're about. As a matter of fact, the Mongols were so good, they got so deep into their adversary, that down in Genoa and Venice, they knew where he was born in, Genoa and Venice, nations that didn't know anything about the Mongols. So outnumbered Mongols, the result was pretty impressive, by seeming to come out of nowhere, yet be everywhere, hence all these things, and bring adversary's collapse.

Well, why were they able to operate dispersed? Because they understood a fundamental truth here about those things. If you can operate at a faster tempo than your adversary, you can play the dispersion/concentration game at its widest possible sense. If you operate slower, you're going to have to get concentrated, because otherwise you're going to get torn to ribbons.

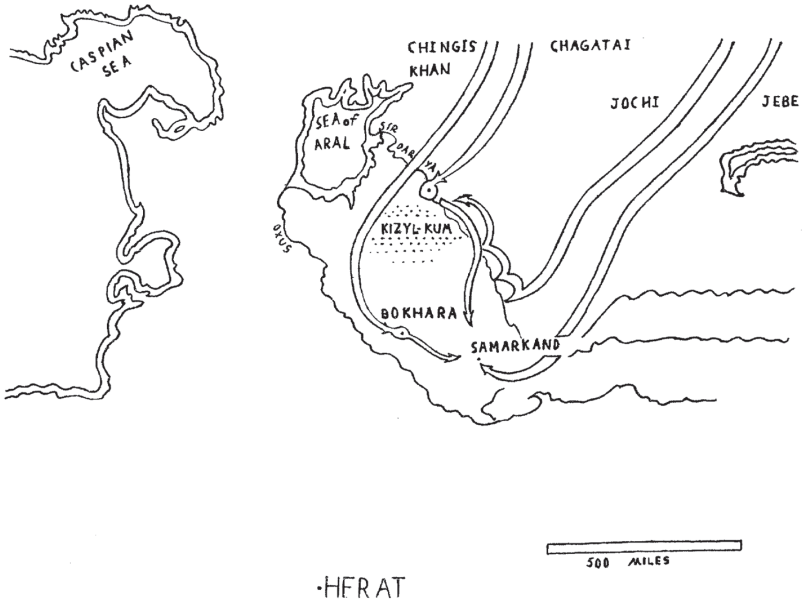
Not only that, Rommel understood that in the desert. The British complained down in 1942, '41, against Rommel, Christ, they were too spread out, that's why Rommel was beating them. Rommel was sometimes very spread out and sometimes concentrated too, but they didn't realize he's turning over his operations much more rapidly than the British and pulling them apart.

How many people in here have read Clausewitz, anybody? You ought to read him. Book eight, chapter nine, where he has a long

SLIDE 26

MONGOL STRATEGIC MANEUVER

(1219–1220)



SLIDE 27

? – RAISES NAGGING QUESTION – ?

Even though outnumbered, why were Mongols able to maneuver in widely scattered arrays without being defeated separately or in detail?

discussion about concentration and speed. In fact, he didn't understand it himself. He says act with the utmost concentration, and later on he says it's the highest possible principle. Maybe that why we got it as a principle of war, because it came out of Clausewitz.

SLIDE 28

HISTORICAL PATTERN
CHINGIS KHAN AND THE MONGOLS

Message
By exploiting superior leadership, intelligence, communications, and mobility as well as by playing upon adversary's fears and doubts via propaganda and terror, Mongols operated inside adversary observation-orientation-decision-action loops.

Result
- Outnumbered Mongols created impressions of terrifying strength—by seeming to come out of nowhere yet be everywhere.

hence,

- Subversive propaganda, clever stratagems, fast breaking maneuvers, and calculated terror not only created vulnerabilities and weaknesses but also played upon moral factors that drain-away resolve, produce panic, and bring about collapse.

But then when he goes into the discussion, he shows four exceptions on the idea of concentration. *[30:00]* Four exceptions! Well, if it's the highest principle, then why do you have an exception? Not only that, when he talks about speed, there's no exceptions. He says act with the utmost speed, act with utmost concentration. But concentration's the highest principle. And then when you read between the lines of concentration, if you can operate fast you don't require to be concentrated. If that's the case, then the premier idea's speed, not concentration. Because with speed, you can play the dispersion/concentration game; in fact, you use it in order to concentrate on your adversary. So where in our principles of war do we have the principle of speed? Not there.

And that's what the Mongols understood, they could operate—so Rommel and the other guys understood, and that's why if you

could set up a tempo or pace faster than your adversary, run these multiple thrusts in there, you can get at the other guy's exposed flank, so they are exposed, he can't figure out what you're up to, so you're pulling his socks down and he's not pulling your socks down.

So, to get you the facility to play dispersion/concentration game in its widest possible sense by doing that, you can play dispersion against concentration like *cheng* and *ch'i* too. In other words, you can think of it as a variation on *cheng* and *ch'i*. Kick your guy, so he doesn't know what you're up to.

Go ahead, read. Book eight, chapter nine of Clausewitz. You'll see it right there. Yet earlier on, he says it's the highest possible principle. Well, if he finds out he can't violate speed but he can violate concentration, tells me that speed is the highest principle. So that's an internal contradiction in his own goddamn treatise. You want to challenge me on it? I got the book right here and I'll show you. So, people say you got to act with the utmost concentration all the time and they say it's the highest principle, I say then they don't, I guess they're not too accurate, mentally or otherwise.

That doesn't mean you don't operate concentrated sometimes. Remember, I said you could blend *cheng* and *ch'i*. And of course that was part of the argument. I tend to use the word focus rather than concentration because I think concentration has too much excess baggage. So, I think we ought to get away from that goddamn idea of concentration because of the excess baggage.

Let's put a new word in there, so we can define it the way we want to. And some people want to call it *focus of effort*, I would say, well, why don't we use *focus of efforts* [unintelligible] so we be sure, that you know, we can play it in the widest possible sense. Give yourself more leverage against your adversary, deny him the opportunity of gaining leverage against you. Because people, when you use a word, they tend to interpret it a certain way, so instead of actually giving you opportunity, it gives you constraint. And you want to design things, so it gives you opportunity, not constraint, in so far as possible.

Audience: So, to follow that, sometimes our terminology constrains us because it's not general enough—

Boyd: It may not be intent to do it, but it's an accident, but as soon as you see it, you better correct it. If you don't, it's just going go

on, and it's going goddamn grind itself in deeper and deeper. That's why I always worry about words, sometimes I do it to myself, "Hey, that's bullshit," all I'm doing is, I got to get rid of that and come up with something new, even though I don't know what it is right now. And you're always going to be doing that. Things change, that's part of that variety and rapidity, you're changing. You got to learn how to do that. Okay?

With that in mind, let's move closer to the present.

Audience: Colonel, could I ask you a question on your last slide—

Boyd: Go ahead. Last slide—

Audience: Basically, the idea of terror, in other words, scaring your enemy badly enough before you get there so far as to unhinge him, sort of like the British did in the Falklands, they said we're bringing the Gurkhas, and they're going to do bad things to the Argentinians when they catch them.[21] Somewhere in your presentation, do you get to how we might use that today, given, you know, congressional rules of engagement and media coverage [unintelligible]. One of the things you're getting at with the Mongols here, is they terrorized people a long time before they actually showed up.

Boyd: Well, we've got things today called terrorists, as a matter of fact. We call them terrorists, state sponsored terrorism, et cetera. And the guerrillas used it very heavily. You got to be careful how you use it, I'll be talking to that later on. One thing you want to do, you

[21] The Brigade of Gurkhas in the British Army consists of soldiers from the Indian subcontinent, particularly Nepal. The brigade is representative of a larger historical connection with soldiers recruited into British service when India was a colonial holding of the British Empire. Gurkhas were noted for their use of the *khukuri* curved knife in combat, and had long established a reputation as tough, fearless soldiers. The Falklands War was a conflict fought between Argentina and the United Kingdom 2 April–14 June 1982. Argentina had long claimed sovereignty over British territories in the Falklands Islands, South Georgia, and South Sandwich Islands, and invaded and occupied those territories in April 1982. The British government dispatched an amphibious task force to retake the islands, which included elements of the Brigade of Gurkhas. Boyd correctly notes that the Gurkhas' reputation preceded them to the Falklands, and interestingly, it was probably the Argentinian press that did the most to spread fear about what the Gurkhas would do on the battlefield. Gurkhas were described in wildly exaggerated stories as barbarians whose savagery was augmented by drugs that made them immune to gunfire on the battlefield.

want to know your adversary; if you use terror, you also may tend to actually goddamn build up his resolve and cause you big problems then too. In other words, you unify him against you. So, if you're going to use that terror, you better understand how you're going to use it. Will it really pull him apart, or is it going unify him against you? You just can't say, well, we're going to use terror, it may blow back on you like you wish you'd never had happened blow back on you.

[35:00] Even if you could do it. Right now, we have a lot of constraints, I understand that. But even if you could, you still want to be very careful with that stuff. It can blow back on you. And not only that, you have a different world today. Remember, the world we talked about back in here, they could run an operation against some goddamn empire, some group, nobody else even heard about it because they didn't have the communication. So, by the time they heard about it, it was already over, plus they could control it much better. Today, with all the TV and mass communication, you do something like that, you're in trouble. Remember, the world's changed, we got to change whether we like it or not. If you just say bullshit, I'm going still do the same, you're still operating back in an earlier century and you're going get cleaned. You're going get taken out.

Audience: Sir, I think what he was suggesting was that some of the things the Mongols did, terror, propaganda and so forth, are inconsistent with American values. Can you address—

Boyd: Oh, I understand that. I understand that. And I will address that.

Audience: Okay.

Boyd: If you're going, see, here's the bad part of— Go ahead.

Audience: To me, sir, that leads to us being very predictable.

Boyd: Not necessarily. You mean if we can't do terror, we're predictable? There's many other avenues you can operate on. And remember, if you use terror, remember, we put ourselves up in the world being true to our vision. We got our Declaration of Independence, our Constitution, all that, so that if we go against it, all you're going to, you're going alienate the rest of the people. Those dirty bastards, they say one thing and they do another. And I'll get into that later on. That's a moral issue, and you get taken out on a moral issue if you do that. And that's the reason why you got to be very careful.

Audience: That's what I'm getting at, is somewhere down the road—

Boyd: Yeah, my strategy, particularly in my strategy. I get into that moral issue, I don't get deep into here, but my strategy I get very deep into that. And so, if you say, I am this kind of a guy, you put, you know, television, TV, people out there all the time, and then you do something different. How would you like it if I were a friend of yours, or pretended to be a friend, and I tried to present myself one way, and I'm screwing you in the ass in a different way? You wouldn't like it after a while, would you?

Well, guess what, nations are the same way. If you present yourself one way, start doing something else, you're going to alienate yourself from other people. We're the ones that subscribe to those values, now are we going stick to them, or are we going become terrorists, and we got to erase all that goddamn stuff and get down in the gutter with those other bastards.

I have a long—Mike [Wyly] knows in my strategy pitch I take that stuff head on, because I lay it out how the subtle twangs can get you in deep trouble. I can give you hint of it right now. Do you like a person that promises one thing and delivers something else? What if I tell you one thing all the time, and I'm doing something else? You wouldn't have much respect for me, would you?

In a sense that's what you're doing, but in a much sharper, harsher sense. Now, it may be justified under very extreme circumstances, and you can justify it, fine; but as a basis of operations without those extreme circumstances, you're going be in deep trouble. In other words, thou shalt not kill. We believe that except we go to war, we've got to go. But in the meantime, we understand, we've got that written in, we have to do that. And we're only going to do that under very certain kind of circumstances. And if you're going do terror, you can only do that under very certain kind of circumstances, and particularly the way we look at the world, we're going be more constrained with that than many other people, as you've already cited. But that doesn't mean we have to throw the towel in. Did I see another hand?

Audience: Terror is also a word, sir, that carries a lot of excess baggage with it—

Boyd: That's correct—

Audience: —and we're just trying to get inside the decision loop and create this confusion and chaos—

Boyd: —that can be regardless of terror—

Audience: —that's the terror—

Boyd: If I get inside the guy's decision loop, he starts coming unglued. He's terrified.

Audience: Well, that's exactly what I was getting at, in a case like in the Falklands, the British said we're bringing the Gurkhas—

Boyd: I know, because people really fear the Gurkhas, that's right, I understand. It's probably the Latin mentality, maybe more than other kinds of mentalities. I don't know, maybe I'm being racist and I shouldn't be, but my suspicion, from what I hear, being an American, I guess I've been preprogrammed, they tend to be more emotional.

[slide 29]

Okay. Battle of Leuthen. I don't want to spend a lot of time on this, I'm just, since a later theorist used it, I wanted to bring it out. All it is, is a more modern replay of Leuthen, where Frederick the Great brought his troops in and rolled up the Austrian wing from bottom to top here. Sort of another operation going on here, *cheng* operation going out here. [unintelligible] He was outnumbered almost two to one. Just sort of a single envelopment or single outflanking scheme. Okay?

We all want to take a five-minute break or something? It's a good time. Let's take about five minutes.

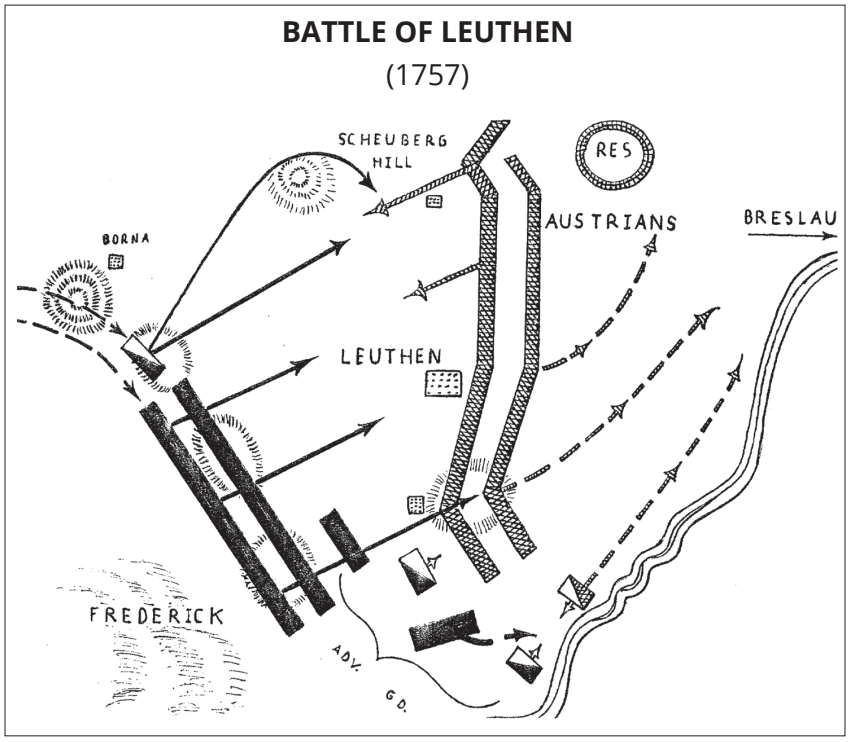
[tape pauses, then begins again]

[slide 30]

[40:00] Okay. Now, let's move on then. I'm digressing too much here. Move closer to the present, eighteenth-century theoreticians. Here, we see these people, [Hermann-Maurice, Comte de] Saxe, [Pierre-Joseph de] Bourcet, [Jacques Antoine Hippolyte, Comte de] Guibert, and [Jean] du Teil. And the theme associated: primary plan or several branches, primarily associated per se. Mobility and fluidity of force. Cohesion, in other words, cohesion of force. And with these things then, they can play the so-called dispersion/concentration game. Napoléon played it very well, I might add. We'll show you the way he played the dispersion/concentration game.

And this idea here, actually Liddell Hart brought it out, he brought

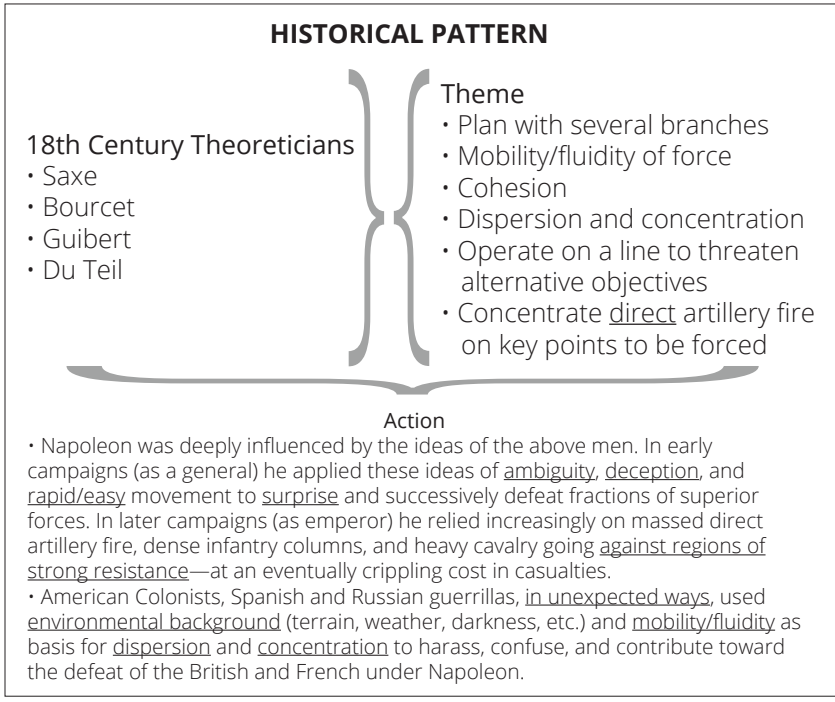
SLIDE 29



it out by looking at Bourcet's stuff, and also by watching or observing [General William T.] Sherman's operations in the south. And so, it operated on a line to threaten alternative objectives. He didn't understand his own concept, I might add, point that out to you. [unintelligible] operating on a line to threaten alternative objectives. The idea being if you have alternative objectives, you operate between them, the guy doesn't know what to do, so he tends to defend both. So that at the last moment, you have a large fraction of your forces going against him, I mean a large fraction of your force going against a small fraction of his, you get strength against weakness. In other words, you put the guy on the horns of a dilemma.

You know what he said? He said it's deception. That's not deception, you're trying to deceive the guy, you're not trying to deceive—you want him to know that you don't know where you're going.

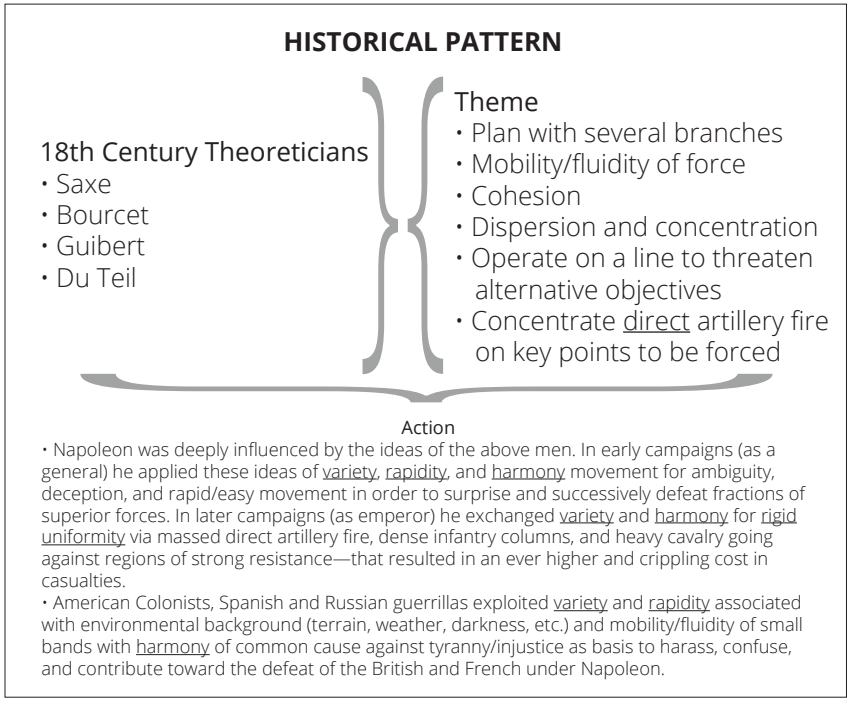
SLIDE 30



That's ambiguity. It's ambiguous. That's one of the things in multiple thrusts, you're generating ambiguity. You got all kinds of impressions in his mind. We'll point out later on, mental friction or mental entropy. It's why he can't cope.

In any case, concentrate direct artillery fire at key points before—see, they didn't have much indirect fire at the point, so primarily direct fire. And the action, note these things. I got the wrong chart here. How do I do that? Somehow, I'm slipping underneath. Okay. So, Napoléon's very familiar with these things, note what I'm saying, very familiar with these guys. The idea, here's the key thing, ambiguity, deception, rapid/easy movement. These are the ingredients you use to generate surprise. This is the input, that's the output. Ambiguity, deception, rapid movement or speed, rapidity. So, these combinations permit the surprise, the other guy can't cope, can't keep up, so they become surprised. This is the action, this is the reaction, when you look at these operations.

SLIDE 31



But then in later campaigns, we'll see what happens later. We as colonists, the Spanish and Russian guerrillas. You're using these same techniques to help defeat. We, the British, and the other people were the French under Napoléon.

[slide 31]

But there's another way I can present that, going back to my previous chart. The top's the same, I didn't change the top part's the same, it looks like it's the same chart, isn't it. But note what I did. What is this: plan with several branches, isn't that a form of variety, rapidity, form of harmony, dispersion/concentration, variety, operating in a direct line, et cetera.

So Napoléon, in the early campaigns, he's supporting these ideas of variety, rapidity with harmony in order to generate ambiguity, deception, rapid/easy movement. And the second part's the one I want to really get your attention on. Exchange variety and harmony for rigid uniformity. He wanted to get these guys into nice, neat

SLIDE 32

IMPRESSION

The ideas of Sun Tzu, Saxe, Bourcet, and Guibert seem to be at home with either Regular or Guerrilla Warfare.

columns, and all that kind of stuff. What happened? You lose your ability to adapt. You also become what? Predictable. That's my point.

[slide 32]

Okay? And here's my point. When we talk about the ideas of Sun Tzu, or any of these other people, they're at home with either regular or guerrilla warfare. Now the reason why I bring that out, we very often try to draw a big distinction between regular warfare on the one hand and guerrilla warfare on the other hand. I'm going show that they really, they come together in many different ways, particularly when we come down to the present. So we'll be looking at that, both regular warfare and guerrilla warfare, particularly going to the twentieth century, go deeper and deeper into guerrilla warfare along with regular warfare.

So with that in mind, then, what I want to look at now is what I call the three giants of the nineteenth century. First the superpractitioner, Napoléon, we'll look at him in more detail. Second, the philosopher of war, Clausewitz, and third sometimes called the systemizer, Jomini. Clausewitz primarily was looking at the character and nature of war, Jomini was looking at it from an operational viewpoint. In any case, let's look at all three.

Now the reason why we want to look at all three, why do we want to do that? Anybody think why I want to look at those three guys?

Audience: Synthesize—

Boyd: That's one reason. Another reason, good reason, we want to see what ideas still hold. Remember, we're trying to search for that kind of stuff. What works, what doesn't work, can we use it today, et cetera. That's exactly right. So, we're not just taking the whole bag of goods that goddamn, that Clausewitz was a smart son of a bitch,

that's going be the lens through which we're going look at them all. You got to pull it apart first, so then you can put it back together. Pull Jomini apart, pull Clausewitz apart, Sun Tzu apart, and find those things, those invariants that hang together, we can apply them later.

[45:00] That's part of it. The other part, theme, is because it had such a pervasive influence on modern operations. And people don't even realize it. Some of it good, some not very good. So, we're going pull it apart, find what works, what doesn't work so we can also do that synthesis. Had a very pervasive influence upon the way we look at war. So, with that in mind, let's look first at Napoléon, the super-practitioner.

[slide 33]

We look at Napoléon, we find out, here was what some people call revolutionary army, gifts to Napoléon. Moral and physical energy of the citizen-soldier, and new leader. Remember, the people are now going to get a piece of the action, so they get this moral *elan*, they really want to go for it. Because they're going be part of the game now, instead of being held down by the aristocracy and Marie Antoinette, let them eat cake.

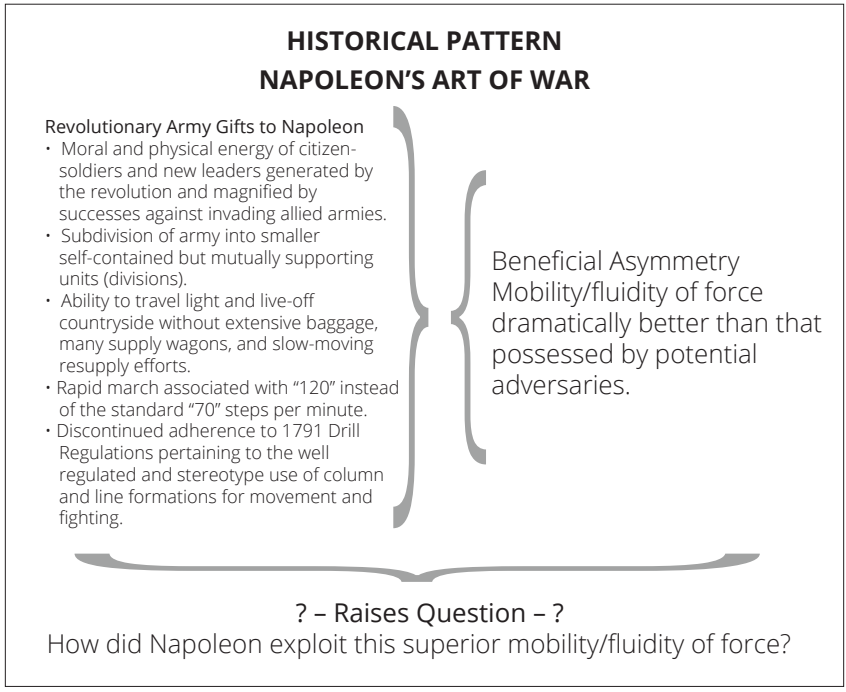
Okay, another concept that came up prior to Napoléon: the idea of subdividing the army. What we call today the divisional concept, instead of [unintelligible] which makes it a much more flexible instrument. And of course, if you have that, remember, think of it this way: if you have one rigid body going in, it's very immobile, you got all these thrusts going there, you really start pulling the other guy apart. You get at his flanks and rear, if you really pull, you get at his flanks and rear. That means you have to be a good commander, but of course Napoléon was that kind of a good commander.

And the idea of living off the countryside, traveling light. In other words, sort of a reaction against eighteenth-century warfare where they had all these supplies, so they live off the countryside, you operate at a much faster pace. Remember, that's what the Mongols did, living off the countryside, going 50 to 60 miles every day. And sometimes you see this in the rapid march, 120 instead of a standard 70 steps per minute. Sounds like a contractor's brochure here. [unintelligible]

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[Begin tape 2, side 1]

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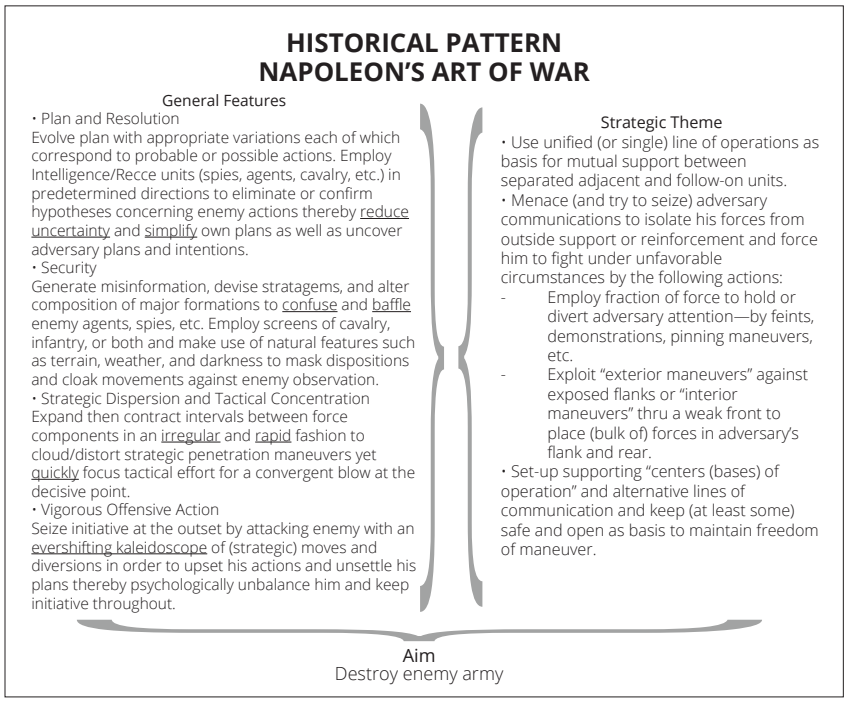
Boyd: [unintelligible] use of line and column: initially, even though they were, in effect they weren't adhered to. Okay, so when you pull all that together, and here's the asymmetry that Napoléon got over his adversaries. Mobility and fluidity of force much better than his adversaries. At least where we're going. And of course we raise the question, how does he exploit this? So, let's look into that. Okay. So, what I'm laying out here in a rather detailed chart are the general features, plan and resolution, security, I'll let you read it. You read the left side, then I'll take you through the right side.

[slide 34]

[long pause as audience reads the slide]

Take the top. Note what he's doing here, all different kinds of things he's doing. The idea is, he's trying to find out where his adversaries, by sending spies out, so finding, he's eliminating possibilities. In other words, keep his own plan simple, also reduce his own uncertainty. Okay, note what he's doing here, his idea of security. In

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other words, just an amorphous kind of a being, guys can't figure out what's going on, whole different ways he doing it. In fact, you can think of the security as being a *cheng* for his vigorous offensive action, being the *ch'i*.

And note this: strategic dispersion, tactical concentration. You read the literature carefully, it talks about assembling concentration. You really read between the lines, what it is, is sort of strategic dispersion followed by tactical concentration. In other words, you're operating really wide ranges and gradually you come closer and closer, you bring your force together, and with a large force pounce upon a fraction of your adversary, is what he's trying to do. And we'll get into that later on.

And then vigorous offensive action. In other words, way of grabbing the initiative. So, these are the kinds of things that he was doing. A strategic theme. Note what he's talking about. Single line of operations. It doesn't mean—unfortunately some people draw the

wrong idea. Even though it's a single line of operation, you have people spread out laterally and also [unintelligible] you have multiple thrusts even when they're separated, operating as an organic whole. And also note this: in other words, try to seize that, isolate his forces so he can't be resupplied. In other words, so we gain leverage on [unintelligible] and note the kind of thing he's talking about here. Once again, you see it's sort of a *cheng*/*ch'i* operation. Part of his force in order to tie the guy up, the other part of his force in order to pull him apart.

And his idea of setting up supporting centers of operation or depots or bases. The idea being, rather than being constricted by one line of communication, you want multiple lines of communication, so if we get sawed off from one, we've got other lines of communication in the field. By doing that, they—it frees up his freedom, you've got more freedom of maneuver than his adversary, because his adversary only has one line of communication [unintelligible].

And his aim was quite simple: to destroy an enemy army. In other words, you're not taking out terrain, you want to take out the army. It's a partial truth, didn't get it all right. Remember, down in Spain, he destroyed the regular army but then the guerrillas took his people apart. So, it's not the formal forces, it's any resistance force. Not just the formal forces. But he had a partial truth, he just didn't recognize that terrain doesn't fight wars. Okay.

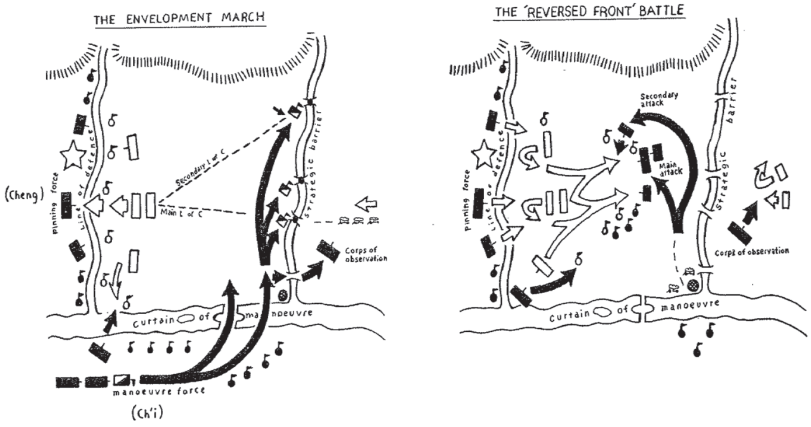
[slide 35]

In any case, we'll see some of his examples of his strategies here, strategy of envelopment. Idealized schematic, where you actually tie up a force here, force down the flanks, sneak in the back door, cut him off and then fold back into him and [unintelligible] kinds of pressure, and the other guy's trying to make all the adjustments. We pull him slowly apart, we call it the strategy of envelopment. [unintelligible] The strategy of central position, this is one that Jomini liked to talk about. Wherein, what he would do is, the other guy's spread out, you'd wedge in between him, show up in here, then you have a secondary attack. SA stands for secondary attack, small force here, main attack, MA, going against this force here. After you clean these guys up, go back and take out the other force. But there's a hidden assumption there, what is it? Anybody?

[slide 36]

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STRATEGY OF ENVELOPMENT
(IDEALIZED SCHEMATIC)



Source: David G. Chandler—Waterloo: The Hundred Days—1980

Audience: Speed.

Boyd: That's right. You're not going to get away with that unless you can operate at a faster tempo than the adversary. You can't play that. So, there's a hidden assumption, the idea of speed. And that often isn't brought out. That's exactly right. Okay, with that in mind, let's step down to the tactical level. I'll let you read these, and then I'll talk [unintelligible]. You notice I took quotes here in both cases because they're so nicely written [unintelligible].

[slide 37]

[05:00] When I'm talking about earlier tactics, I didn't say it changed all of a sudden. In other words, there was a process [unintelligible] early on these tactics, and later on these tactics, in other words they transpired over a period of time.

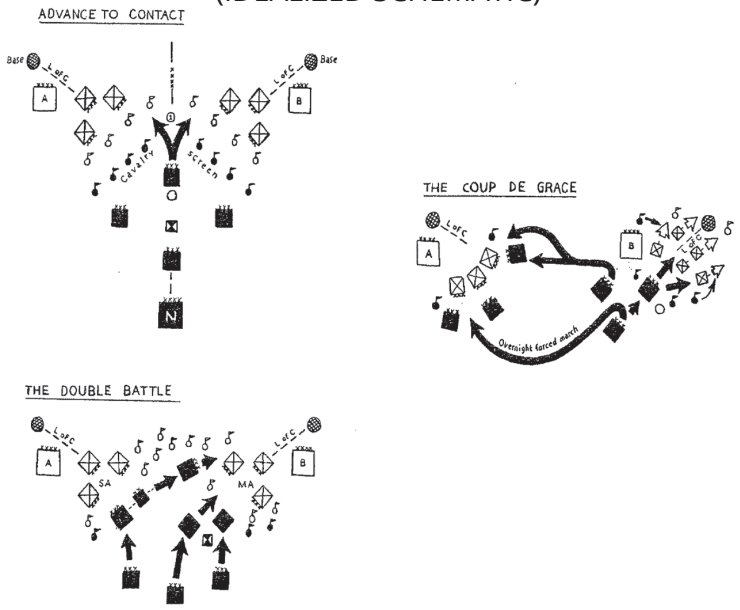
[long pause as audience reads slide]

Okay, let's discuss this. Note the underlines here, these two underlines actually capture the whole essence of the thing. Note what

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THE STRATEGY OF CENTRAL POSITION

(IDEALIZED SCHEMATIC)



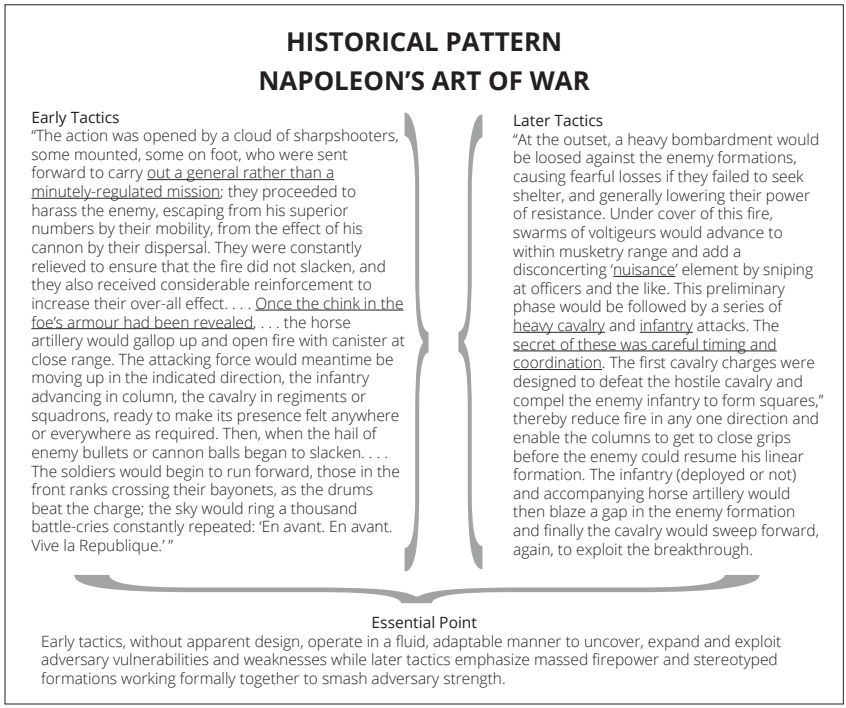
Source: David G. Chandler—Waterloo: The Hundred Days—1980

he's saying: carry out a general, rather than a regulated mission. If I have a general rather than a regulated, what does that provide me? It allows you to be adaptable. If you're regulated, you're nonadaptable. With that adaptability then, then you can go after the chink in your foe's armor, in other words strength against weakness. So, the idea here is adaptability, strength against weakness. That's the whole message of the whole thing.

Over here, note, heavy bombardment, strength going against strength. Now, everything's carefully timed. What's an example of that people are trying to promulgate today? The Army, everybody's seen the Army Field Manual 100-5? *Synchronization*. How in the hell do you synchronize human beings?[22]

[22] *Operations*, Field Manual 100-5 (Washington, DC: Headquarters Department of the Army, 1982, 1986, 1993).

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Remember, they've got those four things up front: depth, synchronization, agility, and initiative. Agility and initiative are good. Depth, there's nothing wrong with it, except it's in the wrong part of the manual, it should be in the back, getting lower with agility and initiative.

Synchronization's a disaster. You don't synchronize human beings, you synchronize watches. If harmony is higher, then they should use harmony instead of synchronization. Synchronization is part of harmony, but harmony is not necessarily part of synchronization. In other words, harmony is a more general term. It's a mistake. So they still, goddamn it, haven't learned their lesson yet. Then they say, "Well, we didn't mean it." I said, "Then take it out! Then why is it in there?" Not only that, it doesn't fit with initiative or agility. Initiative and agility are human terms, synchronization's a mechanical term.

Now do machines fight a war or human beings? Remember,

they're putting up front their philosophy. I'll tell them right to their face, it's bullshit. You got to learn how to use that noodle. If they want, they can put something else up here, okay, but you know, it doesn't go alongside. You don't synchronize human beings. That's not saying you shouldn't synchronize watches, I'm not against that. Once in a while, you want a very tight synchronization with the artillery coming in on a time, on target, or something like that, but you don't synchronize human beings. You want to talk about artillery, synchronizing watches or something like that.

If you use the word *harmony*, you can use the word *synchronization* later on and guess what, it's in accord with harmony because it's a subset of harmony, but it's not all of harmony. They got to get that through their goddamn heads! Synchronization's a subset of harmony, doesn't mean you shouldn't have it, but it's a subset, it does not go for human beings. Anybody who tells they're going to synchronize me, I get personally irritated.

Okay, so that's the problem, you see, careful timing. Well, Christ, we're in a war of confusion, how are you going to be careful timing, that's bullshit. So there, sort of here's the essential point. I guess they like this part. I guess that's what they read in Napoléon. That's the pervasive part that came down, comes out in synchronization now. I'm sorry [unintelligible] essential point, all I'm doing is I'm just [unintelligible] essential point.

Audience: But also doesn't [FM] 100-5 on synchronization—. Your point's well taken, I agree with it completely, sir, but synchronization is, they also refer to it as the state of mind of the commander when he's developing his plan, to consider the application of everything. *[10:00]* There's one little statement in there—

Boyd: Oh, they're going synchronize everything—

Audience: No, I mean, he's considering things—

Boyd: He's considering—. I want him to use harmony, he can put the synchronization down in a subset. You can't know everything of what his troops are going do. Otherwise, you're going go against the very—what he's going do is lay down what he wants done. They're going determine how it's going be carried out. He's not going know the infinite details, if he tries to get in there, he's going screw up the operation, period. We've done that over and over again. I guess these generals, I don't know what the hell they're thinking about,

because they ran a platoon one time, 20 years earlier, I guess they still want to fight at the platoon level. Did you know Patton criticized his guy? He told a colonel, "Goddamn it, I don't want you to interfere with their tactics. You just tell them what they're supposed to do, and they're going do it, and that's your job. Be sure they get the resources," he told his colonels. Quote. He said, "All you're going do is muck it up." He understood that. Can't say he wasn't a successful commander. He says, "All you're going do is muck it up."

Audience: Colonel Boyd, didn't we start doing that though, during the Korean War, with nuclear weapons and communications were better—

Boyd: You're raising a very crucial point. I think what you—You're on to it. I normally bring it out. It's a very good point you're raising there. What's happened, because of the rise of nuclear weapons and communications—Well, of course, we had communications during World War II—

Audience: But they weren't as good as ours today, were they—

Boyd: Communication, radio, I mean they're not as good as today. But of course, 20 years from now they'll be better than we have today, too. But I mean, they're not like World War I or previous communications. But the point I'm trying to bring out with the advent of nuclear weapons and also the communications: boy, they didn't want some guy flinging off nuclear weapons, so they had very tight control, because it's an awesome weapon. And they should. But you shouldn't—because you have it at nuclear weapons, you want to have it at all other levels. Once again, that's a rigidity of mind.

Audience: But since the Korean War, take the company commander. His power, or whatever he had, has declined because of those two areas. One time, I think the company commander—

Boyd: You know, if you want to give an order, you can always give an order. What you want to do is, you want to tell somebody what you expect. Let them determine how it's going to be carried out. You should also tell them why you want it done. You know, so they can see that there's a reason for it, not some goddamn bullshit in itself. And then you should put in, also, let them determine how, what, why, determine how. And then you should put in whatever constraints that you want, because remember, you're probably going deposit this thing in a larger context, and if they start doing any-

thing they want, it can cause you some problems. So, you should put constraints. Unfortunately, what we do is make the constraints so goddamn narrow, the guy can only do one thing, so therefore he's got no freedom of action.

Audience: All those things you just said, you know, give the guy an order, let him do it how he wants, that's what we're told in school.

Boyd: That's correct.

Audience: But then we have speakers come in, and—

Boyd: I understand—

Audience: —low intensity conflict for instance—

Boyd: I know exactly what you're telling me. "Oh, we agree with you," and then they tell you, and Christ, you don't have any freedom of action. That's exactly right. In other words, they're telling you one thing, saying one thing but they're doing another. In other words, it's a huge goddamn deception operation. On you! [audience laughter] You're the object of the deception. You don't have to do that.

I'll give you a good example of when I was overseas, of how they wanted me to do it. I was initially—you raise a point, the reason I'm going to bring it out, it's an interesting point that came up—I was sent over to Task Force Alpha.[23] You probably know that was the old sensor program, sometimes called Igloo White or some other names. People didn't like [unintelligible]. In any case, over in southeast Asia.

In any case, one night—eventually they made me base commander. They went through seven base commander in two years. They said, "Boyd, you got to clean it up there." I didn't want the job, hell I don't want this goddamn, but I had to take it over. Well, one night I'd been there for—hell, I didn't even know what my responsibilities were, so—a couple of our electric goons, those spy C-47s crashed, listening and ELINT gear and all that on there [unintelligi-

[23] Established during the Vietnam War, Task Force Alpha monitored a sensor system set up to track North Vietnamese traffic along the Ho Chi Minh Trail in Laos. Boyd served as vice commander for Task Force Alpha in 1972. For more details on Boyd and Task Force Alpha, see Brown, *A New Conception of War*, 23–26.

ble].[24] Of course, guys are out there in areas where there might be guerrillas and that, those people sent us some choppers.

So, the guy says, "You're the commander on the spot." Now I hadn't been there too long. I said, "I am?" He says, "Yeah, okay let's go down." And he said, "Here's your checklist." I goddamn near fell over. I said, "What do you mean, checklist?" I took that goddamn thing and threw it, it went out the window. I said, "Now where's a map, let's find out where they are, and let's start making some decisions." The guy brought the checklist back in, and I threw it back out the goddamn window. Some captain. I said, "You can't operate this way." They don't know, you know, I said, "If I read this, those guys will die of starvation out there before we get to them."

So, I said, "Now where's the map?" I said, "Get that goddamn thing out. You point where they are." They said, "We don't know." I said, "Who knows?" He said, "We'll find out. We're on that." I said, "Fine. What resources do we have available?" I'm going to take the choppers out there, then we found out we don't have enough choppers, so they had a [unintelligible] They said, "Yeah, but these guys got to go first." Fuck that, I don't care. I said, "What is the situation out there?" *[15:00]* So, I reversed the whole order and sent the choppers out and everything else. And he kept bringing the checklist back. I said, "I don't give a goddamn to hell you're [unintelligible] you bring it back in here again."

He said—you know, as the new guy. I didn't know what the hell I was doing. I got them all out. Blew up the two goons. You know, we had to blow them up because security [unintelligible] we got them all in there. I didn't go by any goddamn checklist. I said, you know, "What do you have," went down my way, and did things that had to be done.

If I started reading a checklist, hell, [unintelligible]. That's bull-

[24] The Douglas C-47 Skytrain was a military fixed-wing transport aircraft used extensively by Allied forces during World War II and adapted for a number of different missions following the war. Based on Boyd's discussion here, he is likely referring to the RC-47 variant, equipped for photographic reconnaissance and electronic intelligence missions. ELINT refers to electronic intelligence, a subcategory of signals intelligence, an intelligence process that intercepts signals between either people or electronic devices. ELINT can be collected from sources such as radars, missiles, other types of guidance systems, and aircraft.

shit. Of course, I'm a fighter pilot, I think that way. It's just like he's a fighter pilot back here, every year. I think they maybe still had it when I was there. They had this huge book. You got to sign about all the regulations that you've signed it, and so if you violate it, they can hand you your ass.

Well, nobody ever reads the son of a bitch, they just signed it and walk out the door and said "Yeah, I read the son of a bitch." That's a huge deception. You still sign that bitch, don't you?

[Cross talking]

Boyd: I bet it's probably this goddamn thick now.

Audience: They're a lot thicker now. You don't sign anymore, sir. They just say you're responsible for all these regulations, even some that you don't know of. That's the new way.

Boyd: Yeah. So, everybody walked out. I said, "We're all a bunch of goddamn liars." We all go in here, great, sign, walk out the door. It would take thirty seconds. Nobody reads the son of a bitch. And they had this huge book. That was so if you violate something, they could hang your ass and they got your name on it. That's all it was for.

You really read that thing, you'd be here a week. Like he said, it's even thicker now because they got more regulations in the meantime. It's a huge thing. We all used to laugh. I'd say, "We're all a bunch of goddamn liars."

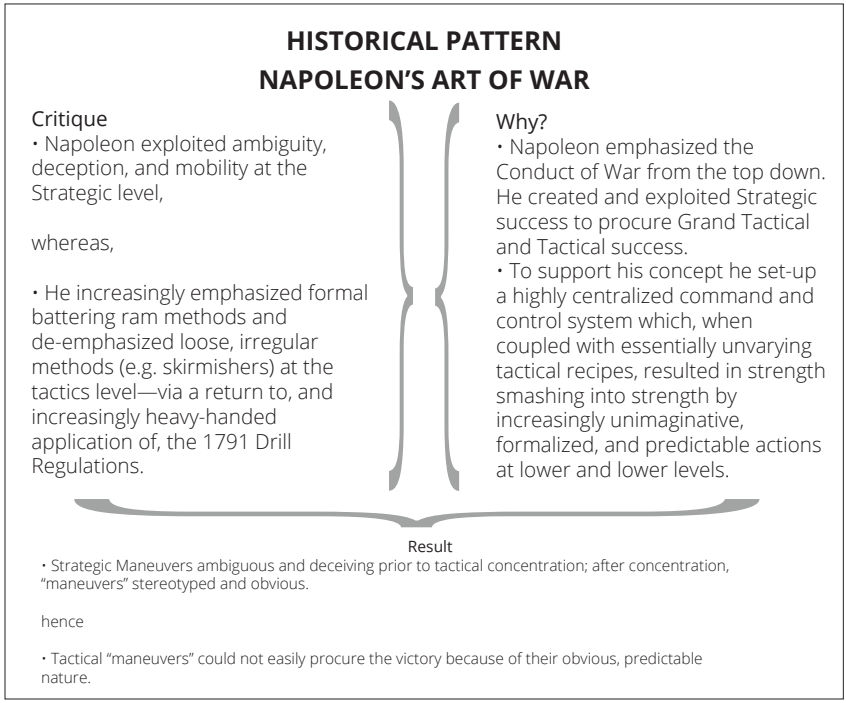
You go down there and stand in line [noise representing book pages turning] this huge book. Boy, you really walked up through there fast. It's a disaster.

Okay. We look at Napoléon. Did I take you through that? Yeah. [unintelligible] I'm getting off track. Okay. Napoléon's Art of War. He did exploit ambiguity, deception and mobility, at the strategic level. Look what happened down at the tactical level. Actually a return to the 1791 [French] *Drill Manual*. He ran a very heavy-handed application, that prescribed the use of line and column. Generally line for attack and column for movement [unintelligible].

[slide 38]

Okay. And he emphasized the conduct of war from the top down. He wanted to get strategic success, he wanted to gain grand tactical success, and then tactical success. Strictly a top-down mentality. To support his concept, he set up this highly centralized command and control. Whereas he had a scheme in his mind, his marshals didn't

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know. Since they didn't know, they had to do what he wanted to do. And they worried about their own troops wouldn't do it. It gets more and more rigid as you go down lower and lower.

So, the result is strategic maneuvers, ambiguous and deceiving prior to tactical concentration. After concentration, stereotyped and obvious. And he could not procure the victory because of their obvious, predictable nature. Waterloo's a good example. Christ, he made some mean strategic moves. Then it was "hi diddle diddle, right up the middle." He got taken out.

Not only that, Wellington, as I told you before, said Napoléon came on the same old way and we beat him in the same old way. Napoléon figured out how to take on those line and columns down in Spain. Napoléon used the same technique. He used the same technique against them.

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WHICH UNVEILS

The Napoleonic Spirit

Strategic "fog" followed by stereotyped and ruinous tactical assaults.

So the Napoleonic spirit, strategic fog followed by stereotyped and ruinous tactical assault. In other words, the strategic, I want to give him high marks. Lower level, not so good as time went on. We'll get into that later on, why that happened. I'm not going to talk about it right now.

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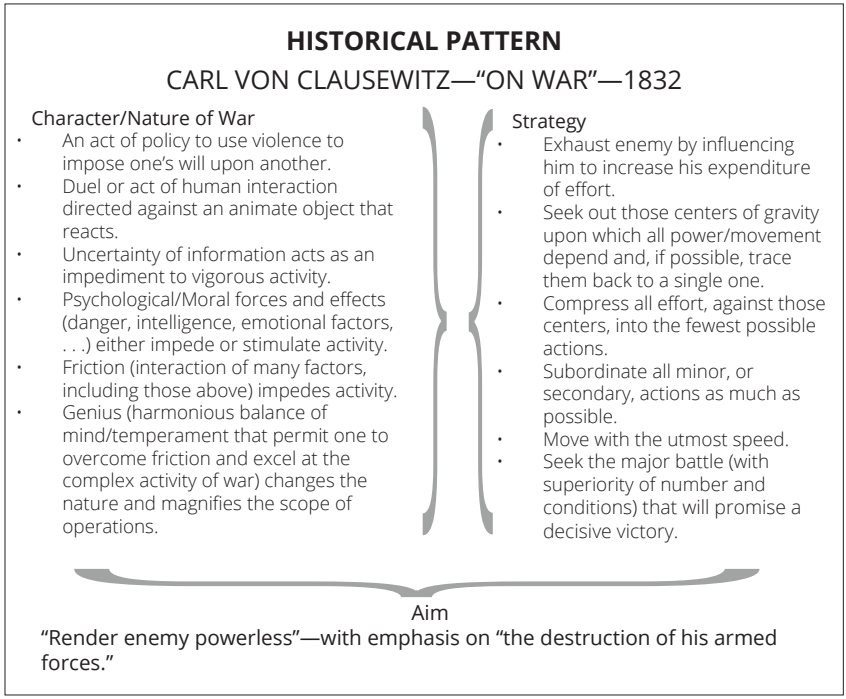
Okay. Now let's go on to the philosopher of war, Clausewitz. He made that famous statement where he talked about the character, act of policy, to use violence to impose one's will upon another. Later on, he made the statement, not only war is politics by other means. We've all heard him say war's an instrument of policy.

Anybody see anything wrong with that? The military's an instrument of policy. When you say something's an instrument, what are you really inferring? You've got control over it. In other words, you've got—you know, a tool or an instrument, you've got control of it. But you can't control war. You might be able to control the military as an instrument. Maybe not too much but [unintelligible]. You can never say it's an instrument of policy, an act of policy, already you went too far. It's not an instrument of policy. That presumes you can decide what's going to happen during it. You can't.

Maybe that was our problem. We wanted to make an instrument—we wanted to make the Vietnam War an instrument of policy. I'm sure that the idea wasn't to go in there and get kicked out.

Another statement he made which is good, duel or act of human interaction directed against an animate object that reacts. *[20:00]* The idea is you're not sure how he's going to react. And since you're unsure how he's going to react, that builds up the idea of uncertainty

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among other things, uncertainty of information acts as an impediment to vigorous activity.

Then he brings in very strongly the importance of psychological and moral forces and effects, since we're talking about animate objects. Danger being one of them. Intelligence. Here he's talking about not an intelligence service but mental intelligence and emotional factors. Emotional factors, courage, confidence. Fear, anxiety, alienation, being the negative ones. Courage, confidence, and esprit being the positive ones. They can go either way, either impede or stimulate, in fact, depending upon the circumstances.

And then he does a very interesting thing. He takes all the interaction of all these things and lumps them under the notion of friction. The interaction of many of these factors, including all those above. And because that's all very complex, that tends to, what, impede activity. Overall, it impedes activity.

Anybody remember his famous statement? "Friction is the only concept"—I'm quoting him now—"is the only concept that more or less corresponds with those factors that distinguish real war from war on paper."[25]

The point is, if you haven't accounted for friction, you're not talking about real war. And he's quite right, if you think about it. Because the way he looks at friction, you read it very carefully. He treats it almost the same way we treat the modern—the way we look at the second law of thermodynamics. Entropy. We talk about all natural processes generate entropy in the second law. He doesn't treat it in a physics sense.

The way he's looking at friction is the way we almost look at the way we use entropy today in the second law. So in a sense, his ideas were a precursor to the second law. And that's laced throughout his book. And the fact that a commander has to overcome that friction. In fact, in a dialectic sense, he used genius as the opposite of friction to overcome that friction. The idea that genius at war, harmonious balance of mind and temperament that permit one to overcome that friction. And excel at that complex activity.

While they can't change the character and nature of war, they can change the nature and magnify the scope of operations. And then strategy, his strategy, exhaust them to influence and increase the expenditure of effort, he brings it up over and over again.

And then, seek out those centers of gravity upon which all power and movement depend and if possible trace them back to a single one. Look at all those powers and see if you can ideally take it back to one. Then he squeezed it one more time. He said in that effort, compress all effort against those centers into the fewest possible actions. Still not satisfied, he gives it another squeeze. He says, subordinate all minor and secondary actions as much as possible in all this activity.

So, by doing all these things, in a sense he's in harmony with his idea of friction. What he's trying to do is overcome his own internal friction. See what I'm saying? So, he can deal with that. And move with the utmost speed. We already talked about that. And seek out the major battles that will promise decisive victory.

[25] Clausewitz, *On War*, chapter 7.

His aim is quite simple, render your enemy powerless, with emphasis on the destruction of his armed force. Not only the armed force, but that was his emphasis. He also talked about capturing a city or taking a province or something like that, also to try to destroy your enemy's will. But he says, this precedes or dominates the others. That's how you prevail, destruction of his armed forces.

Okay. Let's critique Clausewitz. Clausewitz overemphasized the decisive battle and underemphasized strategic maneuver. And the reason why is he came up with strategic maneuver only through the eighteenth century on. In other words, he was reacting against that kind of war and overplayed [unintelligible].

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Also, he emphasized method and routine at the tactical level. Why did he do it? His own words, to reduce his own internal friction. Is there anything wrong with that? He wasn't looking outward. He was always looking at things in an absolute sense.

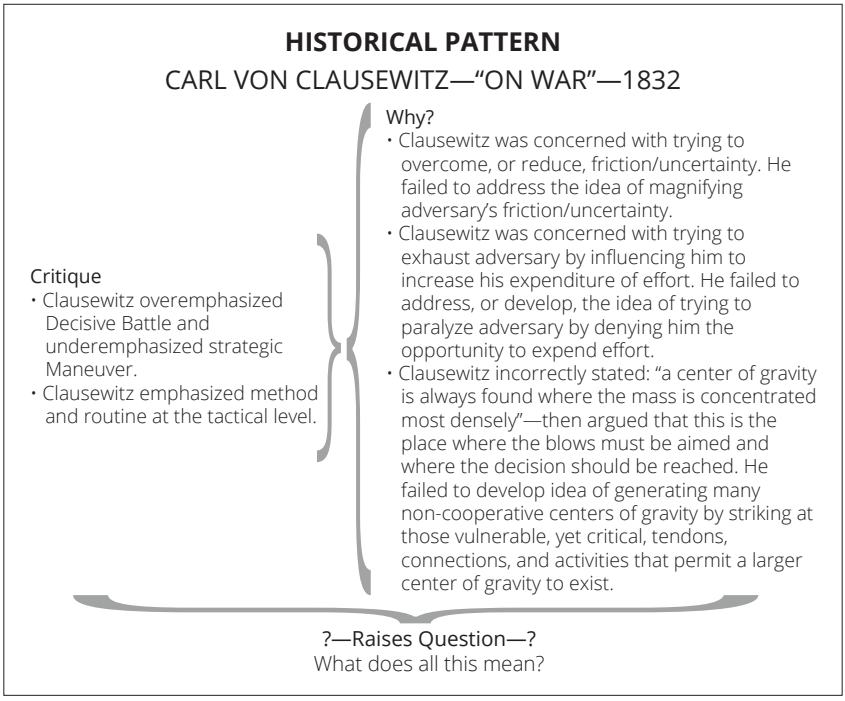
Clausewitz is concerned with trying to overcome or reduce friction and uncertainty. He failed to address if you want to try to magnify an adversary's friction and uncertainty. The point is, if you have routine in your own services and become predictable, you've also lowered your adversary's friction relative to you. You've got to think of it both ways.

Not only that, I had earlier on there, move with the utmost speed. Well, what good does that do you, the utmost speed? Why do you want to move with the utmost speed? I'm talking about [unintelligible]. Just to get there first? He should've said he wanted to move faster than the adversary. What's utmost? The other guy's moving with utmost, he might be faster than you. So he's looking at things in an absolute sense. Remember, he looked at the absolute nature of war and then the reality. He didn't look at it in terms of a relational thing. *[25:00]* He was concerned with trying to exhaust his adversary by causing him to increase his expenditure of effort.

Why not turn the argument around? Why not develop the idea of trying to paralyze your adversary by denying him even the opportunity to expend any effort? Not that the first is wrong, but he's not looking at it broadly enough.

And he incorrectly stated, "A center of gravity," quoting him, "is

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always found where the mass is concentrated most densely." That's not always true. In a donut, the center of gravity, well, there is no mass. In a hollow steel ball, it's where the steel isn't. In a dumbbell, it's in the connection between the mass. You can come up with counterexample after counterexample. It's not correct.

And then argued this is the place where the blow must be aimed, the decision should be reached. And then he talked about centers of gravity, the army, the capital, and public opinion. Followed up the army and capital, didn't really follow up the public opinion. If you aim at the public opinion, here's what happens then. You fail to develop the idea of generating many noncooperative centers by striking at those tendons, connections that permit a larger—that says longer, but it should be larger center of gravity exists.

In other words, you want to generate many noncooperative centers of gravity so the guy can't function as an organic whole. What kind of people do that to us today? What about the guerrillas? Didn't they do that to the U.S.? We had many noncooperative centers of gravity in this country. As a result, what happened? We had to come home.

And I might add that, everybody said, hell, we won all the battles. No, we didn't win all the battles. I don't care if they said so. I know one battle we didn't win. What battle was that? They say we won all the battles, I said no. If you're going to use battle as a measure of merit, you better be sure that it's not a narrow lens. It's got to be as broad as possible lens, if you use that as a measure of merit for success. We lost the battle in the home front. When I bring that up, they only think of the physical battle.

If you're talking about battles, you've got to talk about the moral, the mental, and the physical. They were thinking body count, attrition. That's what they were thinking. I know exactly what they were thinking.

In fact, Harry Summers said we won all the battles.[26] I said, "Bullshit, Harry. We didn't win all the battles." He says, "Well, I know we did. I did all the investigations." "Bullshit. You didn't. I know you didn't. And I didn't do all your investigation. Did you win the battle on the home front?" Of course, he'd never lie, and he said, "No." I said, "Okay." There was the most important battle. It cost us the war.

And what dimension was that played in? Physical? No. In the moral dimension, which bears to what Napoléon said. The moral is the physical as three is to one. If you get a chance to hear my strategy, I go into that deeper. [unintelligible]

Audience: [unintelligible] the same point in [unintelligible].

Boyd: Say again. [unintelligible]

Audience: You said what Napoléon said and what you just said—

[26] Boyd refers to Harry G. Summers, who served in the U.S. Army during both the Korean and Vietnam wars. Summers wrote an analysis of American operations in Vietnam through a Clausewitzian framework entitled *On Strategy: A Critical Analysis of the Vietnam War*, 2d ed. (New York: Presidio Press, 1995).

Boyd: Yeah.

Audience: —moral is to the physical as three is to one. I'm just trying to relate—

Boyd: You see, I'm looking at that pyramid from another angle, is all I'm saying. That's what I'm trying to bring out. We didn't win. We didn't win all the battles. We lost the moral battle. But see, the guys only want to define the physical sense. Nah, it's too weak. That's not true.

But see, attrition warfare is easy. Christ, you just go out there and just slug off artillery and machine gun rounds and all that bullshit. You don't even have to think. Just pound away.

When you lead troops, your first concern, your first duty is to your troops. You don't want to goddamn run up a goddamn hill and clean out your company and say well, shit, we tried, when you could've come in the back door.

That's what I told you Patton said, hold them by the nose and kick them in the ass. That's what he's talking about. You get them to concentrate one way, and you kick the shit out of them in a different direction. Then we ain't [unintelligible].

In fact, you've got a good statement in your new warfighting manual.[27] That thing by Slim is beautiful. Your warfighting book that does—in your conduct of war. Remember that little quote by Slim at the end?[28] He said, bullshit on the principles of war. Here's all you've got to remember. It's a beautiful statement. He had it exactly right. He was a smart guy too. He's in the wrong theater so he didn't get much credit.

Okay. So, what does all this mean? So to attack this, let's go in

[27] *Warfighting*, FMFM-1 (Washington, DC: Department of the Navy, 1989). Capt John Schmitt, USMC, was *Warfighting*'s primary author. The Marine Corps' development of *Warfighting* is described in Brown, *A New Conception of War*, 163–72.

[28] Boyd is referring to the following quote by Sir William Slim from *Warfighting*: "Many years ago, as a cadet hoping some day to be an officer, I was poring over the 'Principles of War,' listed in the old Field Service Regulations, when the Sergeant-Major came up to me. He surveyed me with kindly amusement. 'Don't bother your head about all them things, me lad,' he said. 'There's only one principle of war and that's this. Hit the other fellow, as quick as you can, and as hard as you can, where it hurts him most, when he ain't lookin!' " (see *Warfighting*, 55).

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HISTORICAL PATTERN
CARL VON CLAUSEWITZ—"ON WAR"—1832

Message

Clausewitz did not see that many non-cooperative, or conflicting, centers of gravity paralyze adversary by denying him the opportunity to operate in a directed fashion, hence they impede vigorous activity and magnify friction.

Likely Result

Operations end in a "bloodbath"—via the well regulated, stereotyped tactics and unimaginative battles of attrition suggested by Clausewitz.

reverse order. Let's assume we can generate many noncooperative centers of gravity. If we can do that, what do we do? We deny the opportunity to generate—we impede vigorous activity. If we impede vigorous activity, what does that mean? We maximize friction and uncertainty. That's exactly right.

So very often when you turn the argument around, you see what's going to happen. Because it can't function as an organic whole. And so, there's the message then.

[slide 42]

Did not see that many noncooperative conflicting centers of gravity paralyze adversary by denying him the opportunity to operate in a directed fashion, hence impede vigorous activity and magnify friction. *[30:00]* That's the game the guerrillas play to the hilt.

Audience: Does that mean divide and conquer?

Boyd: Yes, same thing. But there's many divisions, you know what I mean, multiple. That's exactly right. It's just another way to

SLIDE 43

HISTORICAL PATTERN
JOMINI—1861

Secret of Success

". . . the narratives of Frederick the Great commenced to initiate me in the secret which had caused him to gain the miraculous victory of Leuthen. I perceived that this secret consisted in the very simple maneuver of carrying the bulk of his forces upon a single wing of the hostile army. . . . I found again, afterwards, the same cause in the first successes of Napoleon in Italy, which gave me the idea that by applying, through strategy, to the whole chess-table of a war this same principle which Frederick had applied to battles, we should have the key to all the science of war."

divide and conquer. But not just in a physical sense, what, in a moral sense, in a mental sense. You understand what I'm saying?

They think of divide and conquer as split this force off. I'm talking about a moral and mental sense as well. And so, since he did not see it, the likely result's not too surprising, ergo World War I.

Now let's look at Jomini—

[slide 43]

Audience: Can we go back a second? I'm puzzled on how we, the friendly side, create the many centers of gravity simply by aiming at the decisive points with the one center of gravity and [unintelligible].

Boyd: Well, you want to know your adversary, first of all, you got to go back to understanding your adversary. What are those things that you can concentrate on that's going—you can divide him up so

he can't function as a whole, not just physically but morally and mentally as well?

Wyly: So, would your multiple thrusts be one example?

Boyd: Multiple thrusts, that's—that's one example. You know, we talked about that earlier. Yeah, that's, a lot of it's a physical sense, but it's done physically on the other—well, you think multiple thrusts as—you can have multiple thrusts moral, mental, and physical too.

If you think of the battlefield, you tend to think of the physical. But you'll also get moral and mental implications that flow out of that, even though it's physical.

Audience: Is there such a thing as a center of gravity?

Boyd: Oh, that's a good question. It's hard. You're talking about center of gravity. See, I think—you've heard people say—you've got a good question, colonel, because I don't like the term, personally. And the reason why, people say we're going to go after our adversary's strategic center of gravity. I say, what the hell is that? We didn't know our adversary. We didn't know ourselves where we could find our strategic center of gravity. I find that a very interesting phrase.

And they say, they went after ours. I say, that's not quite true. I say I agree that as a result the American society became divided, and that turned out to be our strategic center of gravity. But they didn't know that ahead of time. They found out about it after the fact, and they levered it. They didn't start out that way.

I'm talking about Giap and his boys during Vietnam.[29]

Audience: So, John Schmitt's warfighting manual, when he talks about vulnerabilities, we're onto something better than the center of gravity.[30]

Boyd: Yes, in fact, I think that's a much better term.

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[29] Võ Nguyên Giáp is best known for his role as military commander of communist Vietnamese forces that fought against Japanese occupation during World War II, French troops attempting to reassert colonial authority after World War II, and American and South Vietnamese forces following the partition of Vietnam in 1954. Despite lacking any formal military training, he nevertheless proved himself a very effective strategist, field commander, and logistician against opposing military forces.

[30] *Warfighting*.

Audience: But also we don't—

[Cross talking]

Boyd: Remember, as a matter of fact, Sun Tzu said it. Remember what he said? In fact, I got it in my—what manual do I have? This one [unintelligible] don't know where I put the son of a gun. It's in my strategy kit.

Remember what he said, seize that which is the vulnerability, seize that which your adversary holds dear or values most highly. Then he will conform to your desires. That's a vulnerability. He said that, Sun Tzu back 400, 500. Seize that which your adversary holds dear and values most highly. Then he will conform to your desires.

Audience: John qualifies that by saying "critical," for example, his PX may be vulnerable, but it's sure as hell not critical.[31]

Boyd: That's right.

Audience: So, you've got to look to what's vulnerable and to what's critical.

Boyd: That's right. But no, no, Sun Tzu said it. Seize that which your adversary holds dear or values most highly. That is critical.

Audience: But what if it's not vulnerable?

Boyd: Well, it may not be. But I'm talking about—but he's always talking about strength against weakness. He doesn't say directly try to do that.

Wyly: You're kind of feeling your way as—

Boyd: He's feeling your way. See, he recognizes it.

Wyly: In fact, every vulnerability, essentially you get onto something.

Boyd: And you may not know that at the time, exactly what that is.

[Cross talking]

Boyd: Let's say you're going to penetrate a front—you want to go after your adversary's weakness, strength against weakness. You may not know that exactly. One way of finding out, though, is multiple thrusts. Because some are going to get hung up. Some will leak through. The ones that are leaking through, you know they're doing

[31] PX refers to post exchange. PXs consolidate retail items and certain services into one facility for servicemembers.

it. So, then you can shift your *schwerpunkt* and ram it home through those.[32]

In other words, you're adapting to circumstances. You see what I'm getting at?

Audience: I'm trying to put it all—

[Cross talking]

Boyd: You see what I'm saying? In other words, you're—you say, okay, they've outsmarted me here. But in the meantime, you ram some of them in there, see. And some are leaking through. The other ones are being hung up.

Okay. The ones that are hung up, you don't reinforce those. They just have to sort of hold the position and keep the other guy tied up and reinforce or resupport those guys that are going through and ram that home real deep into the guy.

Audience: I'm not getting the connection between the successful thrusts and the vulnerability.

Boyd: I know what you're saying. You have a—let's differentiate between weakness and vulnerability. A weakness may not be real. A guy may not be vulnerable because he's weak. And that's what you're talking about.

Audience: Yeah, because you're going through there—

[Cross talking]

Boyd: You may find a weakness and go through, but he may not be too vulnerable necessarily. But also because you've got the weakness—because you act, then you can exploit that weakness. Then you can direct that out of that weakness and effort into his vulnerability.

Audience: *[35:00]* Okay, now the $64 question—

Boyd: If you go after something that's vulnerable, a critical vulnerability, he probably knows it is too. So therefore, he's going to put a lot of forces there. Now you've got strength going against strength. In other words, you've got Verdun and all those battles [unintelligi-

[32] *Schwerpunkt* is a German term roughly translated for military use as "main effort" or "focus of effort." Introduced to the military lexicon by Prussian officer and military theorist Carl von Clausewitz in *On War*, *schwerpunkt* has evolved in meaning but generally refers to an aspect of an operation that is considered to be decisive and thus weighted heavily in terms of troops and supporting resources required to ensure its success.

ble]. Do you understand what I'm saying? So, it's sometimes better to exploit the weakness. As a result, you can get to the vulnerability.

Did you ever read Manstein's thing on lost victories?[33] Remember, he's always talking about unhinging the front. You'll never be vulnerable. What he's trying to do is find a weakness and then start getting behind him. They're going to abandon these areas where they're vulnerable. So, he gets at the vulnerability by getting to that weakness first.

Audience: We need to go through the intellectual exercise before the battle to think that through.

[Cross talking]

Boyd: Well, I think what you do, I mean, you don't want to recipe it. I wouldn't want to recipe it. What you want to do is you want to lay out the philosophy so your guys think this way, see. Because let's say he's a commander, and you give him a task to do something out in front. And he has to decide how to do it.

He may not know exactly where the guy—he may have sort of a feel and some *fingerspitzengefühl* on where they're weak. In the meantime, he can allocate his forces and go through, and then he says okay, these guys are succeeding, so I'm going to support that. You other guys hang on. Keep the other guy there and let's ram home. Now, I'm going to take advantage of that weakness, see.

Audience: If we try to time—

Boyd: In other words, it's an opportunistic kind of thing. You see what I'm saying? You're taking advantage of the situation as it unfolds.

Audience: As it unfolds. But I think what we teach is, we teach identify the critical vulnerability, have the focus of effort towards it,

[33] Field Marshal Erich von Manstein, *Lost Victories: The War Memoirs of Hitler's Most Brilliant General*, trans. Anthony G. Powell (St. Paul, MN: Zenith Press, 2004). One of the German Army's most senior commanders during World War II, Manstein planned both the successful invasion of France in 1940 and several operations against the Red Army on the eastern front. He was eventually relieved of command by Hitler in 1944 for disobeying Hitler's orders to hold all territory to the last man. While Manstein's position in the middle of multiple major operations during World War II make his memoir worth reading, his book has also been criticized as self-aggrandizing and whitewashing those parts of the Holocaust that occurred in territory over which he had command.

and let your commander's intent spell that out. But that's kind of a neat prescription.

Boyd: That may cause you some problems, is what I'm saying. You may be allocating strength against strength. Do you understand what I'm saying? Because if you see it as a critical vulnerability, he probably does too. So, he's going to defend that son of a bitch.

Audience: We have to do something initially to try to draw him away from that.

Boyd: That's okay. But what you're doing, you've got to set up some kind of operation to exploit some weakness, which may not be critical. Then if you can get him to goddamn allocate toward that weakness and expose that vulnerability, there's nothing wrong in that. But you've got to get the exposure first, otherwise you can't get to it.

Audience: Yeah, I can follow that, but how does a commander's intent, which is another tool we talked about that we need—

Boyd: What do you mean by intent? Let's ask first, what do you mean by intent? Let's separate—we've got some confusion on this word. I'm going to give you three words so we can sort it out.

First of all, you give your guys a mission, what is to be done, right? What's the difference between mission and intent? Anybody? We've got to distinguish between them, otherwise they don't know what we're talking about.

Audience: The mission being more specific? The who, what, where, and when somebody's going to do something—

Boyd: Well, the mission generally is—you think of it as sort of a lower-level effort relative to the intent. The mission is what has to be done. The intent is the reason behind it and usually encompasses a larger effort. So, in that sense, you're correct.

Okay, but then you've got mission. You've got the intent. And behind that it's more, a little bit more insidious, you've got motive. Mission first, more specific as you like to say. Then the intent. Then the motive. So, the mission is what you want done to these guys. The intent is the higher-level intent behind it. And there also may be a political motive even behind that intent.

So, you might say, okay, we want to direct this thrust in an initial operation out here, but our intent is to do this. Okay. You've got to lay something out ahead of time, but as it begins to unfold, you

might want to change that intent too. As it unfolds a different way, say hey, I can gain leverage by this. Then you shift the *schwerpunkt*, you shift your intent, and tell your people why.

Don't get too hung up in all these things, too much in these words. You want to give yourself fluidity. I look at the intent as the why behind a mission. The mission is the what. The intent is the why.

Audience: I'm thinking two things. One is—

Boyd: Or as he says—think of this, though, think of—you give a task to some company, see. Then you want to know, let's say, the regimental intent behind it. In other words, he's thinking on a broader level, but they have more specific missions.

So, a mission's related to an intent, but intent—like he said, more specific or lower-level relative to the intent. In other words, the intent's more general. That's why I think it's the why.

That's why I say think of the mission as the what, the intent as the why, why you're going to do that. That's why—see in other words, you're folding it into a larger—intent is a larger mission if you want to think of it that way. Or the mission is the smaller intent.

Audience: Initial discussion, getting back to vulnerability—

Boyd: Did I make sense out of that to anybody? Everybody?

[Cross talking]

Audience: *[40:00]* I think I [unintelligible] vulnerability, you're equating that with the enemy's critical point or center of gravity, I think as we've been referring to. We're saying direct our strength against an enemy weakness, with the overall objective of that thrust being his center of gravity or—

[Cross talking]

Boyd: Nothing wrong if you want to get the vulnerability. But remember—

[Cross talking]

Audience: —that's where the disconnect—

Boyd: You've got to get that exposed first. All I said is you want to get that exposed. If you don't expose that first critical vulnerability, he knows it's there. You're going to get strength going against strength, and that's the only argument I gave you.

See often, we think direct. There's his vulnerability, we're going to tear right through it, Christ, you lose a whole division. So, you say, well, why do we have to go right after it? Couldn't we hold him by the

nose, come into the back door and do it? That's what Patton said, hold him by the nose and kick him in the ass.

[Cross talking]

Boyd: That's another way of, you know, what he's doing.

Audience: I think initially that's some of the confusion on the definition of vulnerability and weakness [unintelligible]. Initially, when we started talking about—

[Cross talking]

Boyd: Well, a guy can be weak in an area, but he may not be vulnerable.

Audience: That's right.

Boyd: We know that. People use the word. And so that's a fair question. He can be weak but not vulnerable. On the other hand, if it's a critical vulnerability and he knows that, he's going to put his forces there. And if you try to make a direct effort against it, you're going to lose a lot of your people, and may not make the vulnerability.

So, in some sense, what you've got to do is get him to expose that vulnerability by exploiting his weaknesses, whatever they are, or creating weaknesses, whatever they are. Does that make sense? We seem to be still hung up on that.

Audience: I have no problem with the intent being a wider relation to a task. When you're looking at a force, he's going to assign his subordinate units tasks. Now, when we talk about this thing called a commander's intent, somewhat—

Boyd: What he wants to achieve, the commander.

Audience: Right. And—

Boyd: That's a higher-level achievement.

Audience: Well, no. That mission that he's been assigned with a purpose or the why, an intent, from the higher headquarters, he's going to translate that to his subordinates in numerous tasks. But this intent now, the commander's intent, not as it relates to the tasks, the glue and hopefully the way he envisions this operation, this thrust unfolding in general terms, general, broad.

Boyd: See, then you're going to choreograph—I'm thinking you're choreographing, and I get nervous when you say it that way.

Audience: Colonel Boyd—

Boyd: I get nervous when you say—I don't know why, I feel very uncomfortable with that.

[Cross talking]

Boyd: Maybe I'm [unintelligible].

Audience: What you were saying could be solved. When you receive a mission with a purpose or an intent from a higher headquarters, that's your mission. Now you have to go ahead and put up a plan, okay, which is going to have to include—

Boyd: Oh, I see what you're saying.

Audience: —tasks for your subordinate units. So now, how do we—between that mission and intent from a higher headquarters and then—

[Cross talking]

Boyd: Let me ask you something. I'm getting a little confused here. Are you separating tasks from mission?

[Cross talking]

Boyd: We've got a problem here.

Audience: Let's say the division's mission is to seize the airfield. The intent, the reason we're going to seize it, is to permit the introduction of follow-on forces. So, if we want that airfield so—

Boyd: Nothing wrong in that.

Audience: Okay. Now as a division commander, I'm going to have to tell—

Boyd: Why do you want to prevent that? Because you're trying—. You don't want those forces there because you're trying to conduct other operations.

[Cross talking]

Boyd: I understand. Whatever it is. That's fine.

Audience: So, we want that airfield intact so we can bring the C-130 [unintelligible].[34]

Boyd: Right. Right. Got it.

Audience: Okay. But now as a division commander, I'm going to have to give tasks. As I envision I'm going to do that, I have a concept of how I'm going to do it. I'm going to give tasks—

Boyd: Or missions. Subordinate missions.

[34] The Lockheed C-130 Hercules is a fixed-wing military transport aircraft still in use today. It can carry troops and cargo and conduct aerial refueling, and variants have been equipped for direct fire support, reconnaissance, search and rescue, and more. It is also capable of landing and taking off from relatively short and unpaved runways.

[Cross talking]

Boyd: That's why—yeah, you had me confused. You're talking about subordinate missions.

Audience: Subordinate missions.

Audience: Yeah, subordinate missions. Okay.

Boyd: See, I'd rather call that—see, when you say tasks, okay, as long as you think of a subordinate mission, I have no problem with it.

[Cross talking]

Boyd: Okay. We're saying the same thing.

[Cross talking]

Audience: —a task from a higher headquarters translates to my mission—

Boyd: No problem.

Audience: —as a subordinate.

Boyd: So, the tasks are just subordinate missions.

Audience: For example, I've identified a large force to the southeast of this airfield, and I say to the 8th Marines, occupy positions to the southeast of the airfield in order to keep the enemy from interfering with our operation. So, I want him to go where he needs to, southeast of here, to keep the enemy from interfering.

Boyd: Okay, but I'm a little confused now. Are there any troops in that area? You say occupy—you're going to take out the troops first, or you're going to occupy the position? I mean, you're saying seize the airfield.

Audience: I'm just trying to do this conception that I said from the division.

[Cross talking]

Audience: You've got to seize this airfield in order to permit the introduction of follow-on forces.

Boyd: I hear you. I've got that.

Audience: Now as a division commander, as I look at it, I've identified the major enemy here to the south. And I say those guys—

Boyd: Can I raise a question at this point?

Audience: Sure.

Boyd: What about around the airfield? Are there any enemies there, or is it vacant?

Audience: No.

[Cross talking]

Boyd: This is a very important question to me.

[Cross talking]

Boyd: Are there any enemies there or is it just a void, it's vacant? Nobody there?

Audience: It's being protected.

Boyd: Well, then, see, now I have a problem then. See, that's why I asked that question. In order to occupy this position, you've got to take out the force first. Why don't we get rid of those, then we can occupy the position. So, you're going after the terrain. I want to get rid of the force. You say there's a for—I said, is there any people there?

Audience: Yeah. I guess what I'm trying to illustrate is each one of those regiments has got to have—

Boyd: *[45:00]* See, because if you take out those people, you're going to own the airfield. Then you can say okay, set your perimeter up, whatever you want. But I have to go first things first. Not occupy—I want to get those people out of there so I can own that airport.

Audience: He didn't say occupy terrain or anything like that, sir, you said do something—

Boyd: You said occupy position. I just—

[Cross talking]

Audience: —identified enemy force that was threatening the airfield.

Boyd: No, I understand. There's an enemy force out here that can bother you. I said, are there any enemies at the immediate position at the airfield? I asked that question. The answer was yes. Well, I want to take those out, so then I can occupy those positions after I take those out, so I can hold off the enemy force. But I'm trying to go first things first, is all I'm saying.

Audience: Yeah, I'm with you. So, I'm going to have to give—

Boyd: That's why I asked that question.

Audience: —one or two of my regiments—

Boyd: See, that's why I asked if it was vacant. If there was nobody there, I'd say fuck it. Take the positions. I have no problem with that, see.

Audience: But then you're going to—you may have to be fighting inside out, okay? You may not be able to hold that then. That's why it's so hard to discuss, because it's so situational.

Boyd: But let me tell you why I raise that question as so important. Patton said it very well.[35] Trouble is, when you get fixed on something, guys want to go. They want to fight someone. They dig in to fight. Hell, you don't want to dig in and fight. Take them out so you can hold the position first. In other words, you get things twisted about, you get yourself all hung up.

And that happened in Grenada.[36] And Patton told his people, I don't want to hear anybody telling me they're trying to hold ground. He said let the other son of a bitch worry about holding ground. Take them out. He said it over and over again.

And so that's why I asked whether there was any people. If there were no people, I'd say fine, we have no problem. Just take it. I mean, we're talking about resisting. When I say people, you know people are going to resist the attack, of course.

So, I think we have to think that through, because if you don't do it right, your people—

[46:53]

[End of tape 2, side 1]

[35] Gen George S. Patton served in the U.S. Army during the Pancho Villa Expedition of 1916, World War I, and World War II. He was a key figure in the Army's development of tank warfare doctrine after World War I. During World War II, he commanded Army forces during the invasion of North Africa, Sicily, and across France following Allied landings at Normandy in 1944. Based on the reputation Patton had gained from German leaders as an aggressive and effective combat leader, he was named commander of the First United States Army Group, an entirely fictional military formation used to deceive Third Reich leaders about the intended landing place for the Allied invasion of France. Patton was eminently quotable, as Boyd notes here, but also had a reputation for losing his temper (especially in two incidents in which he abused soldiers suffering from what today would be considered post-traumatic stress disorder) and had controversial views on both Germans and Soviet Russians following the war's end.

[36] The invasion of Grenada (Operation Urgent Fury) was undertaken by military forces of the United States and several Caribbean nations from 25–29 October 1983, following a coup against the sitting Grenadian government. Although the operation lasted only a few days, the American forces involved experienced significant problems with intelligence, communication, and coordination of joint operations. These issues were part of the impetus for the reorganization of the Defense Department under the Goldwater-Nichols Act of 1986.

[Begin Tape 2, side 2]

Boyd: —concept, and then you've got to get them hands on, get them out in the field to practice those concepts. Not only that, be fair to yourself. Remember, because you laid out a concept, doesn't mean you have it all right the first time. You may think it through. So, if you see things happen, you say okay, now we've got to take the practice and go back to concept and revise the concept. You go back and forth until it works after you do a number of cases. So then they get that—Now they're getting to *fingerspitzengefühl* the Germans talk about, because they're getting the practice.

Audience: That I can grasp. I think what we tend to do in the military is, we want—once we understand the concept, we want some sort of a tool, prescriptive tool to make it work, and that's when you begin to get in trouble.

Boyd: That's right. And what I'm saying is when you have a concept, let the guys try it under different circumstances out there, and don't let the officers or the leaders interfere too much. Just give them the task and let the other guy do it. If he's going to screw it up, let him screw it up so you can learn what the screw-up is, and then have your critique afterward. That's how you learn. Instead, everybody sets it up so nobody screws up. Fuck them. I want to see a lot of screw-ups.

Audience: It's got to be force-on-force.

Boyd: That's right. You want to see a lot of screw-ups, because you're not sure what are going to be screw-ups and what aren't, because all you've got is a concept. It might turn out some are good, some are bad. That's part of the thing. So that's how you get that *fingerspitzengefühl*.

Audience: So, stay away from the prescription?

Boyd: I would.

Audience: And academia, we can only go so far, sir. You've got to get out there—

Boyd: Let me give you a good example in air-to-air combat. Here's a fighter pilot back there, okay. We go through a long ritual which we started at Nellis many years ago. Before then they had a favorite maneuver. We taught them all these fundamental maneuvers: high speed yo-yos, low speed yo-yos, barrel roll attacks, diving spi-

rals—what do you call it? Pirouettes. Christ, I can't even remember them all, and I was so deeply involved in them. And a guy's trying— I said, "Don't try to remember that stuff, for Christ's sakes. Don't even think of it." When you try to remember it, you know it's like, "Am I going to steer the wheel this much in a car?" Do you know how far you're going to turn the wheel? You don't even think about it. Or how far you're going to push the accelerator down or how far you're—? I said, "What you have to do is, we're going to go out there and we're going to teach you that so after a while it becomes part of your *fingerspitzengefühl*."

We teach them maneuvers, what you do and why you do it. Then we take them out and work it over again and again and again. Pretty soon, he doesn't even have to think about it. So, you don't have to worry about the goddamn manual. You just do it. That's why I'm saying if you teach the concept and you don't give them the hands on, they're never going to get the *fingerspitzengefühl*. So even though we didn't know the term at the time, what we were teaching the fighter pilots was *fingerspitzengefühl*. So, they could do those things. They could do the chops, the counterchops, the maneuvers, the countermaneuvers, the yo-yos when they had to, the low speed, the high speed, the scissors, the vertical rolling scissors, et cetera. You know what I'm talking about. You've been through it all. They've got to have those fundamentals. If they don't have it, they're going to be dog meat for everybody else. A guy's going to go, "What should I do?" [smacking sound] He's out. So, it's got to be right there. He can't think about what page number is that on, what manual or so and so, and get the checklist out. That's bullshit. He either has it now or he doesn't have it, period. So, you've got to get him out there again and again, and give him that practice. Pretty soon they get—I'll tell you, these guys get good. They're not even sure how they get good, but they get good.

Audience: I think our dilemma is within the school environment we're limited in the way we can accomplish that: war games, map exercises—

Boyd: I understand that.

Audience: And that actual, for the hands-on has got to take place somewhere—

Boyd: Yeah, but when you get out to your unit, you should do

that all the time. When you get out to your units—I mean I agree. You're going through a school. You don't have the—We didn't have the time to teach them all that in Fighter Weapons School at Nellis. We gave it to them, we sent them back to the unit, and tell them keep cycling through again and again. We'll get guys out there, and so pretty soon they start getting what we now call *fingerspitzengefühl*. That's what you want to have your officers and your men to get. So, when they get out there, they've just got that goddamn—boom [smacking sound] they can take those son-of-a-bitches out.

But if you're just treating a concept like here on a chart? Bullshit. Burn the goddamn thing. You've got to practice, and you've got do—Not only that. Do it every different way you can think of. And you should not grade a guy because he does it a different way. Say, "Bullshit. That wasn't the school solution. F. You're out." I don't care what's different. If you realize his tactic works out good, say, "Hey that's good. I wonder why that worked." If he can explain it, fine. That's another option. You want to keep widening that repertoire. You want to make that repertoire as wide as possible, because you become more unpredictable. The wider your repertoire, that means you've got a wide-angle lens and the other guy's got the narrow angle lens. You've got the wide band. He's looking at things through the narrow band. You've got the wide band filter. You want him to have the narrow band filter.

Audience: One of the things that you hit on, and that here at the school in answer to the colonel's question is, is it training as repetition, and the more that you do something and the more that you're exposed to something, whether it's a map exercise where you're going to have to make a decision and you have to have input in. You have experience; therefore, you're going to generate output. So in the academic environment, the more that you can exposure yourself to that kind of rapidity, and quickness, and speed of effort—

Boyd: But remember, you've got to be very careful—

Audience: —you're better off than you are otherwise.

Boyd: No, you're very good, except for one thing you've got to keep in mind, which I—I have another part in another one of my lectures. *[05:00]* Whenever you do that, you always want to do it so they have a variety of different circumstances when you're doing it. If you don't do that, then pretty soon you're choreographing things.

You have a narrow repertoire, and you're going to get cleaned out when you're thrown in another environment. There's a very big danger of people like to look good, so they have this narrow repertoire. You want to throw different things at them, as many as you can, so they're developing a rep—I mean a *fingerspitzengefühl* across a wide spectrum. Really, I can't overemphasize that. This is crucial, because this is what makes you adaptable and unpredictable. Remember, I keep using those words. Those are two key words, be adaptable and unpredictable. And then you'll gain leverage. Because the moment you start becoming rigid or nonadaptable and predictable, you know the game's over. The game's over. And that's the danger of doing it with very narrow repertoire, because you want to look good and the commander to be all—practice is wonderful, he's goddamned thrilled. Well, you choreographed it.

Audience: Let me come from the top of an academic department. Concepts—

Boyd: Well, you can't do an academic, but you can give them at least the basic stuff so they can go out and do it themselves. We should be looking at doing this— You see what I'm saying?

Audience: I think we probably give it to them in the sense in terms of map drills.

Boyd: Fair enough.

Audience: With the concept of some very, very general tools.

Boyd: That's right.

Audience: Academic exercise.

Boyd: That's right. And map drills are good, but then you want to set up the map drills many different ways, too. Then in the end, they've still got to connect it up with the actual operation when they get out in their own unit. That's what I'm trying to say. So, they can actually develop that *fingerspitzengefühl*. I can't overemphasize that. Let the other guy not have the *fingerspitzengefühl*. That feels good. You're cleaning his clock, and he can't even figure out why. Maybe you can't either, but you know you're doing it.

Audience: You're saying—what you mean, Colonel, you're going to expose us.

Boyd: That's right.

Audience: You're giving us exposure. You're not going to teach us; you're going to expose us to why.

[Cross talking]

Audience: Educate.

Audience: We made a mistake because we spent a hell of a lot of time on staff planning. If we loosen up the staff planning some and do more—add some more exercises.

Audience: Well, you know, we've only done staff planning once and that's at the first part of the year.

Audience: I think instead of throwing so many different models at you, we throw you one simple model.

Audience: Yes, sir.

Audience: You get through three or four different models.

Audience: One thing I think, I think Command and Staff College, you're exposed to an awful lot of material. I don't think we were taught very much. I just think we had the exposure, we had the references to go to. The other thing I think, I think training—military training and military education are two different things.

Audience: Oh yeah.

Audience: They're not one and the same. Then I think the problem with having hands-on time is time itself.

Boyd: Heck yeah. That's how you get the feel. You've got to get—Because then, what you're doing is you're taking your concepts, your ideas and your training and you're putting it all together to get that *fingerspitzengefühl*. That's what you want to get.

Audience: But the time—we fight time. Time is our enemy.

Boyd: I understand that. He can't do everything, but at least he can expose you to these things in the end when you go on the field. We couldn't do everything at the Fighter Weapons School, but we gave them exposure, said now you guys have got to practice yourselves. We can't do that for you. We can only give you so many different combinations.

Audience: We only give the concept. Then all he does is go—

Boyd: That's right.

Audience: Someone says, "Hey, show us how to do it."

Boyd: You can't give a prescription.

Audience: You've got to get the foot in the door of how to do it—

Boyd: You can't give him a prescription to do that. Then it's a choreographed dance. You really can't do that. I mean, I don't think

so. Maybe I'm wrong. I just don't know honestly how that works. [Cross talking]

Audience: I don't think anybody disagrees.

Audience: The question that always needs to be answered, or at least discussed somewhere along the line, which is: who is ultimately responsible for the success of any operation? You have to work that out once you come to that.

Boyd: Well, the commander has to take the responsibility. In the end, it's his responsibility. In the end, it's the commander's responsibility. It's his responsibility. He can't throw that off. I don't think he can throw that off. If one of the lower guys screws up, well, they work for you.

Audience: By responsibility in this case, I meant the execution—who actually executes it and is responsible.

Boyd: Whoever executes it—whoever does the how, but the higher-level guy still has some responsibility, in a sense, because he laid out the mission.

Audience: As an organization, we push that responsibility down to the bottom, lowest man. The philosophy is—

Boyd: Oh, I see what you're getting at. Okay. No, that's good.

Audience: If we keep the responsibility defined.

Boyd: That's not what I meant.

Audience: *[10:00]* The men below—wherever we draw that line of responsibility, at whatever rank, the level below that ceases to operate—

Boyd: No, you've got a good point. I agree with that. I'm just saying at the end, the commander can't absolve himself of responsibility. What you want to do is make the people down below more and more responsible, and that has to be done. It's very important. In other words, they've got to feel like they're part of the thinking process, the action of that too, and that's exactly what you're suggesting and I agree.

Audience: To make them responsible, you have to hold them accountable.

Boyd: Hold them accountable. That's right. You've got to hold them accountable.

Audience: [unintelligible]

[Cross talking]

Boyd: Yeah. I didn't see what he was getting at. I see what you're getting at.

Audience: It's a dangerous—It's a tricky thing.

Boyd: What do you want? Do you want a bunch of goddamn automatons working for you down here? It doesn't work. A bunch of automatons is bullshit. That's what you're saying. That doesn't work. You can't do it. I mean, you might think you can but it's not going to work. You know, I'm just taking the opposite extreme.

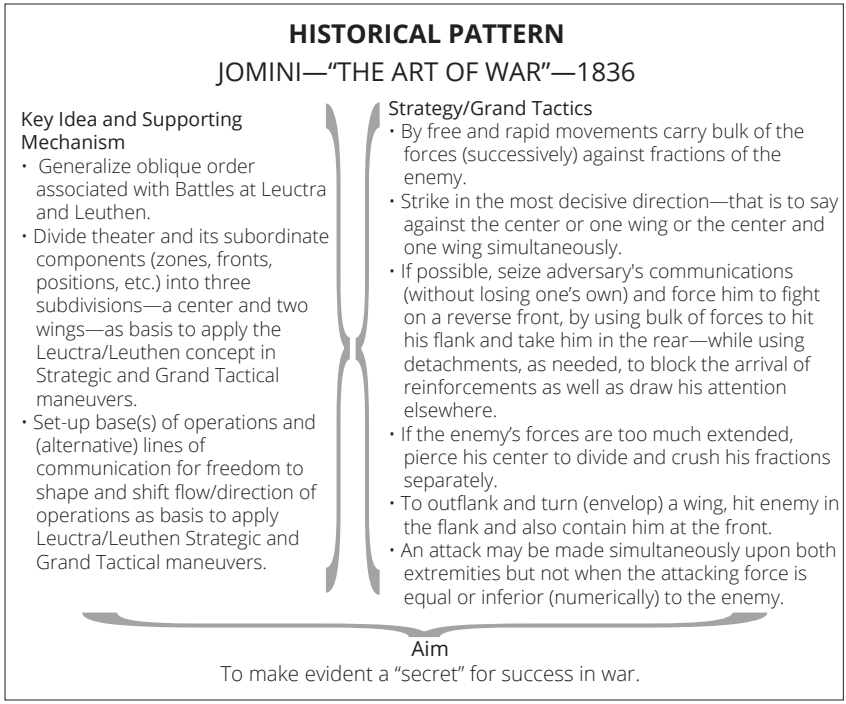
Audience: I continually relate this to the athletic field of endeavors, and my limited successes on those fields. As I look back in retrospect, I wasn't thinking. Once I started thinking, I started reacting to the situation and it became a reactive role. That goes back to the field. That's hard to acquire, though.

Boyd: Oh, oh, I didn't say it was easy. No way. That's right, it takes time. But that's why you want a variety, do it different, and do it different ways. So in the end, you know you're doing something that just feels right. And it's because you've accumulated all this experience, you say, "This is right." You don't even know why. You're making all these connections in your brain many different ways. Not only if it doesn't work out right—Even if it didn't work out, you've got about five or six options. You start shifting gears. Fighter pilots do that naturally. Boy, they start shifting gears real quick if they're any good. They really do. They're pretty good at it.

Audience: They are maneuvering one piece of gear—

Boyd: I understand that. Land combat is more difficult. I'll agree with that. On the other hand, you made it a little bit too simple. They may maneuver one piece of gear. Remember, there are a lot of guys out there, and they've got to work with their buddies, as well as try to take out the other guy. They all have to work a super-*fingerspitzengefühl* together, so they build that harmony so they can do that. In the end, though, your job is tougher. I'll agree with that. There's no way I wouldn't agree with that. Yours is tougher. In a sense, they have more—It is easier for them to operate. You're on the ground. Many of the things you've got problems with—It's a tougher job. But some of those things they learned in a simple situation, you could take advantage and take aspects of it, and use it in a more complicated situation, like in land warfare or ground combat. The Germans

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did it. They use the word. Rommel used it, *finger*—. It's amazing how they all used it, want to get that sure feel. We got off track, didn't we?

[slide 44]

Okay. Jomini. The key idea and supporting mechanism. Remember, we already talked about the previous chart. Generalize the oblique order. Note this, it's a key idea. Divide theater support components into three—He said ideally into three subdivisions: wing, two wings in the center, you can do it two wings left and right [unintelligible], but he said the basic idea is so you have some way of thinking about it. Trying to give you a mechanism so you can employ the strategic and grand tactical maneuvers. And the importance of setting up a base of operations and line of communication. Not only that, so you can shift them and shift them—I mean you can change them and shift them. So, you can actually gain leverage on this maneuver. And his strategy and grand tactics. Note this: By free and rapid movements, carries the bulk of the forces against frac-

tions of the enemy. Those are important statements. If you're not free and rapid, how are you going to get your strength against their weakness? You're not going to be able to. Once again, the speed in the sense is the higher principle than the idea of concentration. He in a sense says that right in the statement. And all that Clausewitz brought out, he was trying to say together.

Okay, strike in the most decisive direction. I've got a caveat this one. That is to say, against the center or one wing, or the center and one wing simultaneously. Remember, I've got two things grouped together. Strategy and grand tactics, which are the operational level. In a strategic sense, you can go against the center or one wing because you're spread outward. In a grand tactical sense, you can go against the center and one wing simultaneously. That's the only caveat. Otherwise, all the other ones stack up pretty much the same. And he recognized the importance of seizing his communications. In other words, cut him off from resupply. Cut him off from support. People tend to panic when they lose their support, and start doing dumb things, and force him to fight on a reverse front. If the enemy's forces are too much extended, pierce his center. *[15:00]* We saw that earlier in Napoleonic maneuver. Go out, flank, and turn their wing. Hit the enemy in the flank and also contain him at the front. That's Patton. Hold him by the nose and kick him in the ass. He might have read Jomini and got it out of that. I don't know. [unintelligible] Hold him by the nose, kick him in the ass.

Note this statement: Attack may be made simultaneous upon both extremities, but not when the attacking force is equal or inferior to the enemy's. There are too many counterexamples to that. It doesn't stand up. Even Napoléon at Dresden pulled it off. You look at Cannae and many other of the damn things done. Just too many counterexamples of that. It doesn't work out. But if you look at it more carefully than what he's writing, what he's really doing is he's juxtaposing the double envelopment versus single envelopment. Basically, what he is saying is you can get the same leverage with less force out of a single envelopment scheme as opposed to a double envelopment. Basically, that's what he's saying. If you look at it in a very rigid sense, that sort of holds together.

Okay. His aim was what he called "make evident the secret to success in war." He was not trying to give you the secret of success,

SLIDE 45

HISTORICAL PATTERN
JOMINI—"THE ART OF WAR"—1836

Critique

- Preoccupation with form of operations, spatial arrangement of bases, formal orders of battle, and tactical formations.
- Lack of appreciation for the use of loose, irregular swarms of guerrillas and skirmishers to mask own dispositions, activities, and intentions as well as confuse and disorder enemy operations.

Likely Result

- Operations become stereotyped—unless one can appreciate Jomini's ideas outside their formal underpinnings.

just trying to give you a way of thinking about it, so you can deal with these complexities, and that's what he's really saying, even though he uses that word.

[slide 45]

Now we critique Jomini. Okay, preoccupation with a form of operations, arrangement of bases. In other words, very formal, very rigid in that sense. Also, a lack of appreciation for the use of loose, irregular swarms of guerrillas and skirmishers to mask—He didn't even put them down, he had—didn't have much to say [unintelligible] and likely resolve. He had some good ideas, but you've got to really throw away those rigid lattice work [unintelligible].

In any case, we tie them all together, Napoléon, Clausewitz and Jomini. The key point here, they really didn't appreciate the importance of irregular tactical arrangements and activities. In

SLIDE 46

HISTORICAL PATTERN
NAPOLEON—CLAUSEWITZ—JOMINI

Key Point

Napoléon, Clausewitz, and Jomini did not appreciate importance of loose, irregular tactical arrangements and activities to mask or distort own presence and intentions as well as confuse and disorder adversary operations.

?—Why—?

Major Flaw

Napoleon, Clausewitz, and Jomini viewed the Conduct of War and related operations in essentially one direction—from the top down—emphasizing adaptability at the top and regularity at the bottom.

other words, you look at—like say here, the opponent comes [unintelligible]. Top down. Emphasize adaptability at the top, regularity at the bottom. I made the point, I said that's one of those pervasive influences that came forward to the present day. One of my great Army colonels got up and he said, "You're wrong." I said, "Why?" "Because today we've got regularity at both top and bottom." [audience laughter] I said, "I'll remember that. That's very good."

[slide 46]

So, why did that occur? In the first case that's what happened. Why did they gravitate to that? Remember Napoléon himself. Even though he was a product of the Revolution, he also reinstalled the

aristocracy, where, you know, the aristocracy wants to control the people below them. So, he did that. Plus, the fact that he'd got a large empire here. He had to use foreign troops. He wanted to be able to also control them. So, those kind of things happened. So, in a sense, by his own conquest and by elevating his own positions, he starts doing the kind of things that the people did before him that allowed him to take then down. I guess you can go back to Lord Acton's statement, "Power corrupts. Absolute power corrupts absolutely."[37]

Audience: Was that because in peacetime, he—

Boyd: Well, yeah. He was trying to run the whole empire, and he had these allies, you know, the Prussians, who were supposed to be subservient to them, and so he had to put down stringent rules upon them. He wanted to be able to control them. Obsession for control. Obsession for control; that's what we're talking about. And the more you try to control people, guess what? The less control you get. It's like a paradox. In other words, the more you try to constrain their activities, the more people resist that and the less control you really get. That's why the sergeant had a very good point. His point was, you've got to make those people responsible below feel like they're part of the action. They've got things they need to do, and we're not going to treat them like automatons. The more you try to treat them like automatons, that's obsession for control.

Wyly: That doesn't necessarily mean the less control you get of the people. You might have them under control but the less control you have of the situation.

Boyd: That's right.

Wyly: So, it's deceiving. People can think they have control—

Boyd: That's right. They really don't have it. They really don't have it. That's right. Like a paradox. Exactly right. It's like a paradox. Exactly right. Got to keep those things in mind all of the time. It's like discipline. You don't really want to be able to discipline people. What you want to inculcate in them is a sense of self-discipline because then you have discipline. If you always have to discipline people, you

[37] John Emerich Edward Dalberg, Lord Acton, letter to Bishop Creighton, 1887.

got a problem. You want to be able to set things up *[20:00]* so inside themselves they build up a sense of self-discipline. That's what counts. That's what you want to do as a commander or a leader, be able to inculcate them with a sense of self-discipline. Then you're a real commander. You're a real leader. Not only that, you have real control then, too.

Audience: Sir, when you developed this, can you recall any rationale why you looked at these three theorists—

Boyd: Not only that, people don't mind it because they feel like they're part of the team. You see what I'm saying? Go ahead.

Audience: When you developed this, can you recall the rationale why you just limited it to these three theorists or did you look at—

Boyd: Oh, I just— Remember, I said "historical snapshots." Since these were the principal theorists out of the nineteenth century, Napoléon, Clausewitz and Jomini, I wanted to focus on them because they had such a pervasive influence upon what we do today. That's why I did it. They're not the only ones. The other guys, you know, made comments too, but these were very important. I mean, I can't do the whole military history. Somebody could always bring up— That's why I call it "historical snapshots."

Audience: I just find it interesting. I think DePuy just added Mahan to it.[38] He used the same three and then he added Mahan.

Boyd: Okay, let me raise a question. Mahan, that's very interesting. Let's talk about both Mahan and Corbett, naval theorists. You being a Marine, you've got to bring that up. Well, where did Mahan get his ideas?

Audience: That's Jomini.

Boyd: From Jomini. Where did Corbett get his ideas? From both

[38] Gen William E. DePuy was a contemporary of Boyd's and a fellow reformer. DePuy focused on reform within the post-Vietnam Army. In 1973, DePuy was made head of the newly formed U.S. Army Training and Doctrine Command. DePuy's efforts to develop a suitable strategy for countering the numerically superior Warsaw Pact forces in a European conflict later led to the Army's adoption of AirLand Battle doctrine, which was often compared to the Marine Corps' maneuver warfare doctrine. While DePuy and other Army reformers were familiar with Boyd's concepts at the time, later allegations that they adopted them wholesale to create AirLand Battle are difficult to prove. Overall, Boyd's influence was much stronger on the development of Marine Corps doctrine.

Jomini and Clausewitz and Mahan. Corbett got it from all three. The point is, it's interesting the so-called naval theorists got their ideas from the Army theorists. Period. Now, they're upfront about it. They didn't plagiarize it. I mean, you know Jomini is very upfront where he got his ideas. I mean, excuse me, Mahan is very upfront where he got his ideas, and so is Corbett. They're very upfront about it. In other words, you know, they say, "Hey, these guys had some good ideas, but also these ideas can be modified somewhat and be applied to naval warfare as well as land warfare."

So, you know, there was no plagiarism. They just said these are good ideas, and they could be applied in this context as well as that context. So, I don't want anybody to think that they stole them in that sense, because they were upfront about it. So DePuy probably finally read a naval book to figure out, "Goddamn," after he retired. Heh heh heh. I got the picture. In fact, I've used that in arguments. They say, "Well, why don't you look at naval warfare?" I said, I don't have to because I know that the same guys the naval warfare guy used in order to build up naval warfare.

Audience: I'll remember that, sir. That's good.

Boyd: You can use that against him.

Audience: Sure.

[slide 47]

Boyd: Okay, here is another theorist at the time. What he did, he said he was deeply influenced by Jomini. Emil Schalk, note what he wrote in 1862 during the Civil War. He said, "There are three great maxims common to the whole science of war."[39] And they're not unfamiliar, you've seen them before. And of course, I added a little cautionary note here at the bottom. That's my cautionary note. Two things: while these maxims by Schalk portray in a general way, note I underline physical maneuver. You only bring out the physical, not the moral and mental. That's why I underlined that. That can be used to realize—Also, they do not address the nonadaptability and predictability of the drill regulation mindset that permeated the nineteenth century. "Maneuvers" at the tactical level. I put quotes around "maneuvers" because they didn't look much like maneuvers, since they were rather rigid. There are some interesting books about that

[39] Emil Schalk, *Summary of the Art of War: Written Expressly for and Dedicated to the U.S. Volunteer Army* (Philadelphia, PA: J. B. Lippincott, 1862).

SLIDE 47

EMIL SCHALK—"SUMMARY OF THE ART OF WAR"—1862

"There are three great maxims common to the whole science of war; they are—

1st—Concentrate your force, and act with the whole of it on one part only of the enemy's force.

2nd—Act against the weakest part of your enemy—his center, if he is dispersed; his flank or rear, if concentrated. Act against his communications without endangering your own.

3rd—Whatever you do, as soon as you have made your plan, and taken the decision to act upon it, act with the utmost speed, so that you may obtain your object before the enemy suspects what you are about."

CAUTION

While these maxims by Schalk portray, in a general way, physical maneuvers that can be used to realize one's purpose in war at the strategic level, they do not address the non-adaptability and predictability (via the drill regulation mind-set) that permeated 19th century "maneuvers" at the tactical level.

at this time. In fact, there's a book— anybody ever read *Forward into Battle*?[40] There's another book—I'm trying to remember the name of it now. The one that two guys wrote about the southern [unintelligible].

Audience: Oh, McWhiney and Jamieson—[41]

Boyd: What's the name of that?

Audience: *Attack and Die*—

Boyd: You want to read that very carefully. There are some interesting things in there. They've got a lot of quotes. There are a couple cases in there where a so-called attack broke down. Note the words. They really didn't break down, but they lost all their goddamn

[40] Paddy Griffith, *Forward into Battle: Fighting Tactics from Waterloo to the Near Future*, 2d ed. (New York: Presidio Press, 1991).

[41] Grady McWhiney and Perry D. Jamieson, *Attack and Die: Civil War Military Tactics and the Southern Heritage* (Tuscaloosa: University of Alabama Press, 1984).

uniformity and rigidity, and the goddamn guys floated at the enemy line every which way and they won. They sat there mystified. How did that happen? Then they went back to their old ways again, tried to pound it home and they couldn't. Some of the ones were breaking—what they thought were breaking down were actually succeeding. What they didn't realize was the ambiguity and deception, guys couldn't deal with the fluidity. So, they focused on the wrong thing.

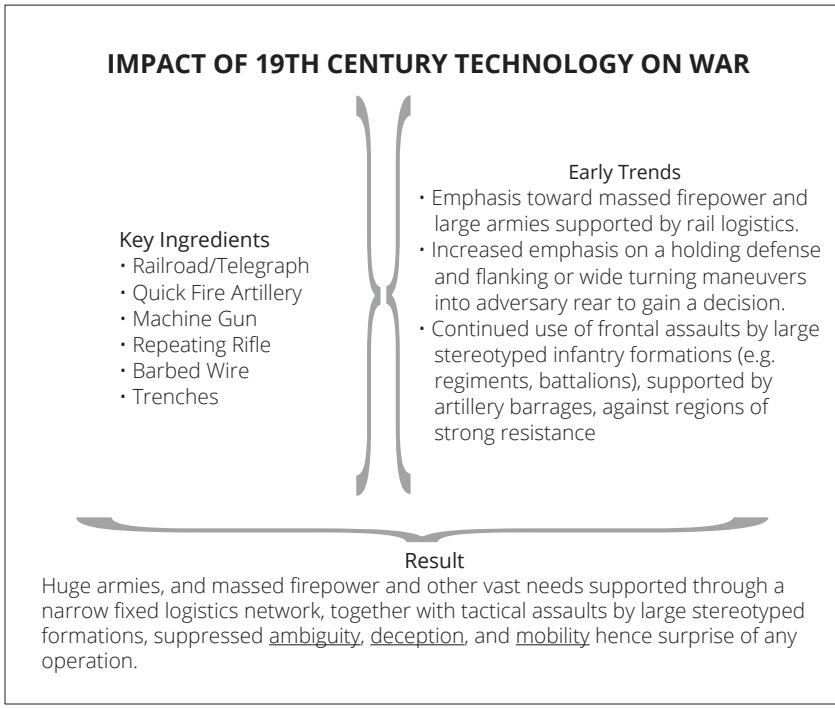
Not only that, Jomini had the answer and refused the answer. You want to read Jomini's book, *The Art of War*, where he was talking about cavalry. What he's doing, he juxtaposes the Cossacks versus the French cavalry. He talks about it, and he says, "They seemed to operate in irregular fashion. You don't know how they're operating but they seem to have a common purpose," and he makes a comment upon the fact that Lloyd, who preceded him, saw that really the Cossacks were a better cavalry than all the other cavalries because of this. Then Jomini looks at this. He said he agreed with him, he said, "But however, we all know the regular cavalry is better," so he voted against the evidence. He had all the evidence and voted the other way. He said, "We're going to have these guys in nice neat formations."[42]

So, here these other guys had the evidence where these guys are floating in and infiltrating the lines because the attack broke down. *[25:00]* "This is bullshit. We're going back the other way" and blow everybody away. You want to read *Forward into Battle*. It's in there. I read it. I said, "God, they don't even read their own reports." It was right there, right in front of their eyes. Couldn't see it because they had preconceptions, presuppositions in their mind, those goddamned drill regulations. They said the attack broke down, but it succeeded. The attack didn't break down, because it did succeed. Their formations broke down and because their formations broke down, it did succeed. That was the answer. The attack didn't break down. The formations broke down. Because they broke down, they were able to succeed. Incorrect interpretation. You saw those. Remember that, Mike, we saw here? Geez, here it is, plain as day. They're quoting right out of it. Boy, this is beautiful stuff.

[slide 48]

[42] Baron de Jomini, *The Art of War*, trans. Capt G. H. Mendell and Lt W. P. Craighill (Philadelphia, PA: J. B. Lippincott, 1862).

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Okay. Impact of— Let's go up now— Of course, the nineteenth century saw the impact of a lot of modern technology, and I want to bring that in. And we see these as key ingredients: railroad, telegraph, quick-fire artillery, machine guns, repeating rifle, barbed wire and trenches, and the early trends we begin to see: emphasis on mass firepower supported by rail logistics. Increased emphasis on a holding defense. But they still use these frontal assaults by large, stereotyped infantry formations. In other words, they didn't break them down into smaller units and try to—and the result is not too surprising. Because the way they're operating, they're suppressing ambiguity and deception. Since they suppress that, they suppress surprise. The result is, you get a bloodbath.

[slide 49]

Okay? Now if we tie it all together, the influence of Napoléon, Clausewitz and Jomini, plus nineteenth-century technology, you see,

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TECHNOLOGY AND THE ART OF WAR

- The legacy of Napoleon, Clausewitz, and Jomini's tactical regularity and the continued use of large stereotyped formations for tactical assault, together with the mobilization of large armies and massing of enormous supplies through a narrow logistics network, "telegraphed" any punch hence minimized the possibility of exploiting ambiguity, deception, and mobility to generate surprise for a decisive edge.
- In this sense, technology was being used as a crude club that generated frightful and debilitating casualties on all sides during the:
  - American Civil War (1861–65)
  - Austro-Prussian war (1866)
  - Franco-Prussian War (1870)
  - Boer War (1899–1902)
  - Russo-Japanese War (1904–05)
  - World War I (1914–18)

Point

- Evolution of tactics did not keep pace with increased weapons lethality developed and produced by 19th century technology.

? —RAISES QUESTION— ?

- Why were the 19th century and early 20th century commanders unable to evolve better tactics to avoid over a half century of debilitating casualties?

boy, that really all comes together. It really denied any opportunity to exploit these kinds of things, like surprise. It was done in all these wars: American Civil War all the way down to the second half of the nineteenth century—American Civil War all the way down to World War I. The point I'm trying to make here is the evolution of tactics did not keep pace with the increase of weapons' lethality produced by the nineteenth-century technology. This raises a rather interesting question. Why were the nineteenth century/early twentieth century commanders unable to evolve better tactics to avoid over a half-century of debilitating casualties? Now, I'm going to pretend we're back in the nineteenth century and we don't know that answer. We're going to answer that question after we get up to World War I. Right now, we'll play we're all dummies. We're going to answer that. I'm going to delay the answer.

[slide 50]

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IMPACT OF 19TH CENTURY CAPITALISM ON INSURRECTION/REVOLUTION
(with a Marxian flavor)

Comment
- A look back reveals that we have been speaking of conflict between social systems, rather than within social systems. With the explosive expansion of capitalism in the 19th century we begin to see the rise of much turmoil and attendant conflict due to opposing tendencies contained within capitalism itself.

Trend
- Without going into explicit detail we find (according to many investigators, including Karl Marx): that the interaction of competition, technology, specialization (division of labor), concentration of production in large scale enterprises, and the taking and plowing back of profits into this interaction produce opposing tendencies and periodic crises that leave in their wake more and more workers competing for jobs in fewer and fewer, but larger, firms that increasingly emphasize (percentage-wise) the use of more machines and less labor.

Result
- Low paid wage earners exhibit discontent and hatred for a system that permits others to live in comfort or luxury while they must live a life of toil, subject to strict and frequently harsh factory discipline.
- Witnessing these unfolding circumstances disillusioned intellectuals, bankrupt owners, and others take the side of the workers, as an enlightened vanguard, to mold them into a powerful opposition.

Raises Question
- How should such an unpleasant situation be corrected?

So now, what other influence came out of the nineteenth century as a result of capitalism? Impact of nineteenth-century capitalism. Remember all that technology produced by capitalism. Capitalism itself had a big influence on insurrection/revolution. The key idea, to look up here, is the idea—now we begin to see struggle within social systems, rather than between social systems. In other words, we're beginning to see the beginnings of what today we call guerrilla warfare. Modern guerrilla warfare. And here's the trend, it's not too surprising. And the result. Which raises a rather interesting question. We're not just looking from an army viewpoint. We also want to look at it from a social viewpoint. Conflict exists there, as we well know. Not just between formal armies. Of course, we go back and pretend we're Marxist. Note that I say, "with a Marxian flavor." And the only way out is via revolution and dictatorship of the proletariat.

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SLIDE 51

IMPACT OF 19TH CENTURY CAPITALISM ON INSURRECTION/REVOLUTION

(with a Marxian flavor)

Message

- According to Marx/Engels and their followers, the only way out is via revolution and dictatorship of the proletariat (workers) to smash the capitalistic system and replace it with one that does not exploit and oppress masses for the benefit of a ruling elite or class.

Necessary Conditions for Success

- Crisis generated by discontent/misery of masses and vacillation by authorities who indicate an unwillingness or inability to come to grips with existing instability.
- Vanguard, or disciplined hard core, that offers leadership, provides a way out, and has support of masses.

Why

- Crises represent height of confusion/disorder due to many opposing tendencies (centers of gravity) that magnify friction, hence paralyze efforts by authorities to dominate such surges of turmoil. In this sense, crises are periods of vulnerability/weakness that beg to be exploited.
- Vanguards represent disciplined moral/mental/physical bodies focused to shape and guide masses as well as participate in action to exploit and expand confusion/disorder of crises that shake adversary's will to respond in a directed way.

Key Insight

- Crises and Vanguards are the golden keys that permit us to penetrate to the core of Insurrection/Revolution and, as we shall see later, Modern Guerrilla Warfare.

It turns out they didn't have a dictatorship of the proletariat. Instead, they had a dictatorship over the proletariats. In other words, they have a little mismatch between promises and reality also, a rather serious mismatch. In fact, as a result of that—remember, Marxism looked very good and Communism looked very good before it was tested. After it was tested, it's going through the test, now all of a sudden they find out it didn't work. They went through extraordinary hops, skips and jumps trying to get their system sorted out.

Okay, necessary conditions for success: note this, crisis. You see it in their literature all the time. You've got to get a crisis. In fact, I always make the point in science. Science depends upon anomalies. Without anomalies, you don't have anything to work on. If you don't pay attention to anomalies, you get mismatched. If you don't pay attention to the mismatch, you get crisis. Without anomalies, no mismatch. Without mismatch, there's no crisis. Without crisis, no

change. People don't do a goddamn thing unless there's a crisis, perceived or otherwise, and then they may not do it right. They recognize that, crisis is important. Because that crisis can be a danger, but as the Chinese say, it's also what?

Audience: Opportunity.

Boyd: Exactly right. It's also an opportunity. And the vanguard. Note the vanguard. *[30:00]* They always bring up the—what's the vanguard? First, they said—. How many people read the *Communist Manifesto*? Probably some of you have read it. They talk about the proletariat being the vanguard of the revolution. Later on, they start talking about the Communist Party being the vanguard of the proletariat. Later on, they start talking about the Central Committee being a vanguard of the Communist Party and the Politburo being the vanguard—In other words, a very, very tight control over a very large ship. Vanguard inside vanguard inside—tight hierarchy.[43]

And here's how it works. Why? Because what happens, the crises then build up the vanguard. The vanguard then exploits the crises. You get this incestuous feedback loop, and you pull the whole thing apart from the inside. It's in all their literature. You read American literature, we never even talk about that. But they keep bringing this up over and over again, in a key insight. I think we've been here too long. You want to throw the towel in? I want to get up to World War I. Let's just finish this. One more page, just one more page, and we'll have to do World War I tomorrow night, I guess. I want to get through that.

[Cross talking]

[slide 52]

Boyd: So, we tie it all together. This is a good stopping point. Tomorrow night we'll start with World War I. Any questions before we depart? We got off track a few times, but I enjoyed it. I hope you did.

Audience: When you talk about multiple thrusts—

Boyd: Yeah, we'll talk more about that. I'm not getting into a bunch right now.

[tape pauses, then begins with lecture the next day]

Boyd: We left off, remember we left off at the—[shuffling paper] here on this side, and when I'm done, I'll go to the other side.

[43] Karl Marx and Frederick Engels, *Manifesto of the Communist Party*, English trans. (Chicago: Charles H. Kerr, 1906).

SLIDE 52

CAPITALISM, TECHNOLOGY AND THE CONDUCT OF WAR

- The creation of crises and vanguards, via 19th century capitalism, make evident the foundations upon which to conduct insurrection/revolution in order to destroy a society from within.

On the other hand

- It is not yet clear how these notions change or fit-in to the way we exploit technology and conduct war against societies from within as well as from without. To gain such an appreciation we must look at the period containing World War I, World War II, and their aftermath.

[Cross talking, shuffling paper]

How's that? That pretty good, or is that bad? Do I have it good?

Audience: Good.

Boyd: Is this about right? Good, okay. Before we continue, I'll answer some questions. Any questions from last night, or we can dive right on. What we want to do is, we want to pick it up from now and go from World War I on. Any other questions from last night? Anything? Okay, let's launch then.

What I want to do now is continue to discuss—

Audience: Sir, could you go over your—explain the thing about center of gravity? I got confused on that last night. You didn't like the term, then you started talking about vulnerabilities—

Boyd: Well, let me go back to the way Clausewitz used it. He said—If you go back, I don't have that chart. I don't want to dig back in here, but if you go back to that chart where Clausewitz used it—back to Clausewitz. If you recall, he said it's where the mass is concentrated most densely. That's just not true. The center of gravity is,

like I said, in donuts where there is no mass, or the hollow steel ball, so, you know, it's really bad once you accept that.

Say we accept his definition. Let's just say whether we believe it or not, we're just going to accept it, period, right now. If you accept that, that it's where mass concentrates most densely, then you go after that, then you've got strength against strength. That's where the mass is concentrated most densely. We said we're going after that, so you're going right after the mass, strength against strength. It throws you right into that. It doesn't have to be. It's really that connectivity. Things that hold together. As long as you can destroy that connectivity, you can pull it apart. That's why I say public opinion is so important. Like the Vietnam War, it's what pulled us out of Vietnam. You can get the public opinion, you get those connections that permit an organic whole to stick together. If it flies apart you, many noncooperative centers of gravity, the game's over. If you isolate the constituents, one from another.

So, his whole concept of center of gravity, which we use—we're going to go after the guy's strategic center of gravity. I don't know what the hell people are talking about. I say, "What is that?" They say, "Well, you know what it is." No, I don't, because I read Clausewitz and he's wrong, and I know you're using it. *[35:00]* How many people here have taken physics? Anybody? The center of gravity is always where the mass is concentrated in the most dense region. It can be.

Audience: It's not necessarily.

Boyd: It's not necessarily. It may be. In a donut, the center of gravity is in a hole. In a hollow steel ball, it's where the steel isn't. So, the whole concept is baloney, the way he said it. It could be, but because he did that, then he said, "Now we're going to use all our effort to go against that center of gravity." Christ, that's mass smashing into mass by his definition, which is incorrect, it's unsuitable. It could be but not necessarily. That's why the center of gravity is a lousy concept. We say, "We're going to go after guy's strategic center of gravity." I don't know what the hell that is. What are we talking about? What is that?

So, if you're going to go after a center of gravity, if you can identify the center of gravity, not using Clausewitz's definition, but let's use a true definition of center of gravity. In other words, those things that permit an organic whole to stay together, whatever they are: moral,

mental, physical. Then you want to find that thing that allows them to retain their connectivity. So, if I can break down those connections and get everything flying off in different directions, now you've got many what I call noncooperatives. Each one's a little center of gravity not connected up with the other one, you've got many noncooperative centers of gravity. Then you scarf them up. But unfortunately, when you use that strategic center of gravity, they act like they know ahead of time. "We know exactly where that strategic center of gravity is." You know, you're imposing certainty in an inherently uncertain process, is what I'm trying to say.

Audience: Can you go back then, Colonel Boyd, and talk about vulnerability in relation to the concept? I think we went through that last night—

Boyd: Now, vulnerability—. And I think it's another way of looking at it. Those kinds of things your adversary depends upon, you may not know whether one is better than the other. You say, "Well, these things look very important." We've assessed it. We got inside it. You know, in the words of Sun Tzu, "Know your enemy," and all that sort of stuff. At least somewhat we know him—We say—Okay, you know, he really depends on them. These allow him to do what he wants to do, whatever they are. So, we should direct our activities against those. Once again, you've got to be careful. He has probably also made an assessment, he's vulnerable there. So, he's going to tend to protect those very heavily. In other words, critical vulnerabilities, he's probably also made that assessment. He may not have, but you've got to figure he may have. Good possibility. So, therefore, you don't want to go directly after those so-called critical vulnerabilities, because that also means strength smashing into strength. Instead, you want to exploit the weaknesses, so you can expose those vulnerabilities, so that they become unprotected. Then you can take them.

Audience: What if you don't have an option? You can't go—

Boyd: It's nice you said there's no option, because then that's a self-fulfilling prophecy, to say there's no other option. So, you get a self-fulfilling prophecy. That's my viewpoint. There's all kinds of options.

Audience: Not belaboring the point, in World War II, did we have the option in the Pacific campaign other than going straight out among the islands—

Boyd: Yeah, MacArthur, initially he was going to do island hopping.[44] Remember, his initial concept was island hopping, one after another.

Audience: But the island—

Boyd: Wait a minute. He was going to do island hopping, one after another until eventually the idea was to reach Japan. Pretty soon they said, "Hey, this is not such a good idea. This could take forever." So, then he started doing leapfrogging and cutting off those other things by cutting their lines of communication, so they withered on the vine. They couldn't do it. He went into a leapfrogging campaign. He's cutting that which they depend upon. In other words, if they can't get outside nourishment, support, et cetera., it's kind of hard to play the game.

Audience: Is that a center of gravity then?

Boyd: If you want to use that. I call it vulnerability. I don't like that word. You see, I'm ducking away from that word *center of gravity*. It's got too much bad baggage with it. It may be a center of gravity. But see, what they do—They want people—It's not so bad to recognize there's more than one center of gravity. In other words, there are centers of gravity depending upon subsystems and all that kind of stuff, see. Because even when physicists or mathematicians use it, they don't take the whole universe. They say, this thing that we're going to examine, here's a center of gravity. There might be another one over here, because of other things they examined, too. Like I took a donut. I could have put that in a larger concept, and it would be a different center of gravity. You know, it's in the hole. See, they're going to go after *the* strategic center of gravity. They might be able to identify that but—. Go ahead.

[44] Gen Douglas MacArthur was a senior American military leader in World War I, World War II, and the Korean War. He was one of only a handful of U.S. Army generals to hold the 5-star rank of General of the Army. Following initial setbacks by American forces in the Pacific theater of World War II, senior American commanders, including MacArthur, needed to develop a strategy by which to force Japanese forces back from their many island conquests and ultimately attack Japan's home islands. The initial island-hopping approach would attack and retake Japanese-held atolls and islands one after the other. Consideration of how long such a strategy would take to defeat Japan, as well as the likely high casualty cost, led to the adoption of leapfrogging, in which only vital islands would be assaulted, leaving remaining Japanese-held islands cut off from supply and reinforcement.

Audience: Sir, what would you call the will of the people? For example, the American aversion to protracted war, would you call that a weakness? A vulnerability? Or a center of gravity for the enemy to try and get—

Boyd: It might be a center of gravity but now see, will—Now you're taking something more abstract. *[40:00]* You're not taking the mass, per se. You're looking at what permits the people to have a center of gravity? What permits that? Since you want to use the term, you used it. So now we're going to use that term. What permits a center of gravity for the people? You say, we're going to go after the will of the people, so we are going to infer that that's a center of gravity. What permits that center of gravity to be? If you don't understand what permits that, what are you going to do, attack all the people? That doesn't work. That's bullshit. So that means you can't use the center of gravity concept. So if you're going to use that, you can do it. Then what permits that to go after that center of gravity. That's what I'm asking. You have to understand.

Audience: Mass understanding or national understanding.

Boyd: So, what are you going to do, just get on the radio and say, "Hey, I'm going after your will. Surrender?" I am going to force you to cough it up.

Audience: I would say propaganda.

Audience: There you go, sir. Propaganda.

Boyd: Propaganda? Just because you've got propaganda, doesn't mean you have subverted their will.

Audience: How would I go about doing that?

Boyd: Yeah, but what is it you're going after? If you're going to use propaganda—

Audience: A national consensus, a national agreement—

Boyd: How are you going to get after that—

Audience: Well, for example, World War II, did we not have more or less national consensus it was the right war, the right time, the right places?

Boyd: That was only to solidify our own center of gravity, if you want to use that term. That was for us. But I'm talking about, we're going to try and undermine the adversary's center of gravity. We're trying to just solidify our own. How are we going to undermine his? The guerrillas do it very well. The guerrillas really undermine the

centers of gravity very well. They figured it out. I'm giving you a hint.

Audience: Protracted war.

Boyd: Nah, no, you're not getting—

Audience: Through the use of violence.

Boyd: That's only part of it.

Audience: Well, yes, sir, but it is our troops being put in a position where they commit atrocities and then publicized—

Boyd: But he wanted to go after the peoples' center of gravity.

Audience: And then the death that occurs on each side, and then the publication of that death. All erodes the national will. That goes back to the Constitution, which starts out, "We, the people." It's the use of violence on both sides, publicized by the adversary, which subverts ultimately, over time, the national will.

[Cross talking]

Audience: The use of violence is not explained in a way that the people would accept.

Boyd: See, now, Mike's starting to come up with—what you want to do is, if you want to subvert or pull apart a guy's center of gravity. Note the words, *pulling apart*. You want to find out what are those bonds, those connections that permit that organic whole to exist. You know, people aren't glued together. There are certain bonds or connections or rules of conduct, codes of conduct, standards of behavior. You want to see what they are. Then what you do, what the guerrillas do, they do it very cleverly. They say, okay, now, let's look at the leadership and see if they're abiding by those bonds, and then we'll use your word *propaganda*, and they show the mismatch. The leader says this, but here's what he's doing. In other words, they've got a mismatch between the rhetoric and the reality, and they bring it up.

Not only that, they show people scarfing off funds and all that kind of stuff. Not only that, he does that in a situation where people are getting screwed. Remember I talked about that last night? Under what circumstances can you use ethics against somebody? It's when they feel like they're getting screwed. They're going to get very interested in ethics because "I'm goddamned getting screwed." So, then you can develop as many noncooperative centers of gravity, so they can't fight as an organic whole. That's based on what? What is the quickest way you can destroy an organization? Anybody? A Marine

should understand this right off the bat. What is it? The quickest way you destroy an organization?

Audience: Destroy the morale.

Boyd: Go even deeper. How do you destroy morale? Mistrust. And when you see these guys playing these dirty games, you're building mistrust inside the organization, and it no longer can function as a whole. Mistrust and discord. You build that up and, Christ, they're going to come unglued. Now, granted, you use violence as a part of doing that. I'm not saying that, but it's only part of it. See, that's how they work on it. So, what we're going to do is, we're going to go out and have an attrition campaign and just pile up body counts and they're going to surrender. That's probably going to make them madder than hell and they won't surrender. That's why your leaders and your people's leaders or future leaders or lower level leaders, you've got to set the example. You can't say one thing and then do another. Because your subordinates are observing you and they say, "That dirty bastard. We've got to do this, but he doesn't have to."

So, if you're a leader, you've got to set the example. You've got to be tougher on yourself than you are on your own people, and if you're unwilling to do that, as far as I'm concerned you should get the hell out of the Marine Corps or any Service. You should be tougher on yourself. Because they're observing you all the time. They're not going to tell you, because they know you have authority, but they're observing you. In other words, can they trust you? If you do that kind of stuff, you're going to already sow bonds of mistrust—I mean not bonds but disconnect bonds of trust. You'll be sowing mistrust. That's what the guerrillas, they play that game. Of course, you can exacerbate with terrorism, but if you do terrorism wrong, you also can make it go the wrong way, which I'll talk about later on. We're going to get into some of that. Okay? That's why, if you have a chance, hear my strategy pitch. Because I get into that moral stuff very heavily. *[45:00]* We get into this stuff. I show you different ways you can pull a goddamn organization down around its socks. [unintelligible]

All I know is, it didn't work out too good. So why was the American will subverted, vis-à-vis Vietnam? It's because our leadership was telling us one thing, and the people were coming back and telling something else. We're winning the war. Goddamn, we're going to win it by this time. Everything is going good. Christ, in the mean-

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WORLD WAR I

- Plans and Execution
- Stagnation
- Finale

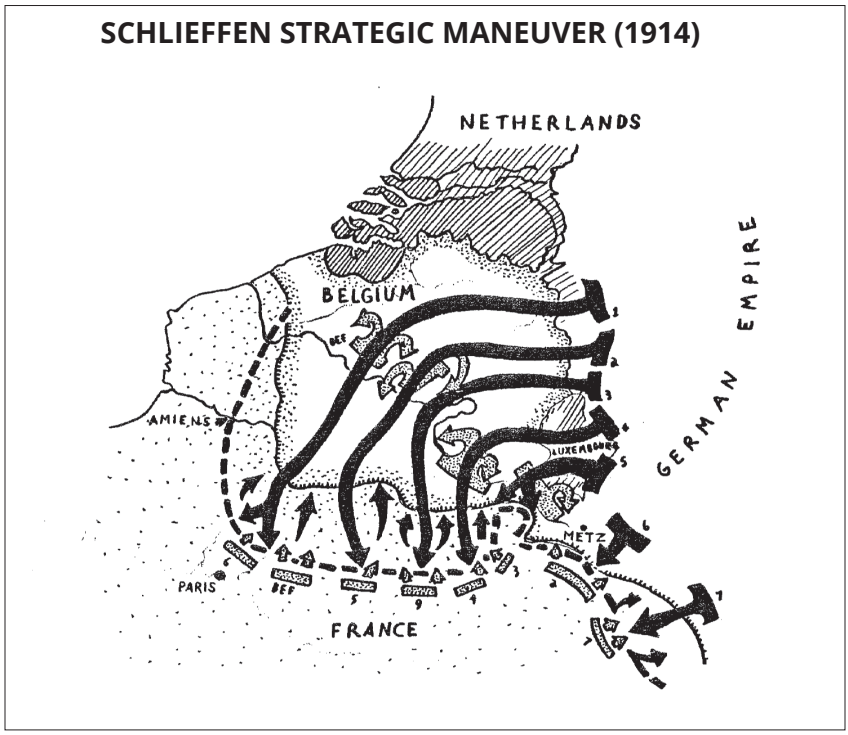
time, we've got Tet '68 and all this other stuff going on and the guys are coming back saying—.[45] You know what helped exacerbate that? The one-year tour. Because the guys are going over there and coming back, and what they're doing is they're spreading among their friends, so the whole thing just builds up a groundswell. So, they found our strategic center of gravity; it was the will of the American people. And in a sense, we looked in the mirror and did it to ourselves. Okay, I don't want to take too much time with that, because we're going to get into some of it later on.

[slide 53]

Now let's go to World War I. Remember, we started way back, you know, point of view and went back to Sun Tzu and came up to the present. I wanted you to sort of keep track of these ideas. Remember, when I said, we were going to break things down and put them back together, break them down and put them back together to find those invariants, those constancies, those kinds of things that

[45] Refers to the Tet Offensive launched by Viet Cong and North Vietnamese conventional military forces at the beginning of 1968. The offensive's aim was to cause sufficient damage and instability across South Vietnam that the South Vietnamese would rebel and overthrow the South's American-backed government. Despite achieving initial surprise, militarily the offensive was a disaster for North Vietnam, whose forces failed to hold any of the objectives they were able to capture, and saw the Viet Cong effectively destroyed as a useful fighting force. But strategically, the Tet Offensive had a significant negative impact on the American public's perception of the war, belying the Lyndon B. Johnson administration's regular assurances that North Vietnam was incapable of attacking on such a scale and that increased American support to South Vietnam was unnecessary.

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tend to hold up in conflict, wherever you are. We want to know what they are, because we can use that as a basis for getting at the other guy, rather than him getting at us. Instead of saying, "Well, Clausewitz is our god; therefore, whatever he says is great. We're just going to go by him," or Jomini, or Sun Tzu, or whoever it is. So that's what we have to do. Okay?

[46:58]

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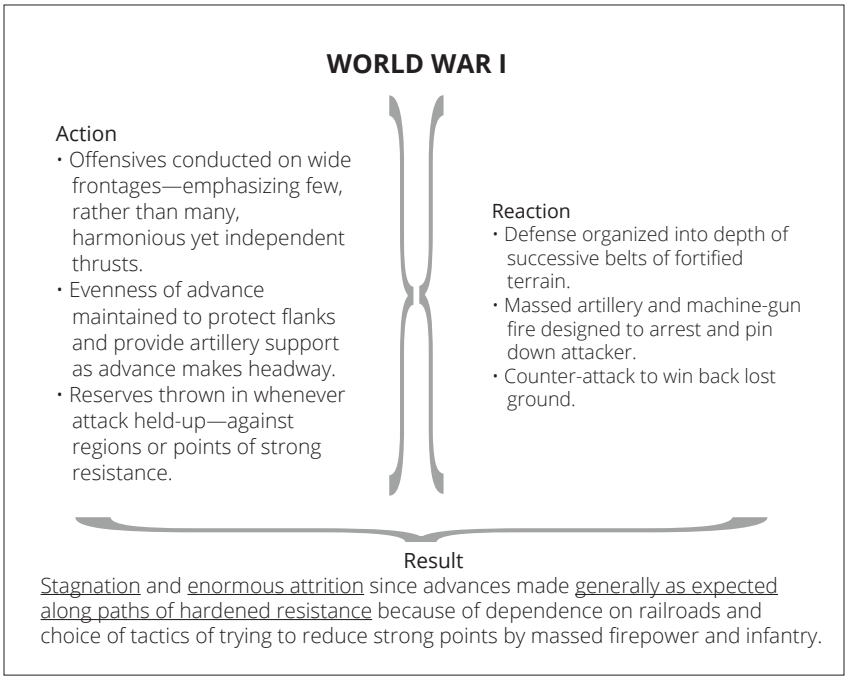
[Begin tape 3, side 1]

Boyd: —and eventually what I call a finale, for lack of a better word. This is not a [unintelligible] World War I. So, we'll go through that.

[slide 54]

Okay. So first, the Schlieffen Maneuver. And here you see that

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they have these five armies here. The idea is to pivot on Metz, get in behind the Allied armies and end the war. [unintelligible] basic idea. And of course, you all know that didn't work out. I'm not going to get into that kind of thing, why it didn't work out. But what I'm really trying to bring out here, it's not any more than a huge, what?

Audience: Single envelopment.

Boyd: Single envelopment. In other words, you can think of it as a gigantic Leuthen. Flanking operation. In other words, you're trying to swing in a back door, grab the guys, cut them off from their supplies and support, force the surrender and end the war. That was the basic idea behind it.

As we well know, there's all kinds of reasons why it didn't work. I don't want to get into that right now. But that's what happened.

[slide 55]

Okay. Now with that in mind, then, let's look at the action, reaction that flows out and stagnation came in, [unintelligible] what happened. I want to talk about what's happening [unintelligible].

First of all, these offensives tend to be conducted on wide frontages. So, they emphasize few, rather than many, independent thrusts. In other words, each thrust was geared to the other ones. They wanted to do it carefully synchronized.

Remember that word I used to talk about the other night, carefully synchronize those thrusts. You go back and look at it. Christ, it was a goddamn—they were trying to choreograph the Schlieffen Maneuver. Well, what happens when you do that, if somebody gets slowed up, then the other ones get slowed. You go the pace of the slowest unit. We talked about that.

So, evenness of advance maintained to protect flanks, provide artillery support as advance makes headway. Well, two things, you become predictable for two reasons. One, it's all working the same way. And two, when somebody gets slowed up, you operate slower so that also makes it predictable.

Those guys, all the time, they were worrying about choreographing the goddamn operation. Okay. Then what happened? When they run into difficulty, then they throw the reserves in at the point where the difficulty is. So, the other guy throws his reserves in. What do you got now? A bloodbath.

Audience: Strength against strength.

Boyd: You've got a bloodbath. Strength against strength. And you just keep piling up strength against strength. You've got a bloodbath, which is exactly what happened. And you go back and look, Battle of Verdun, you look at the Passchendaele [near Ypres] and all those battles. Some of them we'll talk about, we see it done over and over again.

So eventually though, reaction sets in to this, where you're trying these maneuvers. Defense organized into belts of fortified terrain. Yes, it does. So-called trench warfare. Two key ingredients, artillery and machine guns, to arrest and pin down the attackers, and eventually the counterattack to throw the bastards out. Remember, they're all exhausted. It was going back and forth.

And of course, the results are not too surprising. But what was that the evidence of in terms of OODA loops? What does that really tell you, if you want to use the OODA loop as a measure of merit? What's that telling me? You don't have much initiative, do you? It means you're not getting inside your adversary's loop. He's not get-

ting inside yours. It's just sort of a stalemate, going back and forth. You're just blowing one another away at a high rate. It's like an equilibrium condition. Stagnation and equilibrium. Just little gains going each way. And the result is large body counts with no appreciable gain. Because here's what they're doing, going along, there is no perspective in the way they're setting it up. Okay?

Well, let me talk to that, a good example. I want to make good examples, don't want to go too fast. Now let me give you some examples. The Battle of Somme, they figured, okay. We're going to break through. So, they had a one-week artillery preparation in the narrow Somme sector, pumped in something like two million rounds of artillery over a one-week period. Just bang, bang, bang. Well, you know, the other side after a while is going to get wise. Hey, there's something going on here. We're coming pretty soon, guys. So, that's a notion of predictability. And it's not only that, they prepared for previous artillery because instead of keeping the guys just in their trench line, they dispersed them on the field, plus they put them in bunkers, plus they started moving divisions into reserve.

So then on the final day of the rolling barrage, the infantry goes in in these nice, neat, standard formations. And the British, in the first day, then, of a seven-day operation, first day the infantry goes in, 60,000 casualties in one day. 60,000. In one day.

Okay. So, what happened? The Battle of Passchendaele 1917—1918, I'm sorry. It was the next year. What'd they do? Pumped in four million. They said look, we'll double this, all we got to do is we got to double the effort. Didn't change the metric. They doubled the effort. So, they pounded an area. *[05:00]* I think they went 10 days or something like that, it was two weeks. Back in again. Once again, huge casualties, no appreciable gain.

So, think about that. For a long artillery preparation, what are you doing? Isn't that a notion of predictability? So, the guys are ready for it, right? [unintelligible]. And then the way you make the attack, isn't that another aspect of predictability? Of course.

So, what you want to be is, you want to be unpredictable. All the stuff they were doing, becoming very, quite predictable. Plus the fact—another notion of predictability, if you're going—you're able to make an assault upon their front, they're going to know way ahead of time, because in order to dump in those huge amounts of artillery

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WORLD WAR I

Idea	Authors
• Infiltration Tactics	• Capt. Andre Laffargue • Gen. von Hutier? • Gen. Ludendorff
• Guerrilla Tactics	• T. E. Lawrence • Paul von Lettow-Vorbeck

they were pumping into the ground, you've got to build up the artillery stockages.

And you're not going to put them 500 miles away. You've got to put them near the front, where you're going to use them. And all that activity's going on, enemy reconnaissance and intelligence activity is going to build it up. They'll say hey, they're getting ready for a big operation here. So, you want to think about that.

[slide 56]

Okay. What happened? Eventually some people started thinking about that, in fact early on, and the so-called birth of which led to our modern tactics today. There was initially a French captain by the name of Andre Laffargue, who in 1915 said, hey, this is a hopeless way of doing business. So, he envisioned small units leaking through the enemy lines. He didn't have it all right.

The Germans captured some of those pamphlets, and then they augmented it even more. And eventually, of course, it was used against the West in 1918, so-called German infiltration techniques. Today, they're known—some people call them Hutier tactics.

That's why I put a question mark after him, because he was not an architect. He just happened to be commander on the German side that used them, and either a French or English correspondent

used that name. And ever since then, it's been called the Hutier tactics. But he wasn't an architect. That's why I've got the question mark. But he was a commander [unintelligible].

And the guy at a higher level that understood the importance was Ludendorff. When he saw what they had, he said, okay, let's really train and do this technique. So, from a supreme commander or high-level commander, he didn't understand the [unintelligible]. He did appreciate the significance and [unintelligible]. We're going to talk about that in just a minute.

And in the guerrilla front seen through Peter O'Toole, you know, *Lawrence of Arabia*.[46] Some of you people saw that movie, Lawrence of Arabia. And he saw a way of getting at the guerrilla tactics. Also, there was another gentleman by the name of Lettow-Vorbeck down in German East Africa. Anybody read about his exploits down in German East Africa?[47]

In many ways, he was an even better guerrilla fighter than Lawrence because he was totally cut off, literally living on British supplies

[46] Thomas Edward Lawrence was a British officer and archaeologist most famous for his irregular military operations against the Ottoman Empire in World War I. As a liaison officer to Arab factions that rebelled against the Ottomans after the war's start, he provided strategic guidance, coordinated the activities of British and Arab forces, gathered intelligence, and participated in raids and conventional military actions. Lawrence wrote about his wartime experiences in *Seven Pillars of Wisdom: A Triumph* (New York: Anchor Books, 1991). This book was the basis for the movie *Lawrence of Arabia*, released by Columbia Pictures in 1962, to which Boyd is referring here.

[47] Paul von Lettow-Vorbeck was a German officer appointed to command Imperial German colonial forces known as *Schutztruppe* in East Africa shortly before the outbreak of World War I. When war finally erupted in August 1914, Lettow-Vorbeck decided that the most important role he could play in the minor theater of Africa was tying down Allied troops so that they would not be sent to the western front in Europe. During the war, his *Schutztruppe* regularly raided British and Portuguese colonial holdings to replenish his force's weapons and ammunition. With Britain's Royal Navy making resupply virtually impossible, Lettow-Vorbeck undertook a ruthless foraging campaign from local villages, which kept his force fed but inflicted famine on the populations along his lines of march. Until the Armistice, Lettow-Vorbeck's *Schutztruppe*—never numbering more than 14,000—conducted a guerrilla war in the African interior against upward of 300,000 British, Portuguese, and Belgian troops, regularly evading capture and never losing an engagement on those occasions when Lettow-Vorbeck decided to fight.

and causing them enormous problems. And as a matter of fact, he surrendered after Germany did during World War I. In fact, he wasn't going to surrender because he didn't believe them. The British told him that Germany surrendered. He said, "No, no, you're trying to just get me to give up my force." It took a lot of convincing.

He was stronger at the end than he was at the beginning. Not only that, you know what he did, early on against the British and the troops down there. He won an early battle. Note the word *battle*. He said, boy, another one of these victories, I won't have any force left. He said, "I can't afford these kinds of victories." So, he got away and started playing very just—subversion, guerrilla warfare game, very small unit actions. Because he said, "If I lose my force, I'm out of business." He was greatly outnumbered.

Audience: Where did you say he was operating?

Boyd: German East Africa. He surrendered. The beautiful thing is, he surrendered after Germany during World War I. He was stronger at the end than he was at the beginning. And he was living off British supplies. Classic guerrilla tactics. In other words, living off the other guy's logistics effort, so to speak.

He caused an enormous problem, and he was only a colonel. And he was going up against like 20 or 30 British generals. He made them all look like fools. They always came up with a new plan, they're going to eradicate, they liked that word. And they all fell. They all went down the drain.

[slide 57]

Okay. Now let's look at some of these. First the guerrilla. I mean, excuse me, infiltration. What do you see here? Something very different since the nineteenth century. Note, rather than trying to use their artillery to destroy it first. And what are you doing? You're trying to disrupt his defenses. And on the end, you have a short artillery barrage.

And if you think about it, the artillery now is being used for what? It's in a sense—you can think in Sun Tzu's term, it's a *cheng* to the following effort which is the *ch'i*. You'd think it was a *cheng*/*ch'i* operation, which we discussed last night.

And in the follow-on, small teams here and the larger groups. In every case, look and note what they're trying to do. They're trying to

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WORLD WAR I
INFILTRATION TACTICS

Action
- Brief but intense artillery bombardment, that includes gas and smoke shell, to disrupt/suppress defenses and obscure the assault.
- Stosstruppen (small teams or squads of thrusttroops equipped with light machine-guns, flame-throwers, etc.) thrust forward close behind rolling artillery barrage, without any "effort to maintain a uniform rate of advance or align formations." Instead, as many tiny, irregular swarms spaced in breadth and echeloned in depth, they seep or flow into any gaps or weaknesses they can find in order to drive deep into adversary rear.
- Kampfgruppen (small battlegroups consisting of infantry, machine-gunners, mortar teams, artillery observers and field engineers) follow-up to cave-in exposed flanks and mop-up isolated centers of resistance from flank and rear.
- Reserves and stronger follow-on echelons move through newly created breaches to maintain momentum and exploit success, as well as attack flanks and rear to widen penetration and consolidate gains against counter-attack.

Idea
- Hurl strength (echeloned in great depth), via an irruption of many thrusts, thru weaknesses along (many) paths of least resistance to gain the opportunity for breakthrough and envelopment.

use the Sun Tzu metaphor. Remember what I said last night? Behave like water. Flow through the gaps and crevices, the voids, et cetera. In other words, strength against weakness. Trying to flow through. *[10:00]* And note that they didn't try to keep their formations nicely lined up. Each one tried to make his own pace through, not worrying about how fast or how slow the guy on the right or left of them are going. Work their way through.

And then the other teams coming in behind them, larger teams, isolating the local centers of resistance, and mopping them up from the flank and the rear. And then the larger units pouring through, these gaps get larger and larger, until you've got what Liddell Hart calls a torrent pouring through the front.

So, it's in great depth. And of course, then the idea is very simple: hurl strength based on great—by an irruption of many thrusts. Note the word. Not just a thrust but see, wiggling in through there. Multiple, many. Because see, if everybody goes through up on line—I

don't know—I've never figured out if everybody goes up on line, how do you get the other guy's flank. You can't get at a flank. In a sense you've got to present a flank in order to get at a flank. You say well, then we're in as bad of a position as he is. Not necessarily. The question is, who's got the exposed flank? That's the issue. Who's got the exposed flank?

So, if you can operate at a tempo or pace that he can't keep up with, he can't understand what's going on. He's disoriented and you're not. He's got the exposed flank. You pull his pants down. He doesn't pull yours down. You scarf up the prisoners. He doesn't.

Audience: So an exposed flank—

Boyd: And in a sense, it's like the Sun Tzu metaphor. And Patton, I mentioned him last night, he said that. Some guy's worrying, he says, don't give me any crap about your flanks. Let the other guy worry about his flanks. I know you've got a flank. Make him worry about his. Let him have the exposed flank. That's Patton himself. He understood it. Another one he said, don't give me crap about holding your position. You've heard that one.

He was a little more articulate. I think his language is a little more rough than what I use here, but the point is, that's the essence of his message.

Audience: I don't understand what an exposed flank is then. Because you're saying that is—

Boyd: Well, look at it.

Audience: —the force that doesn't—

[Cross talking]

Boyd: If I can go through with multiple thrusts going through somebody, right, he's going to be in these little areas here, right? Let's say these are my thrusts. Right? I've got a flank here, flank here, flank here, flank here, don't I?

Audience: I understand that.

Boyd: But he's got flanks. The question is who's got the exposed flank. And if you're operating so fast he doesn't understand what you're doing, in a sense he's exposed because he's static here. You can start pulling him apart. He's not prepared for all these things being this way. It happened all of a sudden on him. You're prepared because you're in the operation doing it.

In fact, as I show you later on when we get into the blitzkrieg

tactics, they talk about the rollout maneuver. You know, you had the thrusts and the rollout, or what the Germans call the off-roll. So, you got thrusts going in all these directions. You're cutting them up.

Audience: Sir, I got a distractor going around my brain housing group. If Haig had had the same observation and orientation of his frontline commanders, he would've seen that his movement was frivolous.[48] Valid?

Boyd: Who? Who are you talking about? Haig. Oh, the Somme—[Cross talking]

Audience: Yes, sir.

Boyd: Oh, okay. You're talking about the Somme. Well, remember, he was sitting back in a chateau—

Audience: Yes, sir.

Boyd: —getting some radio reports. He didn't go up and interact with the troops and get the feel of what they could do. So, he was divorced from what was going on. All he had was whatever he got in on these little pins that he's sticking in a map, and his radio reports that he was getting.

So he didn't really have a good impression what's going on. It's a false orientation. Yeah, I guess that's your comment. He had an orientation, but his orientation was the orientation you get at a rear headquarters, period.

That's a rear headquarters orientation. Unfortunately, it doesn't map to what was going on up there. In fact, I think he was the one that said after the Battle of Passchendaele, he said if I had only known what had happened, I would never have sent the troops into this goddamn operation. Which means he already knew he had a faulty orientation.

And that's why the commander's got to get up there in order to talk to their people, in other words, get the feel for the way things, also the situation they're facing there. So, you don't take them into situations that are, you know, catastrophic disasters, blunders, whatever you want to [unintelligible]. You're still going to make mistakes,

[48] Sir Douglas Haig commanded the entirety of the British Expeditionary Force for the majority of World War I. He has often been criticized for the high level of casualties absorbed by the British Army under his command and an apparent detachment from the reality of the conditions of the front lines, although recent historiography on these charges is more mixed.

but you'll minimize them. We'll get into that later on. I don't want to bring up too much right now. But you're onto a good point.

[slide 58]

Okay. But note what I say here. I've got a nice, vivid image of the infiltration technique, but unfortunately it doesn't really address how and why the infiltration schemes work. It doesn't really come to a sort of metaphorical answer.

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Let's get into that. Let's pin this down a little bit more. Knowing that, we start pinning these things down, what do we see here? One, fire at all levels. Artillery, mortars, machine guns, army level, *[15:00]* division level, various heavy artillery. What you do is you grab the guy's attention and pin him down. All that stuff going on around him, he's not going to stand out there in an artillery barrage and all that debris.

So, in other words, you're clouding his what? His ability to observe what's going on. Okay. Then in behind him, not only that, the fire, the gas and smoke. What you do is you're cloaking the follow-on movement, the infiltrators' movement. Now the infiltrators, instead of coming through in these nice line-abreast formations, they're squeezing their way forward, dispersed and irregular character. They're actually little swarms, little tiny swarms working their way forward.

Okay. They permit them to blend against the terrain so they're also very hard to pick out. Plus all the other crap going on, the smoke, the gas, the fog. They came out of the fog. That helps out. So, you take all that together, what you do—the defenders, then, since they've never experienced this before, they got a view they've never seen before and they just don't know what the hell's going on, scared of you.

So, the result's pretty simple. In fact, I read some reports when these Australians were captured. They said next thing they know—they couldn't figure out what had happened. All of a sudden, they're being marched off as prisoners. Game's over. Being marched off as prisoners, the game's over. Totally confused. Totally out of it. Never seen anything like this. Note the key word. They were disoriented.

[slide 60]

Okay? So then, in a sense when you say here's the essence, cloud

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INFILTRATION TACTICS

Note
- Such classic descriptions, often repeated, create in listeners or readers minds vivid images of the infiltration technique.

Critique
- Unfortunately this depiction does not address how and why infiltration fire and movement schemes work.

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WORLD WAR I
INFILTRATION TACTICS

Key Points
- Fire at all levels by artillery, mortars, and machine-guns is exploited to hold adversary attention and pin him down hence—
- Fire together with gas and smoke (as well as fog and mist) represent an immediate and ominous threat to capture adversary attention, force heads down and dramatically obscure view, thereby cloak infiltrators movements.
- Dispersed and irregular character of moving swarms (as opposed to well defined line abreast formations) permit infiltrators to blend against irregular and changing terrain features as they push forward.
- Taken together, the captured attention, the obscured view, and the indistinct character of moving dispersed/irregular swarms deny adversary the opportunity to picture what is taking place.

Result
- Infiltration teams appear to suddenly loom-up out of nowhere to blow thru, around, and behind disoriented defenders.

and distort the signature. In other words, you don't want to—you want to give that guy as little signature on you as you possibly can have, so he doesn't know what the hell you're doing. Indistinct, irregular.

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WORLD WAR I
INFILTRATION TACTICS

Essence
Cloud/distort signature and improve mobility to avoid fire yet focus effort to penetrate, shatter, envelop, and mop-up disconnected or isolated debris of adversary system.

Intent
Exploit tactical dispersion in a focused way to gain tactical success and expand it into a grand tactical success.

Implication
Small units exploiting tactical dispersion in a focused way—rather than large formations abiding by the "Principle of Concentration"—penetrate adversary to generate many non-cooperative (or isolated) centers of gravity as basis to magnify friction, paralyze effort, and bring about adversary collapse.

Yet, at the same time, you want to operate in such a way you have a focused effort going through there. It doesn't appear like it's focused, but it's focused, where you can penetrate, shatter, and go mop up the disconnected or isolated debris, which is his system. Like you said last night, that's another way of defeating him in detail. In fact, that's a good way [unintelligible].

Okay. The intent then is quite—you're actually using not tactical concentration. You're using tactical dispersion. Because they were using tactical concentration, they were blowing their people away. Now they're using tactical dispersion, but they're doing it in a focused way, so they gain tactical success and expand the grand tactical success.

Now let's go back to Napoléon. What was he doing? He was trying to use strategic success to gain grand tactical and tactical. These guys do it the other way, use tactical to gain grand tactical and hopefully strategic, which they didn't get. It inverted the whole process.

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? —NATURAL QUESTION— ?

Are infiltration tactics a rejection of the Napoleonic methods —or are they application of these methods under a different guise?

Also remember what Napoléon had. He had strategic dispersion followed by tactical concentration. Here we have a tactical dispersion followed by, with a strategic focus. That's also inverted. But why were these things inverted? They're doing it just the opposite of the Napoleonic method.

But why were they opposite? Anybody? They had to. They tried it to the other way. They were getting blown away. This is the way they had to adapt to the lethal aspects of modern firepower. It's a way they could survive and live and achieve.

So, they were forced to. So, they inverted both techniques. And the implication's quite simple. They're exploiting tactical dispersion but in a focused way, rather than large formations abiding the "principle of concentration." They just worked their way through. They pumped the other guy's friction and paralyzed his effort to bring about his collapse. So, they turned everything around. Just the opposite.

You ever see those World War pictures, those guys coming out of those trenches all going together forward? They have actual combat films. That's not just MGM or something. They actually have the combat films. Geez, I wouldn't want to be in that outfit. That's an unattractive way to do things.

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Okay? So, it raised a rather interesting question. Remember what I said, remember, instead of using strategic dispersion followed by tactical concentration, they're using tactical dispersion followed with

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RESPONSE

Infiltration fire and movement schemes can be viewed as Napoleon's multi-thrust strategic penetration maneuvers being transformed into multi-thrust tactical penetration maneuvers down to the lowest operational/organizational level—the squad.

POINT

Until the rise of the infiltration tactics (and the use of tanks by the allies) in the latter part of WWI, neither the 19th century nor the 20th century commanders were able to evolve effective tactical penetration maneuvers that could offset the massive increase in weapons lethality developed during this same period.

WHY

The aristocratic tradition, the top-down command and control system, the slavish addiction to the "Principle of Concentration," and the drill regulation mind-set, all taken together, reveal an "obsession for control" by high-level superiors over low-level subordinates that restrict any imagination, initiative, and adaptability needed by a system to evolve the indistinct-irregular-mobile tactics that could counter the increase in weapons lethality.

a strategic focus. I cannot use the word concentration. It has a lot of excess baggage. You can call it concentration if you want to.

Okay. So, what do you have? Instead of trying to use strategic success for your grand tactical and tactical, you're using tactical for your grand tactical and strategic. That's also inverted. So, you say are these the rejection of Napoleonic methods? You may think so. But obviously because of my statement after the double dash, maybe they aren't. So, let's address that.

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And so in a sense, what they've done, they've taken the infiltration fire and movement schemes, you can look at Napoléon's multi-thrust strategic penetration maneuvers being now called multithrust tactical penetration maneuvers. In other words, they're fine graining those penetration maneuvers and doing it all the way down to the tactical level rather than just the strategic level, *[20:00]* all the way down to the squad.

So, my point then, is until the rise of the infiltration tactics, and of course the use of tanks by the allies, neither the nineteenth century nor the early twentieth century commanders were able to evolve tactical penetration maneuvers to offset the increase in weapons' lethality until these things start showing up.

And you have to ask yourself, why? And here's some reasons. The aristocratic tradition, that top-down mentality, top-down command and control systems. The slavish addiction to the "principle of concentration." And the drill regulation mindset, and they're going to do all these things in a choreographed way.

All taken together, what it does, it reveals the obsession for control by high-level superiors over low-level subordinates to get them to do what they want. And what it really does, it restricts imagination, initiative, and adaptability in order to confront a different situation than they'd had before.

Now if you go back, remember I said yesterday, why were the nineteenth century and early twentieth century commanders unable to cope with this, and develop tactical schemes in order to cope with increase in weapons—this new weapons technology? Here's the reason why. It's kind of a mindset. That's what [unintelligible].

And I'm trying to tell you something. The more you try to control your people, the less control you're going to have. Exploit sense. You can't make people automatons. You get control by getting them to understand that they've got a piece of the action. They're important to the operation.

And in that sense, rather than talk about discipline, the thing you want to inculcate in people is what I call self-discipline. That's the only discipline that counts. And that's what you have to do as a commander or leader. And when you can inculcate self-discipline in your unit, and get them to do things and take those initiatives, you then have control. But if you don't do it that way, you really don't have it. And that's what I'm trying to [unintelligible].

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Okay. Now, let's move on. So, in a sense, it still failed. Remember, they had success in the lower level and failed at the upper levels. So, why did that happen? Well, here's some good reasons [unintelligible]. One: you can only start out successful. Once it started, when he gets resistance, he starts fighting against that resistance. In other

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WORLD WAR I
INFILTRATION TACTICS

Result
- Immediate success at platoon/company/battalion level coupled with ultimate failure at corps/army level

Why
- Ludendorff violated his own concept by his tendency to use strategic reserves to reinforce against hardened resistance—hence, at the strategic level, he seduced himself into supporting failure not success.
- Exhaustion of combat teams leading the assault.
- Logistics too inflexible to support rapid/fluid penetration and deeper exploitation of breakthrough.
- Communications too immobile to allow command to quickly identify and reinforce successful advances.
- Elastic Zone Defense, when used, (as developed by the Germans and practiced by Petain) that emphasizes artillery and flank attacks against penetrations when they stretch beyond their own artillery support.

words, you reverted back to type, strength against strength. In order to start supporting failure. Also, exhaustion of the combat team leading the assault. He didn't replace the team, same team. Later on, like in World War II, the Germans had a reserve, and they would insert the reserve and have a rotation policy for the leading-edge units and the other units, so they could keep the operation going.

And logistics, they had to set up the logistics in order to handle those kind of things. And here's a very key one, communications that they set up. Remember, if you're going to use this kind of a technique, once it starts, the rear level commander now really needs that information flow coming from the front, who's succeeding and who isn't. Because depending upon who's succeeding and who isn't, that's how he's going to allocate the follow-on efforts, so he can go through those gaps. If he doesn't know who's succeeding and who isn't succeeding, he doesn't know how to allocate people. He's got to make some kind of an allocation, but it's not going to be a very bright one.

And see, that's one thing you have when you go strength against weakness, you have to know where the weakness is, who's succeeding and who isn't. And once they understand that, then they can reallocate or shift the *schwerpunkt* as we talk about nowadays, or the focus of effort. Go ahead.

Audience: When you talk about the immobility of the communications—

Boyd: World War I. Yeah, they had telephone lines. They didn't have the radios we have now. I'm talking about, Christ, they had to string telephone lines. Of course, artillery would be in and cut the telephone lines, and it's hard to string it. Remember, they didn't have much radio then. They had a lot of telephones.

Audience: I was going to say, the immobility of not being able to move the phones lines verses—

Boyd: Yeah. Yeah. I mean, it's sort of a—it's the best they had at the time. Relative to what they needed, it caused some problems. Christ, they were trying to run out the wire all the way up all the time.

Audience: And yet, it was a vast improvement over communications pre–Civil War.

Boyd: Exactly. Exactly. And of course, nowadays, we have—our communications are fantastic. Of course, in some ways they cause a lot of problems. We depend too much on them. And as I'll point out when we get to World War II, Guderian understood that.[49] When you depend upon it too much, it can cause you some problems. He understood that, because we had a lot of radios during World War II.

Okay. So, in that sense, when you think of it this way, in a sense it sort of softened some of the harshness. And of course, the idea of the elastic in-zone defense. Instead of this rigid defense, you have a flexible or a fluid defense. In other words, you pull back from the

[49] Heinz Guderian developed many of the tactics used successfully by Germany's mechanized forces at the outset of World War II. He directly commanded panzer forces during both the invasions of Poland and France. In 1941, following the *Wehrmacht's* failed attempt to capture Moscow, Guderian was relieved of command for pulling his forces back in direct contradiction to Hitler's orders. Thereafter, he held largely ceremonial positions in the German military until the end of the war.

onslaught. Let your people come back, and then you draw the other guys out beyond their own artillery. You dump yours in, then start choking them off from the flanks and the rear.

But you have to have confidence to do that. People normally say, oh, we're just going to stand fast, and we'll blow people away. Sometimes you want to pull back. Anybody ever read Manstein's *Lost Victories*? Remember how he said take that long step backward, get them in, and cut their balls off. In other words, he's using the terrain as a medium for maneuver.[50]

Audience: *[25:00]* There are no lines.

Boyd: That's right. There are no lines. That's right. The FEBAs, the lines, that's all—the only time you have a FEBA is before operations start.[51] After that, nobody knows where it is. So, you're trying to put these FEBAs on the map after they started. It's a hopeless effort. It didn't represent anything that was going on.

If you have a chance, you ought to read his *Lost Victories*. It's very good. Boy, he takes that long step backward, gets the guy strung out, and then cuts his balls off. He gets a whole bag full of prisoners. Christ, their morale's shot to hell and everything else. He's not the only one. He just describes it very well. Other ones did it too. They said we're not going to give up an inch of ground. You put your guys in your trench and start pounding that.

So, when you think of it this way, what are you thinking about? The terrain rather than being—trying to hold the terrain, per se, using the terrain as a medium of maneuver so you can take out the force. Remember what I said? Terrain doesn't fight wars. Machines don't fight wars. People do it. And they use their minds. In that context, using the terrain is a medium through which you're going to maneuver in order to gain leverage on his force.

I don't care whether you're going forwards, backwards, or sidewards or any direction. As long as you have the—you can have initiative going backwards too, you know. See, we're taught if we're going backwards, we've lost initiative. That's not true. As long as you got

[50] Field Marshal Erich von Manstein, *Lost Victories*, trans. Anthony G. Powell (Chicago: Henry Regenery, 1958).

[51] FEBA refers to forward edge of the battle area, a doctrinal term referring to the forward-most area or areas in which ground combat units are deployed.

him playing your game rather than playing his game, you have initiative. And I don't care which direction you're going in.

Audience: Does that necessarily mean you have to take—look at terrain as fluidity vice an obstacle—

Boyd: Now—Normally you want to—terrain's important.

Audience: But what I'm saying is, rather than looking at terrain as an obstacle, you're looking at it, as you said, as—

Boyd: You can look at it—yeah, sometimes you also want to use the obstacles in order—by having obstacles there and reinforce those obstacles, you can get them to flow in a certain direction, too. But don't say because that's an obstacle, we make the whole terrain an obstacle and we're going to stand fast. That's what I'm trying to tell you.

See, because sometimes, you can use a certain kind of terrain. You can say, well, we can set stuff up so he has to go in a certain direction. We can cut him later on too. Nothing wrong in it. That's good thinking. But not to use the whole terrain as reinforced—using obstacles so they can't go up against it. That's my argument.

But you've got to get that in line. Remember, use the terrain as a medium through which you're going to take out his force. Not to defend it per se, but as a medium so you can take out his force. Because once you take out his force, you own the terrain whether you're going forwards, backwards, side wards, or any direction. Then you own it.

[slide 64]

Okay. Let's go to guerrilla now. It's only one chart. Lawrence. Now remember, Lawrence was a scholar. I think he was from Oxford, Cambridge, I can't remember. He read a lot about this stuff. And he came up with the idea you've got to gain support of the population, very modern context. Arrange the minds of friend, foe, and neutral alike. Get inside their minds. He recognized it's mental. And then note this, he said, "Be an idea or thing invulnerable, without front or back, drifting about like a gas." In other words, he's not defending the terrain. He's using the terrain to present some kind of an amorphous image to his adversary, so they can't come to grips with him.

In other words, he not only has fluidity, but he's got inconspic-

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WORLD WAR I
GUERRILLA WARFARE
(A'LA T. E. LAWRENCE)

Action

- Gain support of population. Must "arrange the minds" of friend, foe and neutral alike. Must "get inside their minds."
- Must "be an idea or thing invulnerable, without front or back, drifting about like a gas" (inconspicuousness and fluidity-of-action). Must be an "attack-in-depth."
- Tactics "should be tip-and-run, not pushes but strokes" with "use of the smallest force in the quickest time at the farthest place."
- Should be a war of detachment (avoiding contact and presenting a threat everywhere) using mobility/fluidity-of-action and environmental background (vast unknown desert) as basis for "never affording a target" and "never on the defensive except by accident and in error."

Idea

- Disintegrate existing regime's ability to govern

uousness. In other words, it's even more delicate than water. He's going to behave like a gas than like water. You're bringing the idea of fluidity of action, plus the inconspicuousness, or indistinctness. And note this, another quote: "Should be tip and run, not pushes but strokes, quickest time at the furthest place." What's he doing here by doing all this stuff? He's trying to present a threat everywhere, but yet seem to be nowhere.

In other words, it's like the Mongols. Remember, we read about the Mongols. Remember we said that's the kind of thing they were doing. And so he said, it should be a war of detachment, avoiding contact, presenting a threat everywhere, using this mobility, fluidity of action, and environmental background.

And that's what he did. He was working the Hejaz railroad. He was trying—what he did—actually he was the *cheng* where Allenby

was a *ch'i* for going into Palestine.[52] What he was trying to do is, by doing all this action around the railroad, is to force the Turks to put in more and more troops and supplies there, and then drain away from their effort for defending the rest of Palestine, which made it easier, then, for Allenby to make his stroke into Palestine. So, in this case, the guerrillas were the *cheng* and the regular force was the *ch'i*, if you want to use that Sun Tzu relationship there in that conflict.

But the thing you see here, as well as in the infiltration tactics, they're using the terrain as a medium in order to get, what, leverage over their adversary. Not to defend the terrain, per se, but as a medium to gain leverage on him. That's exactly right.

Now, I'm not going to use this later on, but remember what Mao said. Remember he said there's three phases to a guerrilla campaign. So, I'll preempt myself. I'll tie it right into this, since I won't use this particular statement later on when I get more into guerrilla stuff. He said remember, you've got the strategic defensive, strategic equilibrium, strategic offense. But in all three, it's tactical offense, tactical offense, tactical offense.

[30:00] Remember, strategic defense means you're backing up, and he's still talking about tactical offense. What's he really saying? What he's saying, it doesn't make any difference whether you're going forward or backward. The key thing, do I or do I not have the initiative. And as long as I'm getting the other guy to do the things that I want him to do, rather than what he wants to do, then I have the initiative, makes no difference which direction you're going in.

So therefore, another way to look at initiative is what? I get inside my adversary's OODA loops, I got the initiative. If he gets inside my OODA loops, he's got the initiative. And the reason why OODA loops are important, because they're all human terms. People have to observe. They have to orient. They have to decide. And they have to act. And if you're getting inside that, you're getting inside that guy's rhythm, his tempo, his natural way of doing business. He can't play.

And that's why it's important. I don't care whether you go slow

[52] Field Marshal Edmund Allenby commanded the Egyptian Expeditionary Force in Palestine from 1917–18 during World War I. His campaigns on the Sinai Peninsula and in Ottoman-held Palestine drove the Ottoman armies from much of the Middle East and eventually forced their capitulation. T. E. Lawrence fell under his command.

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IMPRESSION

- Infiltration tactics a'la Ludendorff seem to be similar in nature to irregular or guerrilla tactics a'la Lawrence.
- Why? Both stress clouded/distorted signatures, mobility and cohesion of small units as basis to insert an amorphous yet focused effort into or thru adversary weaknesses.

or fast. People say no, we're going to drive fast—no, no. As long as you—I don't care if you're slow, if you can slow him down even slower. It's all relative. So, you can tie initiative directly to that. Then of course the idea is very simple. I actually prettied it up a little bit. These are my statements, but that's what he was getting at.

But basically, his statements where he was—quoting him, he said the idea is to extrude the Turks from Arabia. That's what he was trying to do. That was an exact quote there from Lawrence, extrude the Turks from Arabia. So, what he's doing, he's disintegrating a regime, even the ability to govern. And so here's the impression then. The infiltration tactics a la—seem to be, at least out in the field—

[slide 65]

Now we've got to be careful, because we're going to get into some other aspects of guerrilla war that are quite different. But out in the field, the infiltration tactics, a la Ludendorff, are very similar to the guerrilla tactics as seen through Lawrence's eyes, very similar.

And why? Very simple. Because they both define the same kind of a game. The important thing is with the advent of modern weapons, rather than the guerrillas gravitating toward the regular force's techniques, the regular forces did what, gravitated to the guerrilla techniques because of the lethality of modern weapons. That's

exactly right. At least in the field, I'm talking about. Some of those things we got to touch on here.

So, we'll begin to see those kinds of things begin to emerge. And see, as I mentioned before, even in World War I they didn't like to do it, because they still hadn't come to grips with night attacks. Nobody likes to make night attacks. Why don't people like to make night attacks? And Clausewitz said oh, a night attack, you read Clausewitz, oh, that's a disaster. He's full of baloney. Because he looked at an absolute sense. And the reason why, it's very confusing. Well, guess what? It's confusing for the other side too.

And as I said last night, Terry Allen, an infantry general in the Army in World War II, he trained his people at night, and they slept during the daytime.[53] The Pentagon was furious at him. He said, well, we had a duty officer in the daytime. He said you want to call me, call me at night. And he was the most successful division commander, infantry division commander, over in Europe, first time in North Africa. But he always went off at night. And they said, well Christ, that's confusing. He said yeah, but the other guy's more confused, because we've been training and they haven't.

And that's the issue. You're going to be confused. Can you get him more confused? That's the name of the game. As long as he's more confused, you got the leverage. You've got the initiative. You're pulling his pants down. He's not pulling yours down. Damn right, it's confusing. But if you are acclimating yourself to it, doing it over, and your guy's, Christ, it's kind of natural in this confusion. The other guy hasn't been doing it. You're gaining leverage.

Okay? I might add he was fired, Allen. And the reason why—he got his job back later on. He was fired after North Africa because his troops got out of hand. He gave them a lot of liberties, and Eisenhower got mad at him and canned him, sent him back to the States. And then they gave him the worst misfits in the army to put together

[53] During World War II, Gen Terry de la Mesa Allen commanded the 1st Infantry Division during North Africa and Sicily campaigns, and later commanded the 104th Infantry Division during operations in France, the Netherlands, and Germany. While Boyd states that Gen Dwight D. Eisenhower relieved Allen of command of the 1st Infantry Division, this occurred at the recommendation of Gen Omar Bradley, whose personality often clashed with Allen's, and who believed Allen did not instill sufficient military discipline in his soldiers.

SLIDE 66

MAJOR ADVANCES BETWEEN WORLD WAR I AND II

Soviet Revolutionary Strategy

- Lenin, and after him Stalin, exploited the idea of crises and vanguards—that arise out of Marxian contradictions within capitalism—to lay-out Soviet Revolutionary Strategy.
- Result:
  - A scheme that emphasizes moral/psychological factors as basis to destroy a regime from within.

Lightning War (Blitzkrieg)

- Infiltration Tactics of 1918 were mated with:
  - Tank
  - Motorized Artillery
  - Tactical Aircraft
  - Motor Transport
  - Better Communications

  } by {

  - J. F. C. Fuller
  - Heinz Guderian
- Result:
  - Blitzkrieg to generate a breakthrough by piercing a region with multiple narrow thrusts using armor, motorized infantry, and follow-up infantry divisions supported by tactical aircraft.

Guerrilla War

- Mao Tse-Tung synthesized Sun Tzu's ideas, classic guerrilla strategy and tactics, and Napoleonic style mobile operations under an umbrella of Soviet Revolutionary Ideas to create a powerful way for waging modern (guerrilla) war.
- Result:
  - Modern guerrilla warfare has become an overall political, economic, social and military framework for "total war".

another division, and he did. And then after—it wasn't right away after Normandy, but he went back to Europe. And again, he was the best division commander with a brand-new outfit. Same thing, attacking at night.

He thought that other way was rather unattractive. Why do I have to lose my whole division, or half my division, for making a goddamn daylight attack? This is bullshit. I'm going to do it different. And the name of the game, we like to get out of the—not only take our objective, but we'd like to have a lot of guys standing at the end. That's not a bad idea. I think it's rather attractive. I think his troops felt it was rather attractive, too. They loved him, naturally.

[slide 66]

Okay. The major advance between World War I and World War II has come up. First, we see these things begin to go on. Soviet revolutionary strategy. And note that, what we're saying here. The im-

portance of the crisis and vanguard. And the idea that it really plays upon the moral/psychological play. It's a big play now, and not just physical operations being the primary.

[35:00] And then the lightning war, the blitzkrieg, which came out of World War I. Actually pulling all these things together, the tank, motorized artillery, et cetera. An initial idea by J. F. C. Fuller, in the British army, that he had in 1919.[54] Of course, it didn't take place because the war ended. And then Guderian, remember Guderian—how many people knew that Guderian was not an infantry officer during World War I? What was he? Anybody?

[Cross talking]

Boyd: Signals officer, communications officer, that's exactly right. He was a signals officer in World War I. Initially, he was an infantry officer before that. In fact, he got canned because he got in some trouble and was forced to go into signals. Their signal corps, the equivalent to our signal corps. So, he was a signals officer, as they called it then. Today, I guess we call them communications officers. But he was a signals officer.

And so, he was familiar and privy to the German infiltration techniques. He read the British pamphlets. Plus, he understood the importance of communications. He put all that together, and therefore he became the innovator of the blitzkrieg. How important that was.

And of course, his was to generate a breakthrough by piercing with multiple narrow thrusts. Note that, multiple narrow thrusts. We're going to talk about that later on. Using armor, motorized infantry, and follow-on infantry divisions, supported by tactical aircraft.

And then guerrilla war, Mao Zedong. Note what he did. He took

[54] John Frederick Charles Fuller (1878–1966) was a British Army officer who saw service in the Boer War, India, and World War I. He was involved in the creation of the Tank Corps and planned several British armored operations in 1917 and 1918. Following the Armistice, Fuller collaborated with B. H. Liddell Hart in the conceptual development of mechanizing and integrating tanks into future military formations. Fuller was a prolific author of military history and theory, and his nine principles of war would influence several militaries throughout the twentieth century (Boyd discusses these principles at length later in "Patterns of Conflict"). Following his retirement in 1933, Fuller became involved with British fascist movements and visited Nazi Germany several times to observe Germany's new mechanized units during practice maneuvers.

Sun Tzu's ideas. He actually had some Napoleonic ideas, et. cetera, and embraced, embedded them under the so-called Soviet revolutionary strategy, and came up with a new way for waging war, guerrilla war. As a matter of fact, it's total war. Why do I say it's total war, his version of guerrilla war, anyway? It's more total than blitzkrieg. Why is that? I'm making that statement. Do you people want to dispute me on that? It's more of a total war than blitzkrieg. You say, Boyd, you goddamn lost your mind.

Audience: Because it encompasses political—

Boyd: Say it.

Audience: —economic, social, all aspect—

Boyd: Because he involves the whole fabric of society, like you said. When you talk about blitzkrieg, it's only going against the armies and the government. The people sort of remain in the background. But his thing, he's involving the whole nine yards in it, the political, economic, the social. He involves the whole fabric of society. That's why.

So, in that sense, I don't care whether you use primitive instruments or not. The point is, he's got them all involved, as a result, he has a greater totality. Whether the instruments are primitive or not is a different issue. And that's the point. And that's something we haven't come to grips with, is guerrilla wars, they have in many ways a greater totality than so-called regular warfare. We have to come to grips with that.

So with that in mind, now let's go—we'll look through. We'll work our way through all three of these. First, the Soviet revolutionary strategy. I'll let you read it. Then I'll comment on it. Is this my water?

[slide 67]

Audience: Yes, sir.

Boyd: Thank you. And note their emphasis on crises, and note what they're trying to do. As you work your way through these, you'll see it has a very high moral/psychological content. They're playing that all the time.

[long pause as audience reads slide]

Boyd: How does this first chart impress you? You see it has very high moral/psychological, you see what they're doing? I'll go into it deeper in the next chart. We'll read the second one, and then I want to comment on both of them.

SLIDE 67

SOVIET REVOLUTIONARY STRATEGY
(A'LA LENIN/STALIN)

Tasks

- Employ agitation and propaganda in order to exploit opposing tendencies, internal tensions, etc. Object is to bring about a crises, to make revolution ripe as well as convince masses that there is a way-out. This is accomplished when the vanguard is able to:
  - Fan discontent/misery of working class and masses and focus it as hatred toward existing system.
  - Cause vacillation/indecision among authorities so that they cannot come to grips with existing instability.
  - "Confuse other elements in society so that they don't know exactly what is happening or where the movement is going."
  - Convince "proletariat class they have a function—the function of promoting revolution in order to secure the promised ideal society."
- Concentrate "the main forces of the revolution at the enemy's most vulnerable spot at the decisive moment, when the revolution has already become ripe, when the offensive is going full-steam ahead, when insurrection is knocking at the door, and when bringing the reserves up to the vanguard is the decisive condition of success." To quote Lenin on paraphrasing Marx and Engels:
  - "Never play with insurrection, but, when beginning it, firmly realize that you must go to the end."
  - "Concentrate a great superiority of forces at the decisive point, at the decisive moment, otherwise the enemy, who has the advantage of better preparation and organization, will destroy the insurgents."
  - "Once the insurrection has begun, you must act with the greatest determination, and by all means, without fail, take the offensive. 'The defensive is the death of an armed rising.' "
  - "You must try to take the enemy by surprise and seize the moment when his forces are scattered."
  - "You must strive for daily successes, even if small (one might say hourly, if it is the case of one town), and at all costs retain the 'moral ascendancy.' "

[slide 68]

[long pause as audience reads slide]

Boyd: All right. [unintelligible] That's just the second chart. Look at these words by Lenin. What's he bringing out here? The mistrust between what? The citizens and the government. To generate these many noncooperative centers of gravity, he's doing it in a moral/psychological content.

Now many Americans, that stuff doesn't grab them. Why doesn't that grab Americans? You've read two charts. [unintelligible]

Audience: *[40:00]* Because we already mistrust our politicians.

Boyd: Huh?

Audience: Because we already mistrust our politicians. We're used to it.

SLIDE 68

SOVIET REVOLUTIONARY STRATEGY
(A'LA LENIN/STALIN)

Tasks

- Select "the moment for the decisive blow, the moment for starting the insurrection, so timed as to coincide with the moment when the crisis has reached its climax, when the vanguard is prepared to fight to the end, the reserves are prepared to support the vanguard, and maximum consternation reigns in the ranks of the enemy." According to Lenin the decisive moment has arrived when:
  - "All the class forces hostile to us have become sufficiently entangled, are sufficiently at loggerheads, have sufficiently weakened themselves in a struggle which is beyond their strength";
  - "All the vacillating, wavering, unstable, intermediate elements—the petty bourgeoisie, the petty-bourgeois democrats as distinct from the bourgeoisie—have sufficiently exposed themselves in the eyes of the people, have sufficiently disgraced themselves through their practical bankruptcy";
  - "Among the proletariat a mass sentiment in favor of supporting the most determined, supremely bold, revolutionary action against the bourgeoisie has arisen and has begun to grow vigorously. Then revolution is indeed ripe. Then, indeed, if we have correctly gauged all the conditions indicated above . . . and if we have chosen the moment rightly, our victory is assured."
- Pursue "the course adopted, no matter what difficulties and complications are encountered on the road towards the goal. This is necessary in order that the vanguard not lose sight of the main goal of the struggle and the masses not stray from the road while marching towards that goal and striving to rally around the vanguard."
- Maneuver "the reserves with a view to effecting a proper retreat when the enemy is strong, . . . when, with the given relation of forces, retreat becomes the only way to escape a blow against the vanguard and retain the vanguard's, reserves. The object of this strategy is to gain time, to disrupt the enemy, and to accumulate forces in order later to assume the offensive."

Goal

- Destroy capitalism as well as its offspring imperialism and replace it with dictatorship of the proletariat.

Boyd: No. The reason why is, we're pretty well-off relative to other people. That's like putting you down where you can't get food and you're being crapped on by everybody. You're in a terrible goddamn position, you get this kind of stuff, you're going to be interested. You're going to be prepared to accept this kind of stuff. In other words, you're going to be mentally prepared.

Remember what I said, without a crisis, they don't have an operation. They've got to have that crisis. Remember what I said last night? Without anomalies, no mismatch. No mismatch, no crisis. Without a crisis, no change.

Remember I said that crisis is important to them because then they can insert, work the propaganda, tear apart, generate these many noncooperative centers of gravity. People go oh, those dirty

bastards. You're all mad at Wright now.[55] Took a poll, 75 percent of the American people, get rid of that son of a bitch.

Wyly: That's what I was going to say. There are some instances—

Boyd: Oh, yeah.

Audience: [unintelligible].

Boyd: They said get rid of that son of a bitch. In the meantime, though, but that's not in his district. In his district, oh, he's great, because they're getting all the benefits, I mean, at all the other taxpayers' expense. Oh, he's great. Don't worry about that stuff. We're doing wonderful. They went on TV and said it. Look what he's doing for our district, bringing all that federal money. It doesn't make any difference whether he was dishonest, corrupt, or whatever it is.

Wyly: Your Vietnam example is another one. I mean, people found out—

Boyd: Exactly.

Wyly: —they were being lied to and—

Boyd: That's right.

Wyly: —and it got to them.

Boyd: And not only that, remember, people were being sent over there, and getting killed, and not coming back. And this really made them mad. And in the meantime, they're being lied to because you see they aren't. It's just going on and on. So, we didn't lose a battle over there. We lost a battle over in this country on the home front, which Harry Summers has a hard time coming to grips with. Go ahead.

Audience: This hinges on being able to predict a crisis.

Boyd: Or if not predict it, as it unfolds. You may not predict it right away, but you can see the circumstances are leading to it and then organize yourself so you can deal with it. That's exactly right.

Audience: You're not creating the crisis. The crisis—

[55] Boyd is likely referring to Congressman James Wright (D-TX), who at the time was speaker of the House of Representatives. At the time, Wright was at the center of several scandals: his aide, John Mack, was the focus of a *Washington Post* interview with a woman named Pamela Small, whom Mack had brutally attacked 16 years earlier and then served a brief sentence before being paroled; the House Ethics Committee was investigating both Wright and his wife for receiving excessive speaking fees and gifts; and Wright allegedly received campaign contributions from "control frauds" involved with the savings and loan crisis in the late 1980s and early 1990s.

Boyd: No, they might be. They might be able to. They might—

[Cross talking]

Boyd: But they can amplify the crisis. If it's there, they can amplify it. You know, if there's no crisis, everything's working good, who wants a goddamn—the name of the game is, if it ain't broke, don't fix it.

Audience: If there are people that perceive themselves as have-nots, can there be a crisis—

Boyd: If they perceive themselves as have-nots and there's a sufficient number of them, that's exactly right. There has to be a sufficient number. The people on the top side, like Marie Antoinette, screw them. Let them eat cake. They were living great. Let them eat cake. No crisis for Marie and her crowd. That's exactly right.

But if there's sufficient number of them, and there's some leadership there, they can— it'll really come about whether the other people want to perceive it or not. And that's why, in some ways, when people say, "What's this mean, let's boycott—This is bullshit."

But if you're in a—people are getting hosed, hey, this is great stuff. Let's take those assholes out. We're going to get a piece of the action. We're talking about human nature.

Audience: That's the real strength of the terrorism movement today.

Boyd: See, and that's why as a leader—that's why I keep going backwards. I'll get into it later on. You have to set the example. If you say things, you may make some mistakes, but at least try to correct them. As long as they observe you correct them, you're going to retain your following. But if you start playing games, saying one thing and doing another, and your people observe you, when the squeeze comes on, they're not going to be there when you need them.

I can't overemphasize that. Do you like it when somebody tells you one thing and does another, and after maybe one or two times that doesn't bother you, then you finally say, this guy's really doing a number. I'm getting goddamn tired of it.

[slide 69]

Now the nature of blitzkrieg and guerrilla strategy, the idea of infiltration, isolation, or penetration and isolation. You're going to see me bring those terms up again and again. Penetration and isolation, or infiltration and isolation, and you do it at all levels, moral,

SLIDE 69

BLITZKRIEG AND GUERRILLA STRATEGY

Infiltration and Isolation

• Blitz and guerrillas infiltrate a nation or regime at all levels to soften and shatter the moral fiber of the political, economic and social structure. Simultaneously, via diplomatic, psychological, and various sub-rosa or other activities, they strip-away potential allies thereby isolate intended victim(s) for forthcoming blows. To carry out this program, a'la Sun Tzu, Blitz and Guerrillas:

- Probe and test adversary, and any allies that may rally to his side, in order to unmask strengths, weaknesses, maneuvers, and intentions.
- Exploit critical differences of opinion, internal contradictions, frictions, obsessions, etc., in order to foment mistrust, sow discord and shape both adversary's and allies' perception of the world thereby:
  - Create atmosphere of "mental confusion, contradiction of feeling, indecisiveness, panic," . . .
  - Manipulate or undermine adversary's plans and actions.
  - Make it difficult, if not impossible, for allies to aid adversary during his time of trial.

Purpose

• Force capitulation when combined with external political, economic, and military pressures

or

• Weaken foe to minimize his resistance against military blows that will follow.

mental, and physical. If you can't penetrate the guy and isolate him, why should he throw the towel in? He's not going to. No point to it.

Moral and political, economic sense, diplomatic, psychological, et. cetera. They try to use that as they strip away potential allies, thereby isolating their intended victims. To carry out this program, it's straight Sun Tzu here. Note this, exploit critical differences of opinion. Remember, I said that's how, you need that propaganda, internal contradictions, frictions, obsessions, et cetera, in that society in order to foment mistrust and sow discord, therefore shape both adversary and allied perception of the world—

Thereby—this is Hitler saying, these are his words, create an atmosphere "of mental confusion, contradiction of feeling, indecisiveness, and panic." Make it difficult, if not impossible, for allies to come to their aid. [unintelligible] alienate themselves.

And then what you do is, you force capitulation, *[45:00]* combined with external political, economic, and military pressure. Then you put the pressure on, get them to throw the towel in. If they don't,

then the foe's weakened. Then you launch the military blow into him and he comes unglued, can't hold in.

One of those things, remember South Vietnam. Remember, we had them all built up and Christ, goddamn it, after we left, why, the NVA went through there like crap went through a goose.[56] It was over.

Now you might say, well, hey Boyd, you know blitzkrieg and guerrilla is quite different. I'm going to show you they are different. But in this sense, they're the same. I'm just showing you, in this sense they're the same. As we go into the details, you'll find out they're quite different.

In fact, there's a Clausewitzean framework you can use in order to pick that difference up, we'll use later. Okay? With that in mind now, what we're going to do is look at first blitzkrieg, and then guerrilla warfare. So, let's go dive into blitzkrieg.

But note what they're doing here. I want to bring out one other thing. What's happening here? If you're exploiting all those differences of opinions, disconnections and that, isn't that the same thing as we said before, generating those many noncooperative centers of gravity? Exactly.

And you got noncooperative center of gravity, they're isolated segments in a sense, more a mental sense. Therefore, you can scarf them all up and realize your purpose, which is the inverse Clausewitzean thing. In other words, he wanted to go after the center of gravity. That's bullshit. Generate many noncooperative centers of gravity. And they can't function as an organic whole.

[46:24]

[End of tape 3, side 1]

[Begin tape 3, side 2]

Boyd: I wanted to get enough in there so you could see, maybe get the message across.

[slide 70]

[56] NVA refers to North Vietnamese Army, the term for the conventional—as opposed to irregular or guerrilla—military forces deployed by North Vietnam against South Vietnam during the Vietnam War.

SLIDE 70

BLITZKRIEG

Action

- Intelligence (signal, photo, agent . . .), reconnaissance (air and ground), and patrol actions probe and test adversary before and during combat operations to uncover as well as shape changing patterns of strengths, weaknesses, moves, and intentions.
- Adversary patterns, and associated changes, are weighed against friendly situation to expose attractive, or appropriate, alternatives that exploit adversary vulnerabilities and weaknesses, hence help shape mission commitment and influence command intent.
- Mission assigned. Schwerpunkt (focus of main effort) established before and shifted during combat operations to bypass adversary strength and strike at weakness. Nebenpunkte (other related or supporting effort) employed to tie-up, focus, or drain-away adversary attention and strength (elsewhere).
- Special seizure/disruption teams infiltrate (by air or other means) enemy rear areas where, with agents already in place, they: seize bridges and road crossings, sever communications, incapacitate or blow-up power stations, seize or blow-up fuel dumps, . . . as well as sow confusion/disorder via "false messages and fake orders".
- Indirect and direct air firepower efforts together with (any needed) sudden/brief preliminary artillery fires are focused in appropriate areas to impede (or channel) adversary movement, disrupt communications, suppress forward defensive fires, obscure the advance, and divert attention.
- Armored reconnaissance or stormtrooper teams, leading armored columns, advance rapidly from least expected regions and infiltrate adversary front to find paths of least resistance.
- Armored assault teams of tanks, infantry, anti-tank guns, and combat engineers as well as other specialists, together with close artillery and air support, quickly open breaches (via frontal/flank fire and movement combinations) into adversary rear along paths of least resistance uncovered by armored reconnaissance or stormtroopers.
- When breakthrough occurs, relatively independent mobile/armored teams led by armored recce with air support (recce, fire, and airlift when necessary), blow-through to penetrate at high speed deep into adversary interior. Object is to cut lines of communication, disrupt movement, paralyze command and envelop adversary forces and resources.
- Motorized or foot infantry further back supported by artillery and armor pour-in to collapse isolated pockets of resistance, widen the breaches and secure the encirclement or captured terrain against possible counter-attack.

Idea

- Conquer an entire region in the quickest possible time by gaining initial surprise and exploiting the fast tempo/fluidity-of-action of armored teams, with air support, as basis to repeatedly penetrate, splinter, envelop, and roll-up/wipe-out disconnected remnants of adversary organism in order to confuse, disorder, and finally shatter his will or capacity to resist.

[long pause as audience reads slide]

In fact, you can say this is sort of, part of your observation. Here's your orientation. Here's your decision. And here's all this action taking place. Look at it that way. Think of it that way.

Looking at—I see that—you see that taking place then. I think most of you people are familiar with the *schwerpunkt* idea, aren't you?

Audience: Yes, sir.

Boyd: This is my editorial, as I mentioned, the *nebenpunkte*. In fact, I laid it on [unintelligible]. He said we don't have that. I said, well, when you're not in the *schwerpunkt*, what do you call it? And he couldn't answer that. So, I said, then we're going to call it the *nebenpunkte*. Using their own language against them.

In fact, Hassen van Heuser [PH] really liked that. He said that's pretty good. He's a German, you know, the German attaché. The reason I want to want to bring in an idea, you want to play the *cheng/ch'i* game. You know, the nebenpunkte in a sense is the *cheng*. The

schwerpunkt is the *ch'i*. So, you really want to set that up. Old Sun Tzu had a good idea there. That's a little bit of my own editorial, invention.

And then these special teams they sent, they had, the Germans had what they called the *Brandenburg Regiment*. Anybody hear about that, the *Brandenburg Regiment*?[57] And then later on, Skorzeny and his boys.[58] And their game is to do this kind of stuff, so the guys are all confused and soften up what you're trying to achieve. It's very successful.

And then your firepower, and of course it just keeps cascading on. Just pour it on. But all the time, strength against weakness. Strength against weakness. And all those levels are working. And of course, the idea is very simple. The idea's very simple. Very simple idea. Okay?

[slide 71]

Here's the impression I'm trying to leave you with. If you look at that, here's the impression. Look what happened to you. If you think about that, what are they doing? Generates many noncooperative center of gravity, because all these thrusts are going in there, and they're dividing not only physical, but mental and moral. They're working on that organism at all levels.

And so, what does that do then? Well, it undermines them. Not only that, it undermines and seizes the important things that the adversary depends upon. Remember we talked about those vulnerabilities. Colonel, remember we talked about those?

You go through those weaknesses. Now you've undermined and seized those things that he really depends upon, his critical vulnerabilities, as you're working your way through his system. But you had

[57] The *Brandenburg Regiment* was a Nazi special forces unit deployed in Eastern Europe, Africa, and the Middle East during World War II. "Brandenburgers" were Germans who lived abroad and were thus highly knowledgeable in the languages, customs, and cultures of the areas in which they were deployed.

[58] Otto Skorzeny served in the *Waffen-SS* during World War II and became a pioneer in the conduct of unconventional military operations. His most well-known operations include the rescue of deposed Italian fascist dictator Benito Mussolini from a supposedly impregnable mountain ski resort and the use of English-speaking SS soldiers dressed in American uniforms to sow confusion behind American lines during the Battle of the Bulge.

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IMPRESSION

Reflection upon discussion, so far, reveals that Blitzkrieg generates many noncooperative centers of gravity, as well as undermines or seizes those that adversary depends upon, in order to impede vigorous activity and magnify friction, thereby paralyze adversary by denying him the opportunity to operate in a directed way.

?—RAISES NAGGING QUESTION—?
How do Blitzers simultaneously sustain rapid pace and abruptly adapt to changing circrumstances without losing cohesion or coherency of their overall effort?

to expose it before you could do that. Expose that vulnerability. Go ahead.

Audience: I can see where you get your noncooperative centers of gravity in guerrilla war. Can you inform me how you get that from blitzkrieg, I missed that.

Boyd: Well, I sort of haven't. I cheated a little bit, not too much. We've got to go back to Guderian and, hang on [transparencies shuffling]. Multiple thrusts. Remember I said multiple thrusts? Guderian's multiple thrusts—I'll go into more detail later on. But I had it in that one chart. I didn't say it here.

Audience: Basically, you were talking about the tactical centers of gravity vice—

Boyd: Yeah, but they do it at all levels. They do it tactical, grand tactical. I'm going to show you that later on.

Audience: What I'm saying is, they're not tying into the social fibers like the guerrillas do.

Boyd: But they're not getting into the social fibers like the guerrillas do. That's correct. Remember I said, remember they're not getting into that moral dimension like the guerrillas are. We'll get into

that later on. I can't put it all in one chart. You've got to let me sequence it a little bit. But you're going to see, I'm going to bring it in. You have a good question. Just hang onto it.

But you're right. The point that they're not getting at that moral fiber like the guerrillas do. That's correct. There's a difference, and we're going to bring that out. I just can't do it all in one chart. I've got to bring out the first bit first. Okay.

But raises a nagging question then. How do they simultaneously sustain a rapid pace and abruptly adapt to changing circumstances? In other words, you're trying to go fast-forward and it's—if you adapt, it's hard to go fast-forward. If you go fast-forward, then it's hard to adapt. So, in other words, they look like two things that don't go together very well.

Not only that, if you try to exercise two commands from the top, it becomes rigid. Yet, you've let the guy do their thing. Then you can't hold the whole thing together. Two more opposing things here. Christ, we let them do what they want, the whole goddamn thing's going to fly apart, the operation. *[05:00]* On the other hand, if we impose too much control from the top, goddamn, you're slow as molasses in January.

So, you have the opposing tendencies here. So, the question is how you resolve these opposing tendencies. Here's one, rapid pace versus local adaptation. You get them adapting over, they're not going rapid pace into the rear. And the other thing is, you oppose too much top-down command and control, you may have good control. But now you have a rigid thing that can't adapt. On the other hand, if you give them freedom, the whole thing flies apart and you're not realizing your purpose.

It's there, so you say we've got to resolve that. We can't resolve that, we got a big problem here. So, let's look into that. So, looking into that, here's a key point. Each level, from simple to complex, from platoon all the way up to theater, they all have their OODA loop or their OODA cycle.

[slide 72]

But remember, the ones at the higher level are going to take much longer to go through. The ones at the lower level are working their way through those OODA loops a little bit quicker. So, the higher up you go, you bring in more and more information, and lon-

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BLITZ OPERATING PHILOSOPHY

Key Point
- Each level from simple to complex (platoon to theater) has their own observation-orientation-decision-action time cycle that increases as we try to control more levels and details of command at the higher levels. Put simply, as the number of events we must consider increase, the longer it takes to observe-orient-decide-act.

Idea
- This brings out the idea that faster tempo, or rhythm, at lower levels should work within the slower rhythm but larger pattern at higher levels so that overall system does not lose its cohesion or coherency.

Raises Question
- How do Blitzers harmonize these differing tempos/rhythms so that they can exploit the faster rhythm/smaller pattern (of the lower-level units) yet maintain the coherency of the rhythm/pattern for the larger effort?

Response
- Give lower-level commanders wide freedom, within an overall Mind-Time-Space scheme, to shape/direct their own activities so that they can exploit faster tempo/rhythm at tactical levels yet be in harmony with the larger pattern/slower rhythm associated with the more general aim and larger effort at the strategic level.

Shaping Agents
- Shape overall scheme by using Mission Concept or sense of Mission to fix responsibility and shape commitment at all levels and through all parts of the organism. Likewise, use Schwerpunkt concept through all levels to link differing rhythms/patterns so that each part or level of the organic whole can operate at its own natural rhythm—without pulling organism apart—instead of the slower pace associated with a rigid centralized control.

ger time, in order to find out what the lower level is doing, so you can make your decision. All you're doing is you're stretching out that OODA loop. I mean, it's just natural. You can't avoid it.

Okay. So, it brings in the idea, this point here. How, in a sense, can you get the slower rhythm of the larger pattern operating with a faster rhythm with the lower pattern? Each one sort of has a certain rhythm or pace they're operating at. They're different, but how can we harmonize them?

So, first point, raises question, how do blitzers harmonize these different tempos and rhythms? Okay. So, here's my initial response. Now this is just an initial blast. We're going to work our way through it so you can understand it.

First of all, you've got to give lower-level commanders wide freedom within, that's the key word within an overall mind-time-space scheme. In other words, everybody sort of has the same conceptual

scheme. They have the same kind of a conceptual scheme through which they're working through. And I don't care whether you're a squad, or whether you're a commanding general of the theater, you're all working within the same scheme.

Because if you've got one, the guy's got another, is going to get very goddamn confused. Then you've got to issue detailed orders and everything stretches out. But there's a danger, which we'll get into later on. So that's one point.

The second thing, you have to have shaping agents in order to implement that scheme. And the two that the Germans used here, I'll go into more, is their mission concept, sometimes called their *auftragstaktik* or *auftrag* concept.[59] And also the other one, they call the *schwerpunkt*. Shaping agents.

We're still only getting to bloodshed. I want to go into it deeper. This is just the first turn on this. I want to give you a feeling for this. We talked about this last night. Okay? Now let's go after it, after having taken that first plunge.

[slide 73]

So, it raises a question here, or questions actually, excuse me. What does the overall mind-time-space scheme imply or presuppose? And likewise, how do these concepts, the mission and *schwerpunkt* concepts, fit into it? We're going to take both those on. First question first, mind-time-space scheme.

[slide 74]

Look at that. And I'm quoting General von Rundstedt. I mean,

[59] Literally "order tactics" and colloquially known today as "mission-type tactics," *auftragstaktik* was a concept of command and control that evolved over time in the Prussian military following its complete defeat by Napoléon in the battles of Jena-Auerstedt in 1806. Prussian officers experimented with less rigid methods of exercising control over troop formations, a reform that gained traction in later conflicts during the 1860s and 1870s when it became clear that the greater ranges offered by modern rifles and artillery necessitated new doctrine based on more dispersed formations. *Auftragstaktik* attempted to balance control with the fluid nature of large modern battlefields by requiring that subordinate leaders understand the overall intention of their superior's orders but allowing for initiative and adaptation in the execution of those orders.

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?—RAISES QUESTIONS—?

- What does an overall Mind-Time-Space scheme imply or presuppose?
- How do Mission and Schwerpunkt concepts give shape to this overall scheme?

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OVERALL MIND-TIME-SPACE SCHEME

Message

- According to General Gunther Blumentritt, such a scheme presupposes a common outlook based upon "a body of professional officers who have received exactly the same training during the long years of peace and with the same tactical education, the same way of thinking, identical speech, hence a body of officers to whom all tactical conceptions were fully clear."
- Furthermore, a'la General Blumentritt, it presupposes "an officers training institution which allows the subordinate a very great measure of freedom of action and freedom in the manner of executing orders and which primarily calls for independent daring, initiative and sense of responsibility."

Point

- Without a common outlook superiors cannot give subordinates freedom-of-action and maintain coherency of ongoing action.

Implication

- A common outlook possessed by "a body of officers" represents a unifying theme that can be used to simultaneously encourage subordinate initiative yet realize superior intent.

excuse me, Blumentritt, said the wrong name.[60] And note what he said. According to him, presupposes a common outlook based upon, and I'm quoting him directly here—and incidentally, those are his underlines, "body of professional officers." The same training during the long years of peace, the same type of education, the same way of thinking, et cetera.

And the second thing, furthermore, according to Blumentritt, "An officer's training which allows the subordinate a very great measure of freedom of action, and freedom in the manner of executing orders."

Now, when he talks about a body of professional officers, who's he really talking about there? It's a euphemism for what? General staff officers. That's what he's talking about, the general, they gave it to the other officers too, but that's what he's talking about.

Audience: Other than historical fact, is there any significance to that?

Boyd: Well, there's a very big significance. I'm going to make it significant.

Audience: Well, no, to the fact that it was only in their case it was the general staff.

Boyd: No, it wasn't only the general staff. He's just making that point. I mean, they were sort of the cadre that also gave the other guys the same thing. Because the other guys who were not general staff officers got this training too.

But when he's using that body of—he's one of the aristocracy in the German Army. Okay. So now let's look at that. Let's examine that.

Let's assume that we didn't do that. We didn't give a guy going through all this, and therefore you said, okay, let them run on their own. Christ, that thing won't hold together. You've got to give them detailed orders if you don't do that.

So, the only way you can give a guy freedom of action is when you have a common scheme. If you give him freedom of action with-

[60] Gen Gunther Blumentritt served on the eastern front in World War I, became a tactics instructor in the interwar years, and served in the *Wehrmacht* during World War II, largely as a staff officer. He was the sole author of the plan for the invasion of Poland and collaborated with Manstein and others on developing the plan for the invasion of France. Blumentritt later oversaw planning for the defense of the French coast against Allied invasion and was implicated but cleared in the assassination plot against Hitler in 1944.

out a common scheme, the whole thing flies apart. It's when you have the common scheme, you can give these lower-level people the freedom of action, because they have the overall scheme of the thing like the other people, and they can then use their own initiatives in that.

[10:00] And that's my point. Without a common outlook, superiors cannot give subordinates freedom of action and maintain the coherence of an ongoing operation. That's the key idea. They can give them the freedom of action, but if they don't have the common scheme, the whole operation will fly apart. You can't maintain a coherent operation.

In other words, in a sense, what am I saying here? Anybody? What I'm really trying to say is you not only want to have individual *fingerspitzengefühl*, in a sense you want to have organizational *fingerspitzengefühl*.

You all remember the word I used last night, right? That's what we're talking about here, that intuitive feel. They all got it among one another too. Now, I get into it deeper when I get in my "Organic Design for Command and Control." Some of you people've heard that, how you do that. That's a very important idea.

Therefore, the implication is very clear. A common outlook, possessed by a body of officers, that represents a unifying thing that they use to simultaneously encourage subordinates to initiative, yet still be inside superior intent.

Think about it. Just run through the logic. If you do not have that common theme, how can you give freedom of action? If you do, the whole operation's going to fly apart. You're not going to maintain a coherent operation. And so, you say, well, I'm not going to give them that. Fine, then you're going to have to have detailed orders. Now you've got a slow as molasses operation. Christ, it's going to take forever now to realize your purpose.

So, in that sense, and I've never said this before, it just occurred to me right now I'm thinking about it. In that sense, how do you exercise control? This is very important. How are you—think about this. When you like to use the word control, knowing that, how are these people really exercising control?

Audience: Self-discipline through the common—

Boyd: Say it again. You said it.

Audience: Self-discipline to the common—

Boyd: The control is through the common theme. In other words, they all have the same mindset. In other words, they work in the same way. The same way. That's the discipline. It works through that. Excuse me, that's the control mechanism. The common outlook. The common outlook's the control mechanism, not the individual guy, whether he goes down this road, or does this zigzag, or whatever he does out there.

Audience: How do you explain the German ability, say, in the last months, say the last 10 months of World War II, to maintain this common goal and common outlook, even though they had very little time to train junior officers and their NCO corps?

Boyd: You should read—incidentally there's a good book out on that. You ever read van Creveld's *Fighting Power*?[61] He goes into that. Even when it was down toward the end of the war, they still trained those guys real well, because they recognized that was important. They curtailed some of it, but they didn't stop that. Behind the lines, getting the guys ready, so they could go into combat instead of just feeding them in there like cannon fodder.

Of course, probably very near to the end they had to, because the SS men were commanding them. So, under very trying circumstances, they still caused us a lot of problems. A good book on that is—in fact I think it's van Creveld's best book, is that one, *Fighting Power*, where he gets into that.

Remember, instead of putting in individual replacements, how'd they put them in?

Audience: In by unit.

Boyd: You're goddamn right. And why did they put them in by unit? They wanted those moral bonds so when they do things, they can act. They have that unit *fingerspitzengefühl*. That's what they were really doing whether they said it or not, that organic harmony.

We don't like to do that. Say, oh, Christ, it causes all problems with personnel. Well, screw personnel. They're supposed to serve the combat forces. The combat forces don't serve personnel.

Yet, we'd rather throw that away. It's the American way. Fuck 'em. Those guys out there, they'll get along. We're going to send

[61] Martin van Creveld, *Fighting Power: German and U.S. Army Performance, 1939–1945*, 2d ed. (Santa Barbara, CA: Praeger/ABC-CLIO, 2007).

them who we want, when we want, and it'll be individual, and shut your mouth.

It's inconvenient for the personnel troops. After all, you're a dummy anyway. Otherwise, why in the hell'd you get in the infantry? All you're going to do is lose your life. I mean, that's the way some people think. That's what I'm trying to tell you. Don't take that personal. I understand where the argument is.

Of course, they think I'm a dummy because I was a fighter pilot. What's that asshole out there screwing around for?

Audience: I think we're all grasping it, but I want to see if these things are co-equal or how they all fit together. The communications we have comes from three things. One is the common body of knowledge.

Boyd: In a sense, that common body of knowledge, that is your control mechanism. That's what I'm trying to tell you.

Audience: Okay.

Boyd: That's very important.

Audience: [unintelligible] two more, i.e. intent, self-discipline—

Boyd: Oh yeah, you want to inculcate that self-discipline. That's correct.

Audience: But how are they three things that we look at equally or—

Boyd: I didn't hear the— I only heard two.

[Cross talking]

Boyd: Common outlook and then self-discipline. What was the other one?

Audience: Yeah, and intent, the commander's intent.

Boyd: Intent. Well, the point is, if you treat—in a sense they're all together. If you take the common outlook, part of that common outlook is a commander's intent, I'll get to that in just a minute, and the self-discipline. It all plays together. It's part of the organic harmony. That's part of the overall common outlook. That's right.

Audience: And implicit communications and—

Boyd: Yeah. Yeah, it's all part of the common outlook. *[15:00]* But now, you still, even though we say, oh, we've all got a common outlook, we still got to execute the thing. You can't say just do it, because it may still come apart.

And so, you need what I call, the word, shaping agents. We'll get

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?—RAISES QUESTION—?

Very nice, but how do the German Concepts of Mission and Schwerpunkt give shape to this scheme?

into it deeper. We haven't gotten to that yet. All we've talked about is overall mind-time-space scheme. So, let's get into that now.

[slide 75]

Knowing that then, it raises a question, and this is—but how do the German concepts of mission, *schwerpunkt* fit into it? In other words, how do they shape this whole thing? So, let's get to that. Firstly—

[Cross talking]

Audience: Colonel Boyd? Does the German Army still have the same concept today?

Boyd: Mike may know that better. I'm not too sure.

Wyly: What's the question?

Boyd: That's a good question. I don't know that answer.

Audience: Does the German Army today have the same concept that we're talking about?

Boyd: I think some of them do.

Wyly: They're trying to get it back. There's been kind of a controversy in the Bundeswehr, very much like the same one we've had here.[62] And I would say they're closer to this than they were five years ago.

Boyd: They're trying to get it back.

Wyly: They're having a very similar debate to what we've had. They lost a lot of it.

Boyd: Yeah, we won World War II, so they want to do it our way. You know how that goes.

[62] *Bundeswehr* refers to armed forces of the Federal Republic of Germany.

Wyly: That's right. And now they're gaining it back. So, I'd be reluctant to comment and say yes, it's exactly like it. In fact, no, they don't have this whole thing thought out as Colonel Boyd's thought it out, by any means.

They're somewhere in between us and the old World War II German Army, in a word. There's a big—

[Cross talking]

Boyd: I wish I would've given it.

Wyly: Some things you do notice. Let me tell you one thing I have noticed, talking to German officers and getting [unintelligible]. This is why I'm interested in this. One thing that they have not done, it appears to me to the extent we have, is put this extreme emphasis on rank and seniority that we have.

That is, their juniors seem to be much more willing to enter into debates with their seniors, and their seniors don't think it's strange. Now we do it, but you watch the human dynamics, and we put, I think, an inordinate amount of importance on rank and seniority. That's one thing I don't notice that they've done.

But that's—as I say, I don't want to get off on—it's a good question. It deserves a long answer and probably some trips over there but—

Boyd: Yeah, and I haven't talked to Von Lousar [PH].[63] I know that they were trying to get him back. I just didn't know where they were. But I haven't talked to Von Lousar for a few years, because he was back in Germany. And then, of course, I had some problems last year, so I didn't get to get [unintelligible]. So that's why I said to let Mike answer the question. I just don't know right now.

Wyly: But the general staffers, they had to go underground again. The general staff was—

[Cross talking]

Audience: —and all that.

[slide 76]

Boyd: That's right. That's right. Okay. Now the message then behind it. Let's talk about this. Here's the German concept of mission. You can kind of think of it as a contract between superior and subor-

[63] Unclear who Boyd is referring to here; transcriber insertions of [PH] indicate a phonetic spelling based on indistinct audio.

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MISSION

Message

- The German concept of mission can be thought of as a contract, hence an agreement, between superior and subordinate. The subordinate agrees to make his actions serve his superior's intent in terms of what is to be accomplished, while the superior agrees to give his subordinate wide freedom to exercise his imagination and initiative in terms of how intent is to be realized.
- As part of this concept, the subordinate is given the right to challenge or question the feasibility of mission if he feels his superior's ideas on what can be achieved are not in accord with the existing situation or if he feels his superior has not given him adequate resources to carry it out. Likewise, the superior has every right to expect his subordinate to carry-out the mission contract when agreement is reached on what can be achieved consistent with the existing situation and resources provided.

Limitation

- While this concept of mission gives form and expression to what is expected between an individual superior and subordinate, it does not suggest ways to coordinate or harmonize activities among many superiors and subordinates as a collective group.

dinate, an agreement. Whereas, in a sense, the superior determines what is going to happen, but the subordinate determines how it's going to be accomplished, as long as it's within the superior intent.

In other words, he doesn't tell him how to do it. As a matter of fact, let me give you a good example. Tell me, you people have heard of General Balck, haven't you? Hermann Balck? He was one of the most successful Panzer commanders. We had him over here, I think, I can't remember, 1981, or something like that.

We had him at the Pentagon, and we had him and the assistant secretary. We went through a long discussion. We had lunch in one of the nice dining rooms over here with one of the assistant secretaries.

And one of the guys said, "But how do you tell them to do stuff?" And Balck was insulted. He said, "I don't tell anybody how to do anything." He said, "All we tell them is what has to be done and get an agreement upon it. They determine how it's going to be carried out."

He said, "Well, what if you don't like the way?" He said, "Doesn't

make any difference whether I like it or not. He does it. I stand aside. The only thing I worry about is if I think it's illogical, I won't let him do it if it won't work. But normally they know how. It might be different from mine, but if it'll work, he does it that way. He determines how it's going to be done. I just determine what's going to be done." He said, "What if it doesn't work out?" "Well, if they do it a couple times and it doesn't work out, we're going to replace him with somebody else."

But normally, when they pick those guys, they've observed them for a period of time. And then he gave a good example. He talked about this one guy he had who was an Austrian. I think he was an Austrian. Might not've been an Austrian. But—no, it was a German. And during the prewar exercises and all that, the guy was a basket case. He was terrible. Couldn't do a goddamn thing right as a commander.

And so, they kept him in the training thing all the time. Still, when they put him in the exercise, he couldn't do it. So eventually they needed him, because they ran out of commanders. Well, we've got to throw him in. We'll put him in a sort of a sector near the front. And he's doing pretty good. So, they put him in another sector.

The wildest thing, the guy's doing better than any of the other commanders. So, they said, now we're going to send him back and show him how to—we want him to teach his methods to the guys in the back. Once again, he's a basket case.

And I've seen the same thing among fighter pilots. I've seen them when I was out in Nellis. Some guys, Christ, they didn't know how to spell their name and how to tell anybody how to do anything, but they were fantastic. There's an innate skill and they have it. They can get people's *esprit* up. *[20:00]* But in peace time, they're a basket case. And you see that.

He talked about this one guy. He said, every time, they couldn't believe it. They figured, now he's finally got the picture. Now he's going to show our young people how to do it right. Oh, my God, he was a total disaster. Back to the front and did superb.

But that's the kind of things you find out. You get those surprises from time to time. And I'm sure you've seen that in your people at different times.

Wyly: You know, there's one other dimension to that question

you asked, that I think this needs to be brought out, about the German Army in World War II and van Creveld's German Army now. And Marines can relate to this. Because in World War II, you talk to any German soldier that was in that army, and their *esprit* was just incredible.

Boyd: Even in the worst days.

Wyly: Oh, yeah. I mean, right down to some of the things that we call discipline, you know, the pride in being a soldier. And that has a lot to do with it. And I think that's kind of what may've started some of this dialogue 10 years ago. I had so many German officers say to me, you Marines ought to pick up on this, because you have a lot of what we had back in the days of the 100,000-man army before World War II.

Don't forget that since World War II, a lot of that has just come apart because of the pacifism, the attitude, the understandable attitude of post-war German. So, the "click of the heels" and a lot of those things that made all these other things come together, the *esprit* and the camaraderie, some of that's gone. So, it's a different thing.

Yet on the other side of the coin, the German culture has placed a tremendous emphasis on education. John and I were talking about that. And I would say more so than Americans do. And that gives them a different outlook, and that probably keeps them a little stronger.

They're weakened because they've lost some of the old military spirit, and that's gone. And they're going to have a tough time ever getting that back. But they're strengthened because they still put an awful lot of emphasis on education, more so than our society does.

Boyd: But note this. Note that second bullet there. That's the thing Mike was alluding to before. In other words, expect the subordinate to really throw his weight in there before the decision's made. He's given the right to challenge or question, the feasibility of mission if he feels his superior's ideas on what can be achieved are not in accord with the existing situation, et cetera, et cetera. Or if he feels he's not getting adequate resources.

He can challenge it. Expect it. We raised this to Balck. He says a lot of superiors don't like it, but they know they've got to do it. Some

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?—RAISES QUESTION—?

With this limitation in mind, how does Schwerpunkt play into or add to this concept?

of them would not go along with the spirit of it, he said it was bad. You've really got to go along with that. So be sure you bring in those ideas before you make that decision.

Once the decision is in place, though, then they've got to carry out the decision. So, if they're given this place, then likewise, of course, when you play that game, the superior has every right to expect the subordinate to stay within that intent and carry out the decision because he'd been given that opportunity.

In other words, there's sort of a contractual agreement there, is what I'm trying to tell you. There's a two-way sway, not just a one-way sway. Think about it.

There's a limitation. This is an important idea. I say, well, it gives form and expression to what was expected. What it really doesn't do, how do you coordinate or harmonize activity among many superiors and subordinates? You still have to do that. Okay?

Audience: [unintelligible].

[slide 77]

Boyd: We'll take a break in a minute. [unintelligible] through this concept here. So, with this limitation, how does *schwerpunkt* play into this concept? And of course, it's the glue that holds everything together, is what I'm trying to tell you. And I've said it different ways. I'll let you read it. And they have a *schwerpunkt* at all levels, from the theater all the way down. Theater, army group, army, corps, division, regiment, *schwerpunkt* inside *schwerpunkt* inside *schwerpunkt* inside *schwerpunkt*, or focus of main effort, or point of main effort. The main effort.

[slide 78]

Maneuver of all arms and supporting elements are focused to

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SCHWERPUNKT
(FOCUS OF MAIN EFFORT)

Message
- Schwerpunkt acts as a center or axis or harmonizing agent that is used to help shape commitment and convey or carry-out intent, at all levels from theater to platoon, hence an image around which;
  - Maneuver of all arms and supporting elements are focused to exploit opportunities and maintain tempo of operations,

and

  - Initiative of many subordinates is harmonized with superior intent.
- In this sense Schwerpunkt can be thought of as:
  - A focusing agent that naturally produces an unequal distribution of effort as a basis to generate superiority in some sectors by thinning-out others,

as well as

  - A medium to realize superior intent without impeding initiative of many subordinates, hence a medium through which subordinate initiative is implicitly connected to superior intent.

Implication
- Schwerpunkt represents a unifying concept that provides a way to rapidly shape focus and direction of effort as well as harmonize support activities with combat operations, thereby permit a true decentralization of tactical command within centralized strategic guidance—without losing cohesion of overall effort.

or put another way

- Schwerpunkt represents a unifying medium that provides a directed way to tie initiative of many subordinate actions with superior intent as a basis to diminish friction and compress time in order to generate a favorable mismatch in time/ability to shape and adapt to unfolding circumstances.

exploit opportunities and maintain tempo of operations. Initiative of many subordinates is harmonized within superior intent. So, if they know what the *schwerpunkt* is, in that sense then, implicitly each guy is cooperating with all the other people. You see what I'm saying?

Now there's a danger. I notice in some of the Marine documents, you say you designate a unit as being the *schwerpunkt* or focus of effort. You may do that. You may not. Let me show you where that might not play.

You want to be very careful with that. Let's take, for example, when the Germans decided to go through the Ardennes. I'm talking about 1940, not 1945, 1944, when they hit us in December. In 1940, when they went through the Ardennes, initially before that, they were going to have their main effort up north, you know, somewhat follow the Schlieffen Plan. Then as a result of Manstein getting to Hitler, *[25:00]* they shifted the *schwerpunkt* down to the southern sector. Why did they do that? Anybody?

Audience: Because there was no resistance there.

Boyd: Okay. So, the *schwerpunkt* wasn't set because the unit was set, because that sector would give them a weakness they could exploit. So, the *schwerpunkt* was set in that sector, and once it's set there, the units then are part of that *schwerpunkt*.

So don't just designate a unit. You want to look at the sector you're looking at. And you say, okay. This is the area I want to do it because they're weak here. And then those units become the *schwerpunkt* to go through there. Because otherwise, you're only internally focused. You've got to be focused outward, not inward.

Audience: Could you say that again, sir?

Boyd: Okay. I'll say it again. In 1940, so you get the whole idea—and they made a mistake later on. I'm going to show you the difference between the two. That's why I'm drawing this distinction right now.

We're talking about 1940. And if you people haven't read it, I'll explain it to you. There was a big argument in the German Army where the so-called main effort—in fact, most of them thought, until Manstein intervened, that they were going to have their main effort come out of the lowlands, Holland and Belgium, and sweep around almost like the Schlieffen Plan out of World War I, the same kind of idea.

And Manstein looked at that. He was very gifted. He said, that's bullshit. So, then he got together with Guderian and wanted to know, he said we know the French are kind of weak here. Can we get those goddamn panzers through the Ardennes? Guderian looked, said of course we can. So, then he drew up the whole plan for going through the Ardennes, and make that the main effort.

So, the main effort, or the *schwerpunkt* was set not by the unit but by what? By the area where the other guy wasn't going to be. And then, since it's set there, of course, those units become the *schwerpunkt*, and all the support goes in there, the main support.

And the northern effort then became a *cheng* for the *ch'i* coming out of the south there. Well, it wasn't really the south. It was through the center there. It was just on the northern side of the Maginot Line.

Audience: It may just be semantically that I'm confused, but I don't see that that's any different than what we've previously talked

about. In my opinion, in my mind, the focus of effort or main effort or whatever you want to call it, the focus of effort is directed at a critical enemy vulnerability. What you just—

Boyd: Maybe not. Maybe not. We had that argument last night. Maybe you might—if it's a critical vulnerability, he may defend it. Then it's going strength against strength. You don't want to do it. Remember, we went through this argument.

Audience: Okay. I'll buy that.

Boyd: We've gone through this. You've got to be careful with that.

Audience: Using the concept of multiple thrusts, though—

Boyd: What you want to do is get him—you want to expose his vulnerability. You want to go through the weaknesses so you can expose those and get to him.

Audience: I understand that. Using the idea of the multiple thrusts, you may not pick your point of main effort—

Boyd: Say that again. I was going to do that next. Say it loud.

Audience: Using the principle of multiple thrusts, you may not pick the point of main effort until you've actually made contact with the enemy and identified the weakness.

Boyd: Wait a minute. Maybe. You're on the right track. But who's going to be the main effort? You've got 5 or 10 thrusts going. You're going to pick one and everybody—say it.

Audience: Everybody can be your point of main effort.

Boyd: That's right. So, focus of effort, and they're all part of the main effort.

Audience: The point of main effort can be not having one.

Boyd: But it's that area, and they're all part of the focus of main effort. That's why I say you've got to be careful. Designate one unit and all the other guys, you only get one to a thrust, because if you start at theater level and say okay, your army group's the main effort. And then inside that army group, that army's the main effort. Then you go down and you say, okay, the corps or division in front of you got the squads of main effort. Then you got one guy out there that's the main effort for the whole goddamn thing, from army group all the way down. That's bullshit.

Audience: Well, aren't you really saying—

Boyd: You see what I'm saying? I took it to a logical extreme, obviously, to show you that it doesn't work that way.

Audience: The key to that, it seems to me, is the adaptability on your line; in other words, don't be so rigid you can't change your main effort as the real battle unfolds.

Boyd: Well, no. But we're just saying as a starting point. We haven't even talked about shifting. We want to shift it later on, we know. We're just saying okay, we've set the operation up. We're talking about the Ardennes, 1940.

We haven't done any operation yet. We're just saying, okay, where are we going to allocate on the first day, regardless of whether we shift it the next day. All we're talking about is how are we going to allocate. What's going to be the big—this unit's the main effort because we like the guy or something? Fuck, he goes off? No.

What you're going to do is, you're going to look at the front there and say look, they have a weakness here. We can exploit that weakness. Therefore, the main effort is going to be set because a weakness exists here, and then those units become part of that main effort because of the situation you're going against.

It's set primarily by your enemy being weak, not by your own forces. In other words, it's an outward orientation, not an inward orientation even though the *schwerpunkt* itself is inward. Am I making my point?

Audience: [unintelligible] definition of focus of effort is—by sector and area. Is that different between this and main attack—

Boyd: Well, you might sometimes—you already know it's weak all over. You may just say, okay. We'll just designate this unit. I just don't want you—you want a recipe. I'm trying to talk you out of a recipe. You may sometimes set it by unit. You may set it by sector. Understand, I use that as an example.

Audience: My question is—

Boyd: But in every case, when you set that thing, the thing I'm trying to tell you, in a sense it's going against the guy's weakness. So that sort of sets it, if you have a sort of philosophy going strength against weakness. It's how you're going to set that main effort. Go ahead.

Audience: What's the difference between focus of effort and main attack?

Boyd: Oh, same thing. People use things—the Germans use *point of main effort*. They talk about—we call it *focus of main effort*.

Now the Marines like to call—I think it's a better word, *focus of effort* or *focus of efforts*. We're all saying the same thing.

Wyly: *[30:00]* But that "main attack" word is one where we have to be careful—

Boyd: You have to be careful.

[Cross talking]

Wyly: I mean, you talk about terms having a lot of baggage, see. And that's the term the Marine Corps was using.

Boyd: No, the one thing bad about main attack, Mike's onto something, if it's a main attack, how do you handle it from a defensive viewpoint?

Wyly: Exactly.

Boyd: See *schwerpunkt* can also be defensive.

Wyly: And also, that's the term the Marine Corps was using way before we even had this focus of effort concept, and so it tends to be kind of shallow. I mean, if you're thinking of main attack the way it used to be in our old FMFMs, I'd say forget it.

[multiple audience members begin rapid exchanges]

Audience: I can understand that. But the college, the teaching is quite different [unintelligible].[64]

Audience: Focus of effort, you all in the college, you're going to get FMFM–1 more—

Boyd: And it's focus of effort.

Audience: No more main attack—

Audience: It's focus of effort. FMFM–1, if we'd had it when the year started, we'd have saved an awful lot of agonizing discussions, which we saw. So, focus of effort encompasses [unintelligible].

Boyd: But you're going to hear people still want to use the word German *schwerpunkt*. That's all right. Fine. They're talking about focus of effort or main effort or focus of main effort or—and I tend to like the word focus of efforts better, because what I want to do with effort, guys think, well, we only want one thrust. I want the multiple thrusts. So, it's focus of efforts, so you have multiple thrusts. So, you can pull the guy apart. You'll see that in a few moments.

[64] Marine Corps Command and Staff College, the intermediate-level professional military education school for field grade officers, normally majors or equivalent from other Services.

But don't worry about it. What I'm trying to do is, don't think of it as a recipe. That's what I'm trying to get you out of. It's not always going to be—it's only because we designate this unit. I'm trying to get you out of that. You may do it that way, but there's these other ways.

The key thing is, what you're really trying to do is unwind your adversary. You're assigning it internally, but it's so you can exploit your strength against his weakness. It might be because of the terrain situation. It might be because of the way they've set their units. There'd be a number of reasons why you're going to do that.

You see what I'm getting at? Okay. And that's all I'm trying to tell you. I don't want to take it any—don't—what I'm trying to do, and you may hate my guts for it, is I don't want you to have a rigid recipe. Because if you start getting rigid recipes, then the guy's going to find out what that is. You would in a sense become predictable, and he's going to pull your pants down. He may not know it in the beginning, but after you do it a couple times, hey, I'm getting the picture. So, then he'll play it against you. He'll use it against you. Go ahead.

Audience: Sir, I see a flaw in this, then. The Germans said they want to teach their officers to think the same way. They train them the same way, and more importantly, to think the same way. And there's an element of prediction—

Boyd: There's a danger. You lay it out. You're going onto something. Go ahead.

Audience: What bothers me is, I'm trained the same way my boss is. I'm trained to think the same way my boss is. The reason he can just say, "Okay, my intent is," and I can take the ball and run with it, is because he knows that I'm going to come to the same damn conclusion on how to carry out—

Boyd: Oh, no, no. Not necessarily.

Audience: Probably.

Boyd: No, no, no. No, no, no.

[Cross talking]

Boyd: If you hear my "Organic Design for Command and Control," when you train your people, if you train across a narrow repertoire, then you'll tend to do it the same way he does. But if you have a wide repertoire, there's different combinations you can use. And so, when you try to build this common mindset, it's across a large variety of different situations.

And so even though you have one how in mind, he may have a different how in mind. But you're still under the same framework.

Audience: Well, I'm limited by my assets and by what I've got available to do the job with.

Boyd: So what? I don't care if we have limited assets. There's still more than one way to skin a cat.

Audience: Not to me.

Boyd: If you don't think—then what you've got, you've got a self-fulfilling prophesy.

Audience: What I'm thinking is that—

Audience: Some can save time though, sir. There's many ways to skin a cat, but some can save time is—

Boyd: I understand that.

Audience: And if speed is most important—

[Cross talking]

Boyd: See, now you're looking for an optimum solution. We couldn't even get an optimum solution when—I was laying out the equations for goddamn trying to optimize airplane designs, and we couldn't do it. And you're going to do it with human beings. That's even tougher.

Audience: But I'm saying there may be a hundred different ways to do it, but there may be one or two or three—

Boyd: There might be a few in there that are better than the others. I agree. But that doesn't mean you're going to do it exactly like he's going to do it.

Wyly: In fact, it doesn't mean that at all. I mean, we're saying look for weaknesses and vulnerabilities. Now I might find a totally different weakness than you see. I might be able to find one that you would never perceive. Or you might be able to see one that I never would because we think differently. We're two different people.

Boyd: That's right.

Wyly: But we're both going to be looking for those weaknesses. That's the one thing our common commander knows.

Boyd: See, you might see a, because your orientation, because you said it, you may see a physical weakness on a guy. You understand what I'm saying? So, you're going to allocate, and you're going to set up your focus of effort or your *schwerpunkt*, whatever you want to call it, against that.

Whereas, what Mike's saying, he may see, well, the way these guys have behaved before in battle, even though they've got a lot of troops, they're weak units. And in that sense, it's a morale problem, so you're going to direct it against it because he knows they're going to crumble. So, he might set it differently than you would. You see what I'm saying?

[Cross talking]

Boyd: You're orienting differently.

Wyly: One of the best examples to study this is in the British Navy, but the Royal Navy is—I mean, they practice this in their own way. If you take a look at Cape St. Vincent and Nelson's action, it was totally the last thing his commander, Jervis, ever would've thought of to do. But yet, it accomplished exactly what Jervis wanted to accomplish. Nelson pulls out of the fleet formation and bottles up the whole Spanish and French fleet, and they win. *[35:00]* Jervis never would've dreamed of that.[65]

Boyd: In fact, what did Nelson say about his people? They were so understood, he called them a "band of brothers." Same thing.

[Cross talking]

Boyd: Same idea, band of brothers. You see what I'm getting at then? Don't try to make it too recipe. If you get it too recipe, then you start, a little bit too predictable. That's why I'm trying to deliberately set in excursions here. But as long as you have the same feeling, you'll build up that *fingerspitzengefühl*. That's what I'm trying to get at. Okay.

So, you see the way I've laid that out then. It's a unifying concept or unifying medium to work together, you understand. Go ahead.

Audience: I understand your thought process, and you talk about your medium through which subordinate initiative is implicitly

[65] The Battle of Cape St. Vincent (14 February 1797). Fought in the background of the wider French Revolutionary Wars, the battle saw a small British fleet commanded by Adm Sir John Jervis defeat a significantly larger Spanish fleet. Boyd describes here the decision by Commo Horatio Nelson to take a very broad interpretation of Jervis's orders during the battle, which resulted in Nelson's ship breaking away from the main British battle line to cut across the Spanish fleet's course before it could make it to the safety of its own harbor. Jervis had issued no such order to Nelson, but Nelson's decision in the moment allowed the British fleet to achieve its overall objective, which was to intercept and defeat the Spanish fleet.

connected to superior intent. Training can do all this, whatever. But when you have a specific mission at the tactical level, how do you do it? Do you do that with a five-paragraph order, and within there you put *in order to* so everyone realizes what the intent is, and then you leave them to do it? So are you talking about—

Boyd: Or you might not even have a—why do you have to have a written order? Who says you have to have a written order? I didn't say you had to have one.

Audience: I did.

Boyd: I don't need a written order. In fact, the Germans operated verbal orders only. Why do you have to have a written order? Who said?

Audience: Because every MAP-EX we've done here, you get 10 different people going in 10 different directions.[66] And if you don't give them some guidance, it ain't going to get done.

Audience: That's a reflection on the way you think.

Boyd: But I'm saying you don't have to have a written order.

Audience: I'm not saying you have to take the entire recipe—

[Cross talking]

Boyd: Not only that, in the U.S. Army, you ever hear of "Tiger" John Wood—"Tiger" Jack Wood, 4th Armored Division?[67] Considered one of the best under Patton. He was the best armored division. One division, operating on a front 500 miles wide, and cleaning the clocks of the Germans.

You know how he gave his orders? He flew in his goddamn little Piper Cub and had the guy land.[68] He'd go out and talk to the guy and say, you know what to do? Fine. Then he said, I got to hurry. I got to get to the other guy. So he's going all over the front, just talking to them. No written orders. The other guys are sitting back there, they're fucking—he's succeeding, pushing forward.

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[66] MAP-EX = map exercise. A map exercise is a staff-training activity for a tactical unit's staff, as well as attached, adjacent, or subordinate elements, conducted using notional military units presented on a map or sand table model.

[67] MajGen John Wood commanded the U.S. Army's 4th Armored Division under Patton's Third Army, as the Third Army pushed across France in mid–late 1944 following the landings at Normandy.

[68] The Piper J-3 Cub was a light, two-seater aircraft built between 1938 and 1947.

[Cross talking]

Boyd: They said, Christ, you're 500 miles, he said, forget it. Keep going, tiger. He unraveled the whole German front. Patton couldn't believe it. In fact, Patton—he disobeyed Patton's order. Patton says, you've got to loop here. He said, that's not the way the war is. Fuck it. We're going that way. And Patton was going to fire him.

He got to him. He said, look, goddamn it, the name of the game is to get Germany out of the war and going back to the coast. We're looking at England. He wanted to loop around. He says, bullshit. We're going to go right and pull them apart. And Patton looked at him. He said, you're right. Go ahead. [audience laughter]

But he had the guts. He had the confidence to do what had to be done. He was our best armored commander during World War II. You go out to Fort Knox, Christ, they think he's a god, or wherever it is they've got their armored center.[69]

They called him "the Professor," as a matter of fact. "Professor" John Wood, because he was smart. He could think. There's a book out on him called *Tiger Jack*.[70] And you know what he was? He was fired. And he didn't serve in North Africa.

His first combat assignment was after the Normandy operation. He got there late, and he was their best commander. He didn't invade. He didn't land at Normandy. And then he got canned around Metz, because he wanted to use maneuver warfare, and they wanted to slug it out. So, he got fired. He lasted about six months, and Christ, was the best armored commander they ever had. Go ahead.

Audience: So, he achieved what the Germans tried to do through their training, all the— taking guys from the—

Boyd: Wait a minute.

Audience: —the age of pups and training them to—

Boyd: But he trained his people that way. They said oh, he was a stickler.

Audience: In a matter of months or a year.

Boyd: Oh, he worked his people, worked them all the time in the States.

Audience: And he did it in however much time and—

[69] Fort Knox was the home of the U.S. Army Armor Center and School between 1940 and 2010.

[70] Hanson W. Baldwin, *Tiger Jack* (Fort Collins, CO: Old Army Press, 1979).

Boyd: I don't know how much time he did it, but he did it.

Audience: So, maybe we don't need all this training over years and years and years.

Boyd: Don't say that. It's like a spear into my heart.

Audience: That was my intent, sir. [audience laughter]

Boyd: Yeah, if you have all the training, which becomes like a choreographed ballet, it's no good. You've got to take variety and do it. You change things and all and you've got to teach different people.

Sometimes what we do, we get in training, it's just drill after drill, the same old thing. Well, now everybody's rigid. They can't think. They're doing the same thing. And that's why I say you've got to always keep introducing variety in your trends.

And if you don't do it, you're going to have a narrow repertoire and the other guy's got a wider repertoire. He's going to clean you out. It's like a wide-angle lens working—I mean, a wideband going against a narrowband. You know, communications.

You know what I'm talking about? Wide band communication versus narrow band. A wide band can work on narrow band but not the other way. At least all of the bands. So, you want to wide band that son of a bitch.

He's only got a piece of it, and you've got all of the pieces. Or more of the pieces. You don't have all, never. But you'll have more pieces than he's got, and you can pull him down rather than him pulling you apart.

Audience: We've been talking about this since last night. What we think we're saying is there's three levels of argument. One is a concept [unintelligible] you operate on. This is it, maneuver warfare, with all it entails. And then there's the repeated ability to execute it or apply it, so you develop your repertoire. *[40:00]* You've done it so many times in map exercises and CPXs and when you can, full blown field exercises.[71] But when the time comes, you've got a repertoire that doesn't have one or two answers.

Boyd: That's right.

[71] CPXs refers command post exercises. More complex but with a goal similar to a map exercise, a command post exercise normally involves setting up an actual physical command post structure (such as tents, communications networks, and other hardware used in a command post) in order to train and exercise the various staff functions of a military unit.

Audience: But the key is, and we're struggling with it, is how do you get the tools like a five-paragraph order or whatever it is, and make those tools simple enough—we don't concentrate—how much time do we spend on staff actions? We focus on procedures. But what we should be doing is understanding the concepts and practicing them with our limited tools. But that's easy to say, how we get there's tough.

Audience: Oh, I think we do that. But I'm just saying if you have something that's written, it's going to preclude having to ask a lot of questions that are naturally going to arise when someone says go from point A to B.

Boyd: I don't mind you having a simple order, a written order. I'm not against that.

[Cross talking]

Boyd: You don't just have to have a written order. I can do it in verbal orders. The Germans—why do you want verbal orders? I'm getting ahead of myself. You're pushing me. I'm going to answer your question. I'll get into that in a minute. I'm getting ahead of myself. Because I want to talk to that.

[slide 79]

Okay? And if you look at their philosophy, here's the key thing behind it. What they're really doing, if you look at their whole operational philosophy, based upon a common outlook, freedom of action, realized through their concepts of mission, et cetera, they emphasize implicit over explicit communication.

In other words, since they have a common outlook, it's like in a family, and you and I are good friends. I don't have to give you detail what to do. I just give you an order or two, and you're on your way. In other words, that one word is dripping with information, so you don't have to say too much.

As a matter of fact, the British noticed that, that after a German unit came in the front lines, if it was a new unit, they'd talk a lot. After they got in there and were playing the problem, they'd get very quiet. You only had to give a few words to do stuff. In other words—in fact, even Mellenthin sort of tips you off. He said, we finally worked in our signals so we could work together very well. He says it very often in

SLIDE 79

GERMAN OPERATIONAL PHILOSOPHY

Impression

- The German operational philosophy based upon a common outlook and freedom-of-action, and realized through their concepts of mission and schwerpunkt, emphasized implicit over explicit communication.

which suggests

- The secret of the German Command and Control System lies in what's unstated or not communicated to one another—in order to exploit lower-level initiative yet realize higher-level intent, thereby diminish friction and reduce time, hence gain both quickness and security.

Result

- The Germans were able to repeatedly operate inside their adversary's observation-orientation-decision-action loops.

or as stated by General Blumentritt

- "The entire operational and tactical leadership method hinged upon . . . rapid, concise assessment of situations, . . . quick decision and quick execution, on the principle: 'each minute ahead of the enemy is an advantage.' "

his *Panzer Battles*.[72] They worked together long enough, he said, we finally worked our signals so we don't have to say a lot.

So, it's implicit over explicit, which suggests that the secret to a command-and-control system, it's not what's stated, but what's unstated, at least in an explicit sense. That's the secret. And by doing that, you can exploit lower-level initiative, yet realize high-level intent, thereby diminish friction and reduce time. Hence you gain both quickness and security because you're not talking a lot.

We used to train fighter pilots that way out at Nellis. Initially they're all jabbering all the time. So, I'd take them up and work with them. And I said, I don't want you to say a goddamn thing. Nothing, if you can. They said we can't do that. I said, well, I want as few words as possible when you're working together.

[72] MajGen F. W. von Mellenthin, *Panzer Battles*, 2d ed. (New York: Ballantine Books, 1985).

I want one word dripping with information because what happened, they're talking so long, the events are unfolding faster than they can communicate, so the whole thing just welled away into disordered chaos. So, we got them working together, so they developed that *fingerspitzengefühl*. They'd say a word or two, and everybody's adjusting because everybody knew all the sequence that flowed behind that word.

And now, then, your communication is unfolding more rapidly than the events that are unfolding, now you're in charge of events, instead of the events being in charge of you. But if you need detailed orders, the events are spilling out faster than your orders. Christ, you're going to fall behind.

All you're going to do is generate confusion and disorder, and the whole system is going to come unglued. As a matter of fact, that's exactly what happened to the evacuation of Saigon. General Gray talked about that.[73] Christ, they were pumping and changing his orders. And they were doing it at a pace that wasn't fast enough for the events. And they were just confusing everybody.

Finally, everybody stopped looking at the goddamn machine and how they're going to be evacuated. Al Gray likes to talk about that, General Gray. Some people were trying to fob that off as a smooth operation because they're doing it through a computer. He says, I was on the other end of that. That was a total disaster.

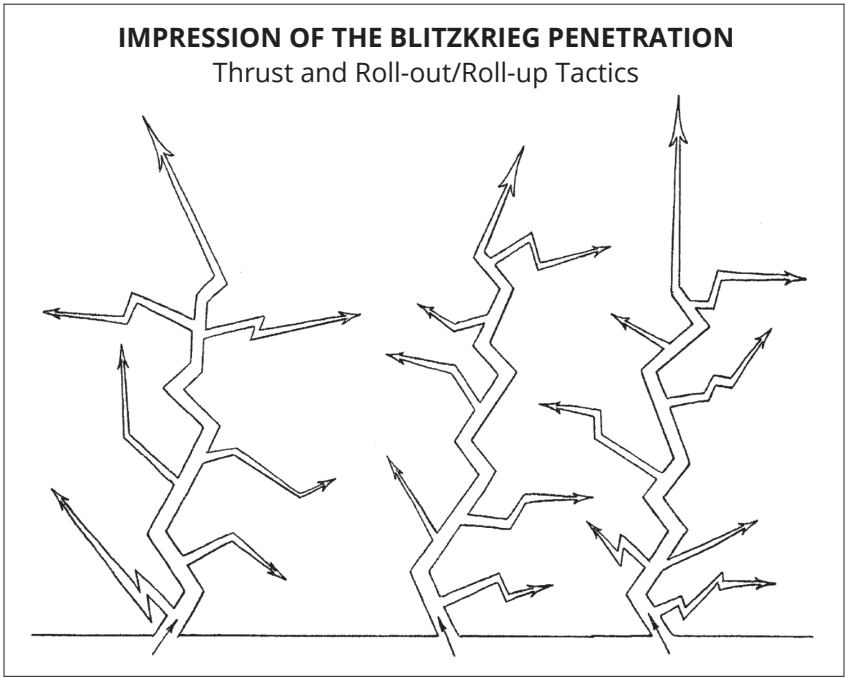
Remember that time, Mike, when he criticized the Army general, some Army general's trying to fob that off. He said, "I was there, were you, General?" He says, no. Let me explain it to you.

So, by doing this, in my words, at least in the early part of the war, they were able to get inside their adversary's OODA loop. Or as stated by General [Günther] Blumentritt, I'm quoting him here, his statement, note what he's saying there. And those are his underlines, which is almost like my OODA loop.

Note what he's saying. "Hinged upon rapid"—he underlined it—"concise assessment of the situation." That's orientation. I al-

[73] Gen Alfred M. Gray was serving at this time as the 29th Commandant of the Marine Corps. Gray was a strong proponent of many of Boyd's ideas and regularly invited Boyd to present "Patterns of Conflict" to the previous commands Gray held. Boyd here refers to Gray's role as director of Operation Frequent Wind, America's evacuation of Saigon, South Vietnam, in 1975.

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ready assume the observation. "Quick decision and quick execution." There it is. Orientation, decision, execution. He just left out the word observation. In other words, he's already gotten that through intelligence elsewhere. Those are his words.[74]

And note what he says. "Each minute ahead of the enemy is an advantage." In other words, you're pulling down his socks, rather than him pulling yours down. I found that after, I said, "Isn't that gorgeous."

Let's take a break. I'll give you a five-minute break. We'll come back and go through the rest of the blitzkrieg, and move on. We've taken a lot of time—

[Cross talking; tape stops, then starts again]

[slide 80]

Boyd: *[45:00]* All I'm showing you here is their penetration meth-

[74] Gen Günther Blumentritt, "Experience Gained from the History of War on the Subject of Command Technique," 27 January 1947.

od. Their impression of blitzkrieg penetration. I'm showing you they're zigzagging their way in. Here's the thrust. Sometimes you call them the thrust. And they call this—these are also thrusts. But when they go laterally, I like to call them off-rolling or roll-out.

The basic idea, what you're doing here is your zig—they want a zigzag. They're working strength against weakness and then rolling that and cutting of the guy's lines of communication so he can't defend.

In other words, they're draining away their support, their rear support in that, and their lines of retreat. Not only that, they do it at all levels. You have those thrusts and roll-outs at battalion, at regimental, division. So, you've got thrust inside thrust inside thrust, at all levels there. So, the other guy says, what the hell's going on here?

Now, you see the way they represent the map, these nice, neat arrows going through. Well, that doesn't really work out that way. That's what I'm trying to tell you. Okay? So now lift it up to a higher level. So now we've got, let's say, a higher-level thrust. But inside those, you've got these individual thrusts, you're working a pincer on a guy. And then out of these, more thrusts coming in, generating—

[slide 81]

Basically, what are you doing? You're generating what? What's the key word? I said it earlier? What are you doing when you're doing that? You're generating what? Anybody?

[Cross talking]

Boyd: Noncooperative centers of gravity. What you're doing by doing that, you're slicing in here, and coming in so that he can't function as an organic whole. You're generating those noncooperative centers of gravity, and you're sweeping out the debris then.

[46:20]

[End of tape 3, side 2]

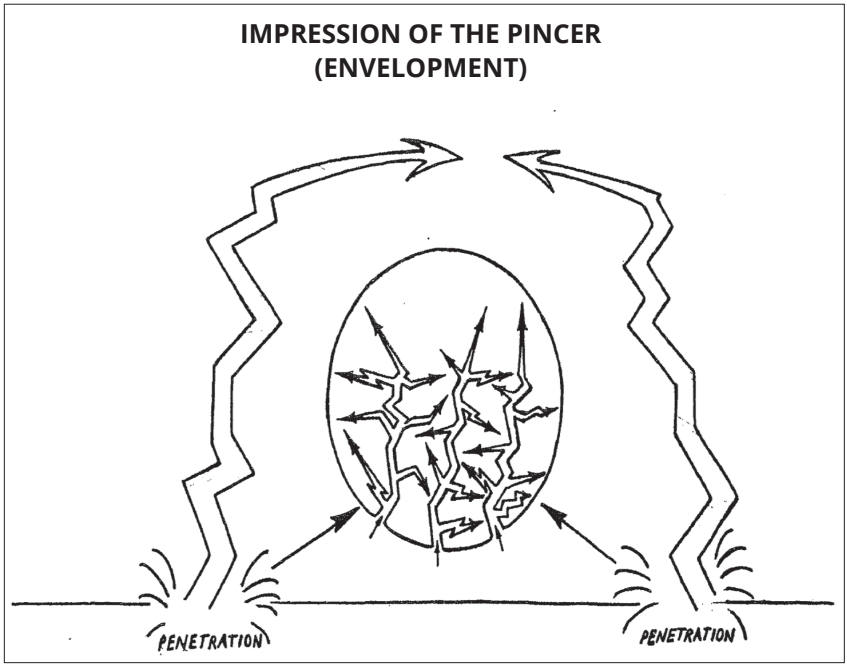
[slide 82]

[*Note: slide 82 falls in the dialogue lost between changing tapes*]

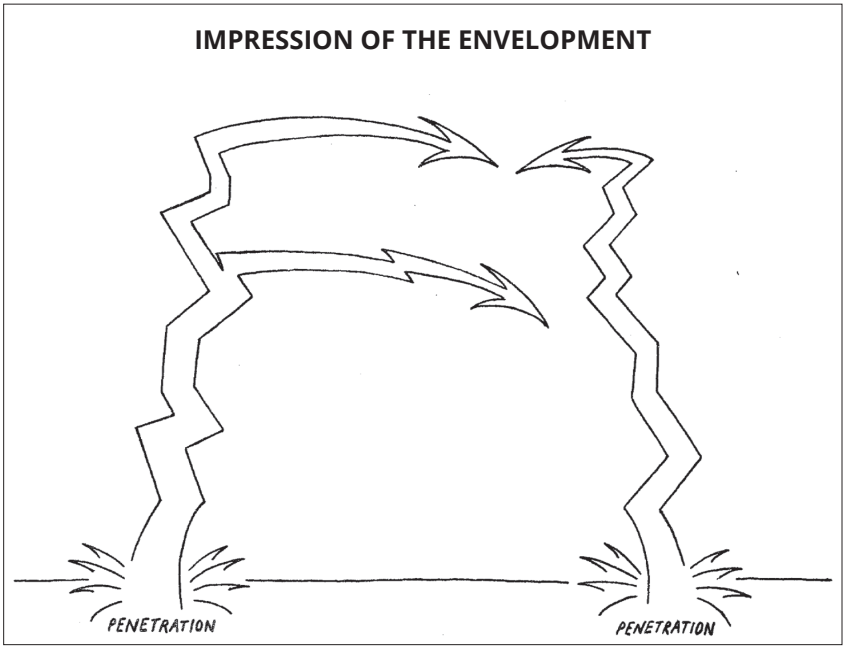
[Begin tape 4, side 1]

Boyd: —start doing things the same way, pretty soon your own troops are not adapting anymore. They start to get fixed mindsets,

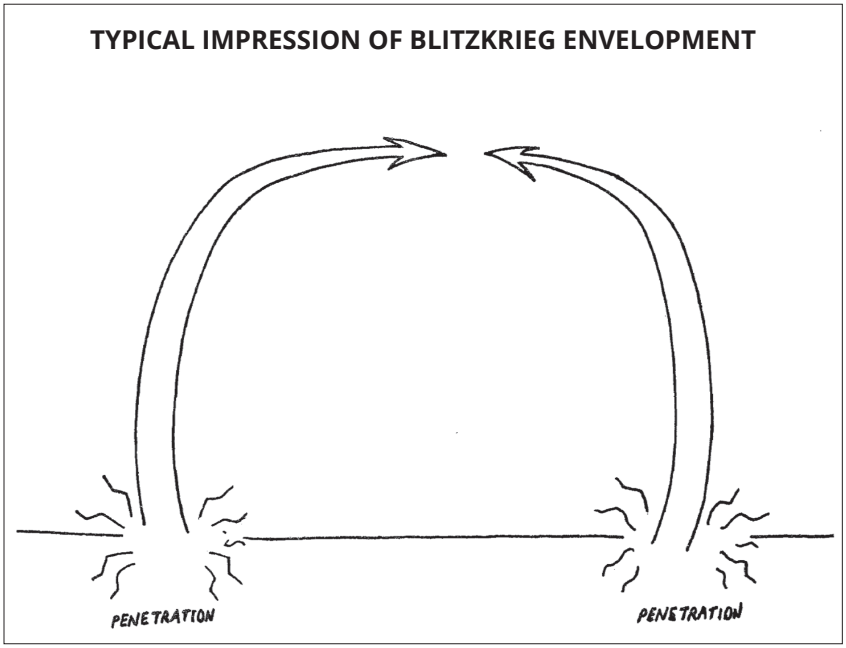
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SLIDE 82



SLIDE 83



they get what the fighter pilot calls tunnel vision. Even if the situation's the same, do it differently. Because otherwise, you're going to become predictable.

[slide 83]

Now, typically we tend to show it like this, but that's nice for a map and all. That's not really what was happening, there were multiples sweeping one way or the other.

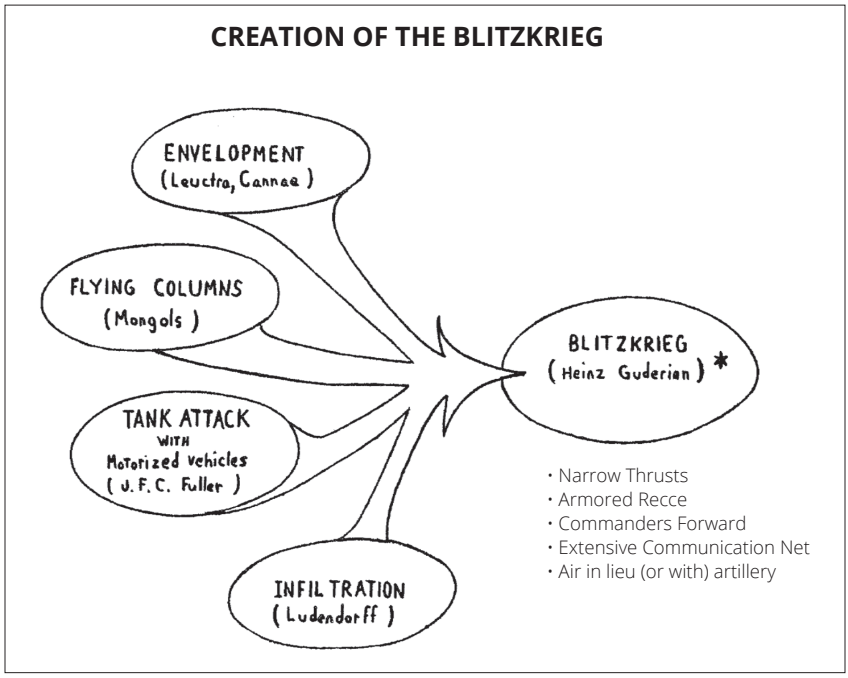
[slide 84]

Okay. So, you look at the creation of blitzkrieg. Here's the kind of things they had: the envelopment, Leuctra/Cannae double/single envelopment, flying column, the tank attack, infiltration. Pull it all together and you've got blitzkrieg a la Heinz Guderian.

Multiple narrow thrusts. I have narrow thrust [unintelligible] Armored recce.[75] Commanders forward. Commanders forward. In other words, they understand what's going on in the battle, under-

[75] *Recce* is a shorthand term for *reconnaissance*.

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stand what's going in the operation, so they can give the right kind of orders and they can adjust to circumstances.

And then extensive communication net. Not extensive communication, the sense of communication net with only what you have to say. And guess what they said to the Panzer [unintelligible] verbal orders only. Not just written orders, verbal orders only.

We asked Balck and the other German commanders, they have all the same reason. One, by giving a verbal order, what are you doing? If you only give a written order, you're really only communicating on one channel. When you give a verbal order, by your own personality, you're communicating on many channels. He really knows what you mean. So, you have a richer communication. That's one reason.

Another reason why, is if you give a written order, the guy might then—you might actually suppress his initiative, because he recognizes if he sort of gets outside that order, he can be court-martialed or something like that. So, you have a verbal order, that doesn't sup-

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?—NATURAL QUESTION—?

Why employ multiple thrusts, bundles of multiple thrusts, or bundles of thrusts inside bundles of thrusts?

press initiative. More bold action. Then you write the orders up afterward. They may not read too honestly but—that's the point.

That's one of the reasons why I like verbal orders. So, you don't suppress initiative. If one guy says well, we fucked up the last time, I'm putting more and more constraints in there, that guy goes outside, I'm going to have him by the balls because I've got a written order. But once a guy knows that, he says, oh, I'm not taking a risk.

You see the subtlety there? So, the verbal orders, it's looser but they have to understand what's going to be done. You also have to understand you have that common outlook. Note the words, verbal orders only.

One guy said well, hell, we saw the written orders. He said, that's right. After the fact. You got to have a good story for the archives. He saw not only that, they read a lot better that way. After the fact. They look more perfect. You know, it's like a Monday morning choir. Air in lieu or with artillery obviously.

[slide 85]

Okay? Now here we're getting down to an actual question. Why do we employ multiple thrusts, bundles of multiple thrusts, or bundles of thrusts inside bundles of thrusts? Now some people say, well, for flank protection. You're really not getting at it. That's true. You get flank protection by doing it.

[slide 86]

But here's the reason why. Because when you have all that stuff thundering through there, you're presenting many simultaneous and sequential happenings to generate confusion and disorder. In other words, the other guy really doesn't understand what's going on, so you stretch out his time to respond to react. He doesn't know

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RESPONSE

- Present many (fast breaking) simultaneous and sequential happenings to generate confusion and disorder—thereby stretch-out time for adversary to respond in a directed fashion.
- Multiply opportunities to uncover, create, and penetrate gaps, exposed flanks, and vulnerable rears.
- Create and multiply opportunities to splinter organism and envelop disconnected remnants thereby dismember adversary thru the tactical, grand tactical, and strategic levels.

what to do. You're stretching out his time. You're stretching out his OODA loop.

Therefore, you're also multiplying your opportunities, to create and penetrate gaps. Remember, you've got multiple thrusts through there. If you've only got one and you happen to hit a strength, it's over. You're done.

If you have multiples going, some are going to get hung up, some leak through, and at that point you start shifting or emphasizing *schwerpunkt* where they're going to go. And the other guys just keep the other guy's attention. Hold them by the nose and kick them in the ass. Well, except you've got multiple hold 'em by the nose and kick 'em in the ass. Not just one. You've got multiples. Hold them by the noses and kick 'em in the asses, you want to use a Patton-esque expression.

That's what you're doing. So, by doing that, what's happened, you're creating multiple opportunities to split apart and envelop disconnected remnants. In other words, you're generating, what, many noncooperative centers of gravity, multiple noncooperative centers of gravity, so they can't function as an organic whole.

And that's the power. That is the power. Go back and read World

War I where Foch tried those massive offenses, everybody grouped together. They went nowhere. Go ahead.

Audience: Well, one question, the maneuver warfare we've been studying all year, *[05:00]* part of it is to enable us to react and to fight a force that is going to be numerically superior than we are going to be. Now what this is telling me, I could be wrong in my perception of how I'm reading this, is that number one, to have all these splinter groups and splinter thrusts you're talking about, we're going to have to have the forces to do that. In other words, we're going to have to have a large force. What if, in fact, you don't have the large force?

Boyd: You can still have multiple thrusts. You're just going to have it projected against only a part of him rather than against a huge part of him. That's all. A good example, what Balck did, and I'll give you a good example. When he was in Hungary in 1944 or '45. I can't remember the year.

Wyly: I think it was '45?

Boyd: I think it was '45. Anyways, that's when they were being pushed back by the Russians. So you can look at the dates. And so that was pointed out for him. They said, well, Christ, one time you have eleven divisions—he was going against Russians. He only had three divisions. And they said, well, Christ, how did you defend?

He says, no way you can defend, Balck said. They said, well, how did you defend? He said I didn't defend. I attacked. Then he rolled up the whole Russian front. He'd come in with multiple thrusts and rolled them up from left to right or right to left, I don't know.

Audience: Even when the—

Boyd: And he was outnumbered better than three to one. And he made the attack. Well, that Clausewitzian bullshit that the defense is a stronger form, that's horseshit. Not only that—

Audience: Van Creveld, in his *Command in War*—[76]

[Cross talking]

Boyd: Not only that is, I don't know if you read Clausewitz, not only that, he even contradicts himself. Because later on, when he talks about the mountains, remember, he says first of all, defense is the stronger form. Then he gets in the mountains, which is rough

[76] Martin van Creveld, *Command in War* (Cambridge, MA: Harvard University Press, 1987).

terrain. Then he says the offense is the stronger form. Well, he's already got a contradiction.

Then he gets in the forest, and he's a little bit more clever. I read that very carefully. He's sort of saying the offense is the stronger form, but he couldn't say it. But what he's really saying then, the offense or defense, whether one's stronger than the other depends upon the situation, whether it be terrain or people and that.

So therefore, if it depends upon the situation, then you say, why do you say it's a stronger form? The stronger form depends upon what's the situation. Whether you're going to use the offense or defense depends upon the situation.

But he didn't say it that way, because he had to have an absolute notion. That's horseshit. Even in his own book, if you read carefully, he's got it wrong. And then he says, act with the utmost concentration, there is no higher principle. Then you go back in book eight, chapter nine, he gives four exceptions. The reason why, is because speed. You want to be fast, and there's no exceptions to speed. Well, if that's the case, then speed is a higher principle than concentration. Once again, another contradiction.

If you don't believe me, get the goddamn, you'll see. It's right there. But see, what he does, he's got a very goddamn heavy logic, and when you go through it and you try to go through his logic in his sense, pretty soon you get sucked into it. You can't think anymore. I found myself doing that. So, I said, okay. Now I've got to think in the outside. Hey, this is horseshit. Contradictions.

Now it doesn't mean he didn't have some good ideas. But I'm saying you can't take that whole thing. Because this crazy notion, that defense is a stronger form, if it is, then how come he says that the offense is stronger in the mountains? And he sort of alludes it's stronger in the forest. Then he makes some other comments in there, well, if the other guys—if you got more morale and the other guy's got less, it also may be the offense may be stronger.

Then you say, well, since the defense isn't the stronger form, then the offense is. But you can't say that either. Which one you're going to use is going to be dependent upon the situation. And in Balck's cases, he said there's no way I can defend with three divisions. I'm going to get cleaned. So he got a surprise attack, cleaned up the attack.

I mean, later on, they rebriefed their forces, pushed them back. But he stopped that whole operation they were setting up against him. So, in that case, defense wasn't the stronger form. His attack or offensive was the stronger form. So don't believe that baloney. Read it carefully.

That's what's wrong with Harry Summers. He read that goddamn Clausewitz. Pretty soon he's got this goddamn prism. He can only go through a Clausewitzian prism. He doesn't understand what's going on in the world.

We won all the battles in Vietnam. He says we won every battle. That's bullshit. We lost the battle on the home front. Wasn't that a battle? He said yeah, that was the most important battle. We had to come home.

So, if you're going to use battle as a measure of merit, be sure you don't just narrowly truncate, it's only for out in the field, there's no other battles. If you're going to use a measure of merit, you've got to be sure that it encompasses all the moral, the mental, and the physical phenomena. Otherwise, it's a horseshit maneuver. I mean, a horseshit measure. So don't let people dazzle you with that crap.

And so, you can see what's happening here. You're generating these many noncooperative centers of gravity, so you pull them apart. Okay, and then, which lead to this. *[10:00]* I'm trying to compress in sort of one chart, the essence of blitzkrieg. Here's the kind of thing you're doing. And the ambiguity, deception, mobility, and you focus that violence to quickly realize these kinds of things.

[slide 87]

And we said the other night, you know, we always talk about it for the people that weren't here last night. We were talking about deception plans. But what about ambiguity?

Wyly: We ought to go back to what you were saying. You were talking about Balck in Hungary and the extreme case there. I'm still thinking of your question. I'm sure Balck was outnumbered. And I'm familiar with that quote too. He said, "I was so outnumbered, I had to attack." That's the way he put it.

Boyd: That's right.

Wyly: But now let's think about the invasion of France. The Germans again were outnumbered. There was no preponderance of

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WHICH LEAD TO:

Essence of Blitzkrieg
Employ a Nebenpunkte/Schwerpunkt maneuver philosophy to generate ambiguity, realize deception, exploit superior mobility, and focus violence as basis to quickly:

- Create many opportunities to penetrate weaknesses in the form of any moral or mental inadequacies as well as any gaps or exposed flanks that open into adversary's vulnerable rear and interior, hence—
- Create and exploit opportunities to repeatedly penetrate adversary organism, at all levels (tactical, grand tactical, and strategic) and in many ways, in order to splinter, envelop, and roll-up/wipe-out isolated remnants, thereby generate confusion and disorder, hence—
- Create and exploit opportunities disrupt his system for communication, cormmand, and support, as well as undermine or seize those connections or centers that he depends upon, thus shake his will or capacity to decisively commit his back-up echelons, operational reserves, and/or strategic reserves, thereby magnify adversary's confusion and disorder and convince him to give up.

Intent
Create grand tactical success then exploit and expand it into strategic success for a decisive victory.

Implication
Blitzers, by being able to infiltrate or penetrate or get inside adversary's system, generate many moral-mental-physical non-cooperative (or isolated) centers of gravity, as well as undermine or seize those centers of gravity adversary depends upon, in order to magnify friction, produce paralysis, and bring about adversary collapse.

forces when they used the same technique or the same thing, the invasion of Russia, or Chinggis Khan.

As Colonel Boyd pointed out, Chinggis Khan was always outnumbered. So—

[Cross talking]

Boyd: And he had multiple thrusts. He was not only outnumbered, Chinggis Khan was not only outnumbered. He had multiple thrusts, and they were spread over areas you can't believe.

Wyly: So, it's the illusion. In fact, it's exactly. Well, think of Ray Smith—[77]

[Cross talking]

Wyly: —on Grenada. His Marines were the smallest force there. Yet, the same Marines were being counted again and again. And I

[77] MajGen Ray Smith commanded Battalion Landing Team 2d Battalion, 8th Marines, as a lieutenant colonel during Operation Urgent Fury, the invasion of Grenada in 1983.

think that's something about multiple thrusts, is they do indeed give the illusion of numbers, of more numbers than there are because you're counting the same—

[Cross talking]

Boyd: You seem to be everywhere but nowhere.

[Cross talking]

Boyd: See, in one sense you're nowhere but you're everywhere and back and forth. The guys are, geez, this is all confusing. Okay. So, the essence of blitzkrieg, you see how it's going. You create many opportunities to penetrate these weaknesses again and again, exploit those opportunities, and in a sense very simple in the implication.

The idea, I don't care whether you want to use *infiltrate, penetrate*, or *get inside his system*. You generate those many moral, mental, physical, noncooperative centers of gravity. And then if you can do that, then you can seize those things that he depends upon.

Those things you depend upon, what is that? We've been saying it yesterday and tonight. What is that? Those are the vulnerabilities, critical vulnerabilities, those things they depend upon. That's vulnerability.

But you've got to be able to pull them down and expose those vulnerabilities before you can get to them. Otherwise, if he knows they're vulnerabilities, he's going to defend against them. If you don't go through his weakness to expose him, you're going to have a tough time.

[slide 88]

Okay? And so here we've got what I call the key to success. I just sort of wrap a lot of things up, or keys may be the better way—

[transparencies shuffling]

[long pause as audience reads slide]

[slide 89]

So, here's some examples, then, of the successful: Poland. When we're talking about advance through France, I'm talking about Patton. Manchuria, the Russians against the Japanese Kwantung Army. The Middle East, the Israelis, Czechoslovakia, the Russians. The Middle East again, the Israelis after they got their act together. They had a little bit of problem at the beginning.

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WORLD WAR II
BLITZKRIEG

Key to Success

- Emphasis on a common outlook and freedom-of-action that are exploited by Mission and Schwerpunkt concepts to fix responsibilities as well as to rapidly shape, focus, and shift operations and support at all levels.
- Flexible command—based on a common outlook and freedom-of-action that are exploited by Mission and Schwerµmkt—that encourages lower-level combat leaders (forward) to exploit opportunities generated by rapid action within a broad loosely woven scheme laid down from central command.
- Intelligence, reconnaissance (air and ground) and stratagem emphasized before and during combat operations to unmask and shape patterns of adversary strengths, weaknesses, moves, and intentions.
- Broad use of Schwerpunkt concept coupled with fast tempo/fluidity-of-action of armored teams and air support permit Blitzers to repeatedly reshape strength and rapidly shift it against, or through, weaknesses thereby generate doubt and uncertainty which magnify into panic and chaos.
- Superior mobile communications to maintain cohesion of overall effort and to enable higher command levels to allocate reserves and support and to reshape as well as shift focus of main effort.
- Essential and only essential logistics tail (using airlift when appropriate and necessary) to support high speed movement and rapid shift among routes of advance.

And then Russia, unsuccessful, winter campaign, fall/winter, North Africa, summer, et cetera. Let me talk to the Fall/Winter campaign 1942/43. What was beginning to happen here? The initial campaign, why was it unsuccessful in a lot of the cases? In fact, I'll go down to the Ardennes.

As time went on, Hitler began to put himself more and more into the operational aspect of the war. In other words, you can see him start interfering in operations. And so, the command structure became more and more rigid and less flexible. So, by the time he got down to the Ardennes here, boy, he was determined how the operation was going to be conducted, not the commanders.

And every German officer I've talked to, I said why did he do that? And they said, very simple reason. He did not trust his commanders, he mistrusted his commanders. Did not trust his commanders. So that's an essential truth.

What I'm saying, all centralized command-and-control systems

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BLITZ RESULTS

Successful
- Poland 1939
- France 1940
- Balkans 1941
- Russia 1941
- North Africa 1941–42
- Russia Summer 1942
- Russia Feb–March 1943
- Advance thru France 1944
- Manchuria 1945
- Middle East 1967
- Czechoslovakia 1968
- Middle East 1973

Unsuccessful
- Russia Winter 1941–42
- Russia Fall, Winter 1942–43
- North Africa 1942
- Russia Summer 1943
- Ardennes Winter 1944–45

are based upon mistrust, not trust. Otherwise, why do you need it? It's based upon mistrust, not trust. *[15:00]* Now I didn't say you shouldn't have it.

Can you think of circumstances where even in spite of that, you definitely want a centralized command and control? And that's when you're dealing with strategic nuclear warfare. Because you don't want some guy flinging off a goddamn weapon. So that is based upon mistrust, and it should be. That's one reason.

In talking to Balck and others, particularly Balck, made it out true. He said there's some other reasons why you want to do that, you might want to have real close guidance. He said, remember, let's pretend you're a division commander.

Let's just imagine you're division commander. He said, you don't get the pick of the litter. You're going to get some choice of people you want. You're also going to have to take some choices you don't want. And the reason why you're going to take them is other people don't want them either. So, you're going to have to be a little bit more careful.

So, the point is, what you want to do is have one kind of orders for one guy, a different kind of orders for the other guy. In other words, you give some people a long leash, more detailed orders for somebody else.

So, instead of having one command and control system, in a sense you have multiple command and control systems so you can maintain that organic wholeness. Now, with our modern electronic communications, how in the hell can you do that? If you depend upon just electronics, you can't.

And that's why they had verbal orders only. Don't you understand? Because you can do it that way. But if you send out a message, then it has to be the same kind of message for everybody. But now when you do it verbal orders only, you can be sure that you're going to tailor your order to the kind of guy you're dealing with. In other words, it's personality related. You're communicating on multiple channels.

And what is that command? You're not even going to be able to do that unless you know your own people. So, if you're sitting back in a chateau somewhere and don't know your own people, you don't know what orders—what different orders you can give to different people to realize your intent.

Some guys, you're going to put on a long leash. In fact, he talked about a couple of those guys. One guy, Christ, he only talked to him maybe once a week. He knew what had to be done. He says, if you have trouble, call me back once in a while and we'll go over it again. Those other guys, he watched them every goddamn day.

But remember, the only way you can do that is if you know your people. And if you don't know them, you can't play that game. Very important. Okay?

[slide 90]

With that in mind, let's get into the guerrilla stuff now. This is my longest chart. I'll let you read that and we'll comment on it. Insurgency, guerrilla, et cetera. Note what I said. Capitalize on discontent and mistrust. Where you got to get those so-called crises in order to leverage the situation. That's your *raison d'etre*, reason for being, if you're a guerrilla.

[long pause as audience reads slide]

It's a damn insidious game, as you can see. And a very successful

SLIDE 90

MODERN GUERRILLA CAMPAIGN

Action

- Capitalize on discontent and mistrust generated by corruption (real or imagined), exploitation, oppression, incompetence, and unwanted presence of existing regime to evolve a common cause or unifying theme as basis to organize and maintain mass popular support through a militant political program.
- Set-up administrative and military organization, sanctuary, and communications network under the control of the guerrilla political leadership without arousing regime's intelligence and security apparatus. Build-up a shadow government, with "parallel hierarchies", in localities and regions that can be made ripe for insurrection/revolution by infiltrating cadres (vanguards) who can not only subvert existing authority but also convert leaders and people to guerrilla cause and organizational way.
- Exploit subversion of government and conversion of people to guerrilla cause to create an alien atmosphere of security and intelligence in order to "blind" regime to guerrilla plans, operations, and organization yet make "visible" regime's strengths, weaknesses, moves, and intentions.
- Shape propaganda, foment civil disorders (such as rallies, demonstrations, strikes, and riots), use selected terrorism, perform sabotage, and exploit resulting misinformation to expand mistrust and sow discord thereby magnify the appearance of corruption, incompetence, etc., and the inability of regime to govern.
- Employ tiny cohesive bands for surprise hit-and-run raids against lines of communications to gain arms and supplies as well as disrupt government communication, coordination, and movement. Retreat and melt into environment when faced by superior police and armed forces.
- Disperse or scatter tiny guerrilla bands to arouse the people (and gain recruits) as well as harass, wear-out, and spread-out government forces while larger bands, or mobile formations, concentrate to wipe-out his dispersed, isolated, and relatively weak fractions by sudden ambush or sneak attack.
- Play upon the grievances and obsessions of people (via propaganda, re-education, and selected successes) as well as encourage government to indiscriminately take harsh reprisal measures against them in order to connect the government with expanding climate of mistrust, discord, and moral disintegration. Simultaneously, show (by contrast) that guerrillas exhibit moral authority, offer competence, and provide desired benefits in order to further erode government influence, gain more recruits, multiply base areas, and increase political infrastructure hence expand guerrilla influence/control over population and countryside.
- Demonstrate disintegration of regime by striking Cheng/Ch'i fashion, with small fluid bands and ever larger mobile formations, to split-up, envelop, and annihilate fractions of major enemy forces.

Idea

- Defeat existing regime politically by showing they have neither the moral right nor demonstrated ability to govern and militarily by continuously using stealth/fast-tempo/fluidity-of-action and cohesion of small bands and larger units in cooperation with political "agitprop" (agitation/propaganda) teams as basis to harass, confuse and ultimately destroy the will or capacity to resist.

game, isn't it? If you've got the right conditions for it. So, what do you observe here? Now you're observing, what, many noncooperative moral, mental, and physical centers of gravity here. If they're imposed upon a government so the government can't function, the regime can't function as an organic whole.

[slide 91]

So, if you want to boil that down, *[20:00]* here's the essence of the whole thing. Here's the intent behind it and the implication associated with it. In order to counter that, you've got to set up sort of a countergame, and that's what the CAP teams were trying to do in Vietnam. And of course, that's not fighting a war with ways—you know, you're not allowed to do "search and destroy" operations there so we got out of that, said, hell, we can't do that "search and destroy" stuff.

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MODERN GUERRILLA CAMPAIGN

Essence
- Capitalize on corruption, injustice, incompetence, etc., (or their appearances) as basis to generate atmosphere of mistrust and discord in order to sever moral bonds that bind people to existing regime.

Simultaneously,

- Share existing burdens with people and work with them to root out and punish corruption, remove injustice, eliminate grievances, etc., as basis to form moral bonds between people and guerrillas in order to bind people to guerrilla philosophy and ideals.

Intent
- Shape and exploit crises environment that permits guerrilla vanguards or cadres to pump-up guerrilla resolve, attract the uncommitted, and drain-away adversary resolve as foundation to replace existing regime with guerrilla regime.

Implication
- Guerrillas, by being able to penetrate the very essence of their adversary's moral-mental-physical being, generate many moral-mental-physical non-cooperative (or isolated) centers of gravity, as well as subvert or seize those centers of gravity that adversary regime must depend upon, in order to magnify friction, produce paralysis, and bring about collapse.

Yet,

- Guerrillas shape or influence moral-mental-physical atmosphere so that potential adversaries, as well as the uncommitted, are drawn toward guerrilla philosophy and are empathetic toward guerrilla success.

How many people here saw the movie *Platoon*, by any chance? It can't just be me. What was the central message that came out of that? There is a central message. What was a big event in there? Remember, it was the attack upon the village. Remember that?[78]

And a lot of Marines and other people get mad. They say well, you shouldn't be showing the American people that. That stuff happened. You can't call these guys murderers. That's true. But it happened. They're not calling them murderers. But what's the whole point of that?

I'm trying to hint and tell you something. We shouldn't be attacking those goddamn villages. We should've been in the villages to

[78] *Platoon*, directed by Oliver Stone, starring Tom Berenger, Willem Dafoe, and Charlie Sheen (Los Angeles, CA: Orion Pictures, 1986).

try to get the other guy to attack it. Then he's the enemy. And that's what the CAP teams tried to do. We worked the problem the wrong way. Exactly the wrong way.

And the initial CAP teams that were sent over there, and the initial Special Forces, were trying to do that. Oh, hell, that takes too long. See, they understood it. You subdue the enemy without any fighting. Make the other guy do it. Then he's the enemy. Then you got the leverage on your side. And Mike can tell you about them guys were over there.

Tell them about that situation, that one time when you were there, what happened, Mike, when they pulled you off that. It's a very important point right now.

Wyly: —1965 and—

Boyd: It's a real important point.

Wyly: We were working on the people and getting a good number of defectors to come in and then using the defectors to go out and get other defectors. And as time went on, we put a message out to the people that—and this came from division and headquarters.

We had authority to tell the people that the Marines were going to stay. Because it was a big question in the people's mind. They used to ask me a lot of times when I'd operate in the villages. I was just a first lieutenant. Are the Marines going to stay here or not? Are y'all going to leave? And I went in to the chief of staff and tried to get in to the general and get an answer. And finally, I was very naive. I was a first lieutenant. They kind of gaffed me off, oh, oh, we're going to stay. We're going to stay here.

So, we put that out in leaflets and by word of mouth, everyone we could, Marines are here to stay. Then we took off and left and went out into the hills to search and destroy—

Boyd: You were ordered to. You didn't want to. You had no choice.

Wyly: That's right. No choice at all. Well, and then we came back again, the families of the people that had been working with me had been assassinated. And we never got any more defectors again. You know, we got zero cooperation.

Boyd: Now you have to attack the villages.

Wyly: And my colonel—when I went back to the colonel and told him what happened, he said, "Lieutenant, you killed them. You killed them. You murdered them. You're the murderer." So I went back and sorted that out for a few years. But that's in a nutshell, a very true story actually. We didn't understand the whole [unintelligible].

Boyd: See Sun Tzu says, subdue the enemy without any fighting. You don't want to go out into the weeds out there. You want to own all the people. And next thing, the other guy has no resource to work with.

Audience: But in order to do that, you're going to have to be willing to enter into protracted warfare, not only the military men but also the civilian population, so you have to—

[Cross talk]

Boyd: That's right. You have to be willing to play the game so you can leverage the game. That's right. Magsaysay understood that. Do we understand? Do we? I don't think so to this day. I'd like to say yes, but if I say yes, I have a feeling I'm telling one hell of a lie.

Audience: Oh, no, I think the military understands, the population doesn't. I don't think the military's willing to do this protracted war.

Boyd: I think a lot of military people are not—I think that we're coming to terms with it, at least some people. But I think as an organic body, I don't think we still—well, look at down in Central America. We still—you know, that's a more recent one. We've still gooned that damn thing. Not that we shouldn't have been there, but the way we go about it.

Wyly: If the alternative is not to do protracted war and lose, okay. Do that. Do it another way and lose. I think we're less willing to lose than do protracted war, if we think it through. Although I'm not saying, I'm not buying onto that protracted war. I think there's some quicker ways to do it.

[Cross talking]

Boyd: I think you can do it rapidly, I think you don't have to have it protracted per se. But it's not going to go at this so-called blitzkrieg pace you want to go at.

Wyly: Yeah, but if the alternative is doing it protracted and having a chance of winning, or doing it fast and losing, that may sound ridiculous but—

Boyd: See Magsaysay did, when he—after he got on board, which I'll get into later on, he wrapped it up in two years.[79]

Audience: Who's that, sir?

Boyd: Magsaysay. Ramon Magsaysay, when he came on board. They were going down the tubes. In two years, he turned the whole thing around.

Wyly: And we had that whole example before us, before we went to Vietnam.

Boyd: It was all there.

Wyly: I studied Magsaysay inside and out as a first lieutenant when I went over there in 1965. *[25:00]* And those examples were there. Combat history examples, problem books and—

Boyd: He did it in two years. You can't say that's real long. It takes a little time. But he turned the whole goddamn thing around. Got in there, got it cleaned out. The guerrillas did it in two years. They were going down the tubes. From defeat to victory in two years.

Wyly: We use that model for our [unintelligible] for setting it up. That was one of the models that we used.

Boyd: Defeat to victory.

Wyly: And the information was out there.

Boyd: It was out there, but you know, that's not those nice European plains. You've got tanks thundering through, personnel carriers, close air support, and all that stuff. That's not our way.

Audience: Where was that, Colonel?

Boyd: Magsaysay, Philippines. So, here's what you're trying to do. You shape and exploit crises and then use this, like we said before, so the implication's very clear. You're trying to penetrate the very essence of the adversary's moral-mental-physical scheme. Generate the many noncooperative centers of gravity. That's the message. Go ahead.

Audience: It's obvious, but it applies to the understanding of the language and culture and religion.

[79] Ramon Magsaysay was serving in the Philippine Army when World War II began. After invading Japanese forces successfully captured the islands and caused the American surrender at Bataan, Magsaysay evaded capture and organized a guerrilla resistance until American forces returned in 1945. In 1950, with the Philippines facing a new insurgency from Communist Hukbalahap guerrillas, Magsaysay was appointed secretary of national defense and led a successful counterinsurgency campaign against them.

Boyd: Precisely. Precisely. How many people read—there's a book out on that where he brings it out very vividly, *Silence Was a Weapon* by Herrington.[80] He pointed that out. It's a very nice book, if you haven't read it. I think it's still out in soft cover. It was about four or five years ago when it came out. It's a damn good book.

And he learned the Vietnamese language, but then he pretended he didn't know it. So, he went over there and pretended he didn't know it. And he was sucking up all kinds of information. So, he took the object.

He learned the things, though. Very few people knew he knew it, and then he would go in these places made out as a dumb American, and he was listening to them. He was sucking up all kinds of information. So, he did a double whammy on them. He said, prove that you're invaluable. It's a very interesting book. He didn't always do that. There's some instances, if you recall, he's playing that kind of a game.

So it's important you understand the culture. We're going to get into that in just a minute. You're onto something. We're going to talk here in just a minute.

[Cross talking]

Audience: That's going to require a long-term investment, I mean— not long-term but handsome investment into the individual—

[Cross talking]

Boyd: Well, goddamn it, don't you want to make that investment? Don't you want to win? Screw it. Oh, no, we're going to do it over the weekend. We're going to win this goddamn war over the weekend.

Audience: I hear you, sir.

Boyd: That's not the American way, is it? Yeah, we've got the weekend to do this. Okay. [slide 92] So, looking back now, I'm going back over the guerrilla campaign, sort of revolutionary strategy, you see what's happened. The underlying parts.

[slide 93]

Here's what it is. I'm going right back to it. The same thing. The sort of the philosophy they're fighting on. They're right. This in conjunction with this. And you see it has a very high moral content, high

[80] Stuart A. Herrington, *Silence Was a Weapon: The Vietnam War in the Villages* (New York: Presidio Press, 1982).

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LOOKING BACK

Now, if we look at the ingredients that make-up Modern Guerrilla Campaigns as well as refer back to our discussion about Soviet Revolutionary Strategy and the Impact of 19th Century Capitalism on Insurrection/ Revolution, we gain some insight into the strategic philosophy that underlies today's guerrilla efforts.

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MODERN GUERRILLA CAMPAIGN

Underlying Strategic Philosophy

- Guerrilla vanguards employ a variety of means to play-upon regimes internal frictions, obsessions, etc., as well as stimulate discontent/mistrust of people. In this way, vanguards sow discord that in turn magnifies regime's internal frictions, obsessions, etc., thereby paralyze its ability to come to grips with crises that further fan atmosphere of mistrust and discord that feed crises—hence push them out-of-control.

Simultaneously,

- Guerrilla vanguards share burden as well as help people cope with turmoil—that vanguards keep fanning and enmesh people into—in order to demonstrate ability to deal with surging crises as well as shape image that only guerrillas offer a way-out of existing unpleasant circumstances.

moral and mental content. That's what I'm trying to tell you. It's not just arms and legs and bodies going in all directions.

[slide 94]

Okay? So, the insight associated with that, now we're coming up on the very point that the sergeant made earlier. The point is, when many perceive an illegitimate inequality, that is when people see themselves as exploited and oppressed for the undeserved en-

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INSIGHT

Insurrection/revolution becomes ripe when many perceive an illegitimate inequality—that is, when the people see themselves as being exploited and oppressed for the undeserved enrichment and betterment of an elite few. This means that the guerrillas not only need an illegitimate inequality but they also need support of the people; otherwise, insurrection/revolution is impossible.

?—Raises Question—?

In the deepest possible sense what does it mean to have support of the people?

richment and betterment of an elite few. In other words, a lot of people are getting screwed, and the other people are taking care of themselves. Let them eat cake. You got the basis for a revolution or insurrection or guerrilla war. A sufficient number of people, that's what I'm talking about.

That doesn't mean the world's equal. But what I call "illegitimate inequality," not only going to need the illegitimate inequality. You also need support of the people. Otherwise, you can't even play the game. It's impossible.

So, it raises a rather important question. In the deepest possible sense, what does it mean to have support of the people? Let's take that on. Now we're coming up with the question and the point that the sergeant made there.

[slide 95]

You must build up those implicit connections and bonds with people in the countryside. In other words, you must be able to blend in with the emotional-cultural-intellectual environment of the people until they become one with the people.

You've become part of the seam, so to speak. Why do you want to do that? Let's just stop right there. Why do you want to do that? What are you doing that for? To show I'm a good guy? No. What are you really doing that for?

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MESSAGE

- Guerrillas must establish implicit connections or bonds with people and countryside.

In other words

- Guerrillas must be able to blend into the emotional-cultural-intellectual environment of people until they become one with the people.

In this sense

- People feelings and thoughts must be guerrilla feeling and thoughts while guerrilla feelings and thoughts become people feelings and thoughts; people aspirations must be guerrillas aspirations while guerrilla aspiration become people aspirations; people goals must be guerrilla goals while guerrilla goals become people goals.

Result

- Guerrillas become indistinguishable from people while government is isolated from people.

Audience: [unintelligible]

Boyd: That's right. You're trying to establish the bonds and build up those bonds of trust so you can work with them and they're on your side, not on the other side. That's exactly right.

And if you're standoffish, if you're living in your culture and they're living in theirs, it's never going to happen. You're a stranger and they're going to treat you like a stranger. *[30:00]* And there's mistrust all the way, period.

And that's why it was so important to have those CAP teams inside the villages, working with the people, building up those bonds, so you can play the game instead of running off doing search and destroy. That's why they should've been in the village instead of attacking the village, like I said in the central scene in that movie *Platoon*.

I looked at that, and I said there it is. That's how we lost— soon as I saw that, I said now I know why we lost. I thought it was beau-

tiful. There's the message why we lost the war. We're attacking the very people we're trying to defend.

So then, in this sense, peoples' feelings and thoughts must be guerrilla feelings and thoughts, et cetera, et cetera, et cetera. And those people who read *Silence Was a Weapon*, didn't Herrington bring that out very clear? I thought he was very clear on that issue. He might not've used exactly these words, but he said that.

The result—incidentally, there's a good book out. I don't think it's any longer in print, but there's a book called *Guerrilla Strategies* by Chaliand.[81] If any of you people can get a copy—anybody read Chaliand's book *Guerrilla Strategies*? Really, it's a first-rate book.

Wyly: It's in the library now.

Boyd: Yeah, it's first-rate. So, the result, the guerrillas become indistinguishable from the people, while the government is isolating from people. That's exactly what happens then. So, the key to success, note that first bullet in the key to success. It's said a special way.

[slide 96]

Ability to continuously demonstrate government weakness and note this: and cause government to alienate itself from the people. We're always saying the people are alienated from the government. That's wrong. The government alienates itself from the people, because of their own incompetence and inability to come to grips with things that they should've come to grips with. They alienate themselves.

I mean, it might help if you added the guerrillas, but nevertheless, they're alienating themselves in a sense. Let's take a look at this. [unintelligible] Mao played the dispersion/concentration game. Cites it all the time. Okay?

[slide 97]

So, guerrilla results, and this is a very truncated list I've put because there's so goddamn many of them. Start with the American Colonies. Here we fought the red coats. Down here we became the red coats [unintelligible]. See here we fought the red coats. Here we became the red coats.

Okay. Here are the Philippines. Now that's another operation

[81] Gerard Chaliand, ed., *Guerrilla Strategies: An Historical Anthology from the Long March to Afghanistan* (Berkeley: University of California Press, 1982).

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MODERN GUERRILLA CAMPAIGN

Key to Success

- Ability to continuously demonstrate government weakness, erode government influence, and cause government to alienate itself from people.
- Support of people (both psychological and physical) for intelligence, recruits, shelter, transportation, refuge, food, money, and medical aid.
- Access to (more or less permanent) safe sanctuaries or base areas and/or fluid bases that can be shifted from place to place, away from enemy forces—in order to rest, recuperate, repair materiel, etc., as well as indoctrinate, train, and equip recruits.
- Use of stealth/fast-tempo/fluidity-of-action coupled with cohesion of guerrilla bands as basis for:
  - dispersion, to arouse people, to avoid adversary strength, and to force government to thin-out, or disperse, its strength;
  - concentration, to hit and wipe-out isolated fractions;
  - shifting of effort (in these as well as other activities), in order to gain and keep initiative.

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GUERRILLA RESULTS

Successful

- American Colonies 1775–81
- Spain 1808–14
- Russia 1812
- German East Africa 1914–18
- Arabia 1916–18
- China 1927–49
- Russia 1941–45
- Yugoslavia 1941–45
- Indochina 1945–54
- Algeria 1954–62
- Cuba 1956–59
- South Vietnam 1958–75

Unsuccessful

- Philippines 1899–1902
- South Africa 1900–02
- Greece 1944–49
- Philippines* 1946–54
- Malaya* 1948–60

*Regime exercised particular care not to inflict casualties and to protect population.

that should've been studied. We started out badly there. We finally figured out the right thing to do, and we were quite successful. There's some good lessons in there. But that happened at the turn of the century. Screw it. It's not important.

South Africa, in a sense I should've probably put that over on this side. Christ, they caused the British all kinds of problems. Not only that, the only way the British could get them to quit is they gave them very favorable terms. Not only that, later on the South Afs got their independence anyway. So, in a sense, they were successful, even though they signed the armistice.

Greece in '44/'45. Philippines, this is won by Magsaysay. He came on board and in two years reversed almost a certain defeat into absolute victory. And we had all that information available to us going into Vietnam. See, but he understood how to fight the guerrillas. Remember, he was a guerrilla himself initially. So, now he became a guerrilla working for the government. So, he turned the tables on them.

Wyly: You know, you really see the same thing in Malaya too. It's misleading. You see all those years there, but it's actually one in the last three or four years. Briggs took over and they turned the tables.[82]

Boyd: When Briggs finally got there, they started turning it around, yeah. Finally, they get their act together. Well, yeah, I showed a lot of years here too, '46 to '54. But it only lasted a couple years.

[Cross talking]

Boyd: Same thing. They finally figured out, hey, there's a way of doing this thing.

Audience: The key for the example of Malaya would be Thailand, was in Southeast Asia, that's the only country the communists completely failed—

Boyd: Say again?

Audience: Thailand, that's the only country the communists failed completely in the last 30 or 40 years [unintelligible].

Boyd: Couldn't pull it off. Couldn't pull it off.

[82] Sir Harold Rawdon Briggs developed a counterinsurgency plan that bore his name as part of the British effort to defeat Communist insurgents in Malaya during the Malayan Emergency of the 1950s.

Audience: Malaysia they were quite successful initially.

Boyd: Initially. But then they were—

Audience: [unintelligible].

Boyd: Yeah, now what's happened—see, not only that, the Philippines, Magsaysay turned it all around, but now they've let it all goddamn fester all over again. Now we've got big problems over there again. *[35:00]* So it's not clear. They still may take over. You know, they blew it. See Marcos and his guys doing the heavy-handed stuff, so now it's all started all over again.[83]

And interestingly enough, you should read the—there's an essay, as a matter of fact, in *Guerrilla Strategies*, about from the Communist side over there, how they lost the Philippines.[84] The whole thing's coming apart. They don't know where to go. Boy, they're being scarfed up so fast by the government. But they don't know where to go because the government's getting the villages on their side, see. So now they're the ones that are being on the run and don't know where to go. It's an interesting story by one of the losers.

[slide 98]

Okay? With that in mind then, let's look at it from a tactical viewpoint here. Remember, in blitzkrieg you're trying to avoid the battle. Guerrillas are trying to avoid the battle. Remember, we say, "If only they'd stand up and fight." They're not going to stand up and fight. They've got a better game to play, and they're going to pull us apart.

Instead, you want to penetrate the adversary to subvert, disrupt, or seize those kind of things that allow him to maintain his cohesion. Whether it be psychological, moral bonds, communications, lines of communication, command and supply centers, et cetera. And exploit ambiguity, deception, mobility, violence, and it generates surprise and shock, again, again, and again.

And wipe out those isolated units that you create. And the intent's very simple. You do this, your intent's a natural consequence, as a matter of fact. It becomes a natural consequence. Okay? Here. I'll skip this one. I'll let you read it on your own. Here, I'm just giving

[83] Boyd is referring to Ferdinand Marcos, president and dictator of the Philippines 1965 to 1986.

[84] William J. Pomeroy, "The Huk Guerrilla Struggle in the Philippines," in *Guerrilla Strategies: An Historical Anthology from the Long March to Afghanistan*, ed. Gérard Chaliand (Berkley: University of California Press, 1982), 88–107.

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BLITZ/GUERRILLA THEME

Essence

- Avoid battles—instead penetrate adversary to subvert, disrupt, or seize those connections, centers, and activities that provide cohesion (e.g., psychological/moral bonds, communications, lines of communication, command and supply centers, . . .).
- Exploit ambiguity, deception, superior mobility, and sudden violence to generate initial surprise and shock followed by surprise and shock again, again, again, . . .
- Roll-up/wipe-out the isolated units or remnants created by the subversion, surprise, shock, disruption, and seizure.

Intent

- Exploit subversion, surprise, shock, disruption, and seizure to generate confusion, disorder, panic, etc., thereby shatter cohesion, paralyze effort, and bring about adversary collapse.

you the Israeli example. The Israeli example of disrupting connections and centers that provide cohesion. [unintelligible].

[slide 99]

[slide 100]

So, key question, why have the blitz and guerrilla tactics been so extraordinarily successful? Let's take that on. These are the kind of things that are going on. They're more indistinct. They're more irregular and quicker in ways we can't seem to see through, because of the way they operate. They can concentrate or disperse, infiltrate or penetrate. So, by operating this way, they're going to get inside their adversaries' OODA loops rather than the other way around.

[slide 101]

You know, a lot of this, at least in the regular war, was uncovered by some of those people who fought in them. I'm trying to show you in those areas where they have the same ideas. Because guerrilla's much more powerful, much more subtle social warfare than blitzkrieg.

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DISRUPT THE CONNECTIONS AND CENTERS THAT PROVIDE COHESION

Israeli example (a'la Gen. Y. Yadin—1949)

"To exploit the principles of war for our purpose and base ourselves upon (the) strategic indirect approach, so as to determine the issue of the fighting even before fighting has begun, it is necessary to achieve the three following aims:

(a) to cut the enemy's lines of communications, thus paralyzing his physical build-up;

(b) to seal him off from his lines of retreat, thus undermining the enemy's will and destroying his morale;

(c) to hit his centers of administration and disrupt his communications, thus severing the link between his brain and limbs."

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?—KEY QUESTION—?

Why have Blitz and Guerrilla tactics been so extraordinarily successful?

How many people have read Clausewitz? Anybody here? Anybody read at least book one, chapter one of Clausewitz? Let me make a point with that. In fact, chapter one of book one's considered the only chapter that was complete. The rest of them he hadn't revised.

And on the very last page, he says you divide a government up into three components. Excuse me, society into three components. The government, the armed forces, and the people. He says you can

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MESSAGE

- Blitz and Guerrillas, by being able to operate in a directed, yet more indistinct, more irregular, and quicker manner than their adversaries, can:
  - Repeatedly concentrate or disperse more inconspicuously and/or more quickly from or to lower levels of distinction (organizational, operational, and environmental) without losing internal harmony, as well as,
  - Repeatedly and unexpectedly infiltrate or penetrate adversaries' vulnerabilities and weaknesses in order to splinter, isolate or envelop, and overwhelm disconnected remnants of adversary organism.

or put another way

- Blitz and Guerrillas, by operating in a directed, yet more indistinct, more irregular, and quicker manner, operate inside their adversaries' observation-orientation-decision-action loops or get inside their mind-time-space as basis to penetrate the moral-mental-physical being of their adversaries in order to pull them apart, and bring about their collapse.

UNDERLYING IDEA

- Such amorphous, lethal, and unpredictable activity by Blitz and Guerrillas make them appear awesome and unstoppable which altogether produce uncertainty, doubt, mistrust, confusion, disorder, fear, panic, . . . and ultimately collapse—a notion implied by Sun Tzu around 400 B.C. and more recently by J.F.C. Fuller after observing the impact of Ludendorff's infiltration tactics in 1918.

do that. The government, the way he said it, was responsible for the policy; the armed forces, the security of the nation; and the people to provide the necessary support.

Let's think about it. Just hold that. We're going to appeal that paradigm. Let's put that in our mind. Now let's talk about a *coup d'état*. In a *coup d'état*, what are you doing? All you're doing is you're working against the regime or the government, not the armed forces or the people.

Now let's talk about conventional warfare like blitzkrieg. We're working against the armed forces and also the government, but the people are sort of the background.

Now, let's talk about guerrilla warfare. What are you doing? Now you're trying to capture the people onto your side. And since that's a support base for both the army or the military and the government, they're just useless overhead now. They have nothing to run. Wither away.

Now whether Mao fought it that way or not, he was doing the

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?—NATURAL QUESTIONS—?

- How can we defend against or counter the Blitz?
- How can we defend against or counter the Guerrilla Movement?

right thing. Because without the people, you have nothing to run. You have no armed forces to—you have nothing to defend. It withers away.

Not only that, the armed force and the government are made up of the people, so the whole thing just dies away. It crumbles. And that's why I say since it was a whole social fabric, it's a greater totality of war than either blitzkrieg or other kind. Because you've got the whole social fabric of society involved.

[slide 102]

Okay? Now let's turn the argument around. *[40:00]* Incidentally, that should be, "defend against or counter." That word "of," my daughter when she typed put an "f" instead of an "r" [unintelligible]. In any case, first the blitz and then the guerrilla. Remember, we showed you this chart earlier on.

[slide 103]

We showed you all this irregular activity. And then a point that I made earlier on, which I called a key point here.

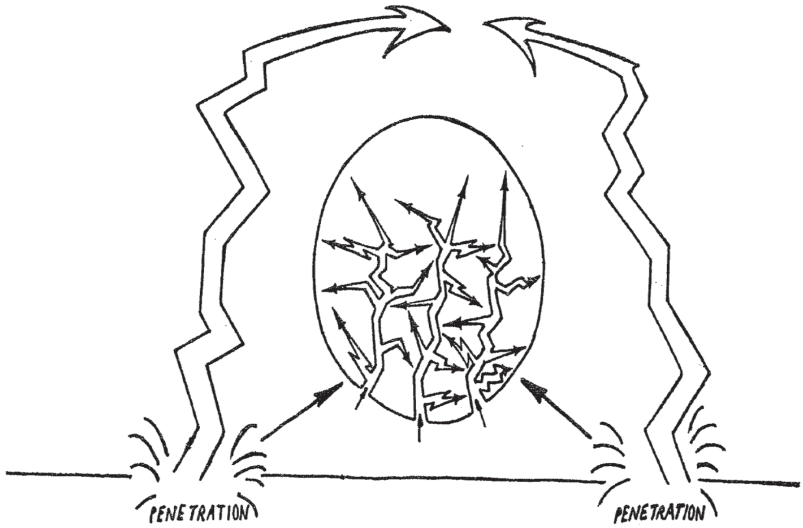
[slide 104]

I might not've said it exactly the same way, but basically the same kind of thing.

Remember, it's difficult to sustain both fast tempo and maintain cohesion of the force to repeatedly and rapidly shift concentration of strength against weakness. So, in a sense, a blitzkrieg has a hard time holding itself together too. So, you should work on it. You could play a countergame there. So, I'll let you read this and then I'll comment on it, see what's going on here.

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WHERE ARE THE WEAKNESSES OF THE BLITZ?



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KEY POINT

Difficult to sustain fast-tempo and maintain cohesion of Blitz effort when forced to repeatedly and rapidly shift concentration of strength against weakness.

[slide 105]

You see, now since we've built up a repertoire, now we can go through and exploit the ideas we've built up along the way. That's what I'm doing now. We can move more rapidly for exploiting.

[long pause as audience reads slide]

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COUNTER-BLITZ
(Variation of German Experiences During WWII)

Posture
- Emphasize intelligence, reconnaissance (air and ground) and set-up screen of forward outposts and patrols to report on adversary activity and warn of any impending or actual incursions.
- Deploy, disperse, and frequently redeploy/redisperse reconnaissance and mobile antitank/infantry/armored teams together with artillery in region behind screen, so that they can mask dispositions, as well as move inconspicuously/quickly to focus and shift local main efforts against adversary thrusts.
- Place armored teams, as mobile reserve, in echelon behind recce, anti-tank/infantry/armor and artillery so that they can easily focus effort, and quickly move-in to decapitate any local breakthrough—or push-off for a Blitz counterstroke.

Action
- Employ air and fast moving mobile/armored reconnaissance teams to determine direction/strength of thrusts and to continuously harass by repeated delaying actions and hit-and-run attacks in order to slow momentum and erode cohesion of Blitz attack.
- Inconspicuously move-in with high speed mobile anti-tank/infantry/armored teams, together with air and artillery support, to strengthen favorable sectors. Hit adversary thrusts and resupply efforts with ambuscades and with repeated sudden/sharp flank and rear counter-thrusts to channel as well as drain-away momentum and break-up cohesion of Blitz thrusts.
- Concentrate swift armored combat forces (held in reserve) and use with air to rapidly drive a shallow and/or deep flank counterstroke in order to swing in behind and roll-up Blitz offensive in detail (counterstroke launched while adversary is moving forward).

Idea
- Smash Blitz offensive by inconspicuously using fast-tempo/fluidity-of-action and cohesion of counter-Blitz combat teams as basis for shifting of forces and quick focus of air and ground effort to throttle momentum, shatter cohesion, and envelop Blitz in order to destroy adversary's capacity to resist.

Let's go to the posture. First of all, you want to depend upon your intelligence, your reconnaissance, et cetera. In other words, you're trying to get as much information from many different sources about your enemy.

Then set yourself up in depth. First screen behind there, you want this one, behind that, this one. You want to set yourself up in depth so you can adjust to the circumstance. And note this, deploy, disperse, freely redeploy and redisperse. Why do you want to redeploy and redisperse? Anybody?

Audience: Keep them off balance.

Boyd: Because if you keep your units the same thing, they're going to know. You're going to become predictable. So, you want to keep changing it, so you give the guy a real—he can't figure out what's going on. In other words, you want to build up his uncertainty

so he can't cope with what's going on. That's what you're trying to do.

At the same time, when you do that, though, you want to set up such that you can still easily focus your own main efforts to dig into those thrusts when they're coming into you, preferably from a flank or rear, not head on.

Have reserves. Why do you want strong reserves? I can give you three reasons, two of which Clausewitz had. One, reserves are used for what? To deal with uncertainty, unforeseen events. You don't know exactly what's going to happen, so it gives you a base for dealing with something unpredictable. To adjust to unforeseen events, that's the reserves. That's one reason.

Two, to sustain or prolong operations. Without reserves, you're going to wear your people out. And that's why you want to reconstitute reserves all the time.

And there's a third reason. Clausewitz had two of them, but there's a third reason. Can anybody guess what the third one is?

Audience: To support that area where you would penetrate the weakness.

Boyd: Yeah, that's all right, but I'm going to give a more fundamental reason, a sort of higher-level reason. That's all right. Anybody want to try?

Audience: To exploit success.

Boyd: Yeah, you're sort of right, but what I'm trying to say is, your adversary doesn't know how you're going to use the reserves, so you generate uncertainty in his mind too. Remember, you use the reserves in order to generate uncertainty that is relative to him, also to prolong operations.

Since he doesn't know exactly how you're going to use your reserves, you build up uncertainty in his mind too. So, three reasons. For you to deal with it, also to build it up in him. Because it allows, it's very important.

When you look at the German operation, you talk about it all the time. And then, of course, your action. Don't get put in the bag. Start using your screening assets, your recce assets to find out what the hell's going on. You get a picture of what's going on. And then you can start moving your troops into those regions, so you can start hitting them from the local flanks and the rear, start digging into them.

But if they have a lot of forces going through, they're still going

to blow through. And that's why you've got the reserves back here. So, then you can have an arching swift counterstroke and really cut them up, roll them up in the flank and rear.

In other words, you've got multiple thrusts going into them like they're coming into you. So, you're building up their problem also. Then the idea is very simple.

So, what are you really doing here? Think about it. What are you really doing here?

Audience: Conducting your own blitz.

Boyd: It's a reverse blitz. That's all. That's right. In fact, that's what Balck said. He said all you're doing is you're just—you don't defend. You counterattack. It's a reverse blitz. It's a reverse blitz. Look at Manstein's operations in *Lost Victories*, *[45:00]* he's doing a reverse blitz, sucking them in and doing reverse blitzes on them all the time, when he could, when Hitler permitted him.

So was Balck on the eastern front. How many people here read *Panzer Battles*?[85] Read about old Balck on the Chir River and all that area, how he was doing all that stuff outnumbered? So, it's sort of reverse blitz.

Notice I didn't say counterblitz. I'm not going to defend. No, let the other guy defend. I'm going to attack. I don't like the word defend. I like initiative and response. Initiative and response, not defend. Let him defend.

You may be going backwards, I'm not defending. I'm taking initiative so I can bag that son of a bitch. You understand what I'm saying?

Audience: It's like when you box, you see him move and you hit him in the shoulder. And that stops, that negates his punch.

Boyd: Well, you've got thrust and parry. But that's—you're setting up a thrust.

Audience: You're not blocking his punch. You're hitting him in the shoulder that's stopping him.

Boyd: I understand.

Audience: Hit him right where—

[slide 106]

Boyd: Okay? Now look at this, blitz and counterblitz, main fea-

[85] MajGen F. W. Von Mellenthin, *Panzer Battles: A Study of the Employment of Armor in the Second World War* (New York: Ballantine Books, 1956).

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BLITZ AND COUNTER-BLITZ

Main Features and Emphasis
- Intelligence and recce action
- Infiltration/penetration and isolation
- Ambiguity, deception, speed, and violence to generate surprise and shock
- Mission/Schwerpunkt philosophy
- Acceptance of "gaps" and (related) "risks" in support of mission/schwerpunkt philosophy
- Echelon-in-depth (offense and defense)
- Reserves reconstituted and accumulated (at all levels) to support or generate success
- Posture of positions, alternative positions, dummy positions and roving positions to mask maneuvers and intentions

tures. Heavy intelligence and recce action. Infiltration/penetration or penetration/isolation. You penetrate. You isolate. And then you subdue—

[46:39]

[End of tape 4, side 1]

[Begin tape 4, side 2]

Boyd: —Generate surprise, mission/*schwerpunkt* philosophy, acceptance of gaps and risk. In fact, they don't regard them as "gaps" and "risks." They regard them as "avenues" and "opportunities." It's only a gap and risk if you're not confident. If you're setting things up, then it's an avenue and opportunity. Let him come through and cut him to ribbons. It is a risk if you think it is a risk. It is a gap if you think it's a gap. But if you think it's an avenue, it's an opportunity to hose the guy. It's a mental, it's a mindset problem. That's why I've got quotes around gaps and risks. Think of gaps as an avenue, and risks as an opportunity.

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GUERRILLA/COUNTER-GUERRILLA CAMPAIGNS

Key Points

- Guerrilla vanguards need cause and support of people that is dependent upon regime's unwillingness/inability to come to grips with crises of its own making.

or more simply

- Crises and vanguards represent the marriage of instability and initiative that create and expand guerrilla effort.

hence

- The thought occurs that in order to dry-up a guerrilla upsurge one should strike at those root causes or illegitimate inequalities that generate and exacerbate crises as well as provide a favorable climate for vanguards to form or operate in.

Echelon-in-depth. Always echelon-in-depth because that gives you a basis to adjust. If you got everybody up forward, they get behind you, and Christ, you lose your whole force. Reserve—keep reconstituting, setting up all the time. Only use what you have to. Keep reconstituting your reserves, because that gives you the basis for adjusting in the future, generating uncertainty in his mind and dealing with uncertainty. And then your positions that we talked about before. Keep changing though, so that the guy you're presenting, a very ambiguous, deceptive, or uncertain picture. He can't understand what you're up to. Makes it very—he doesn't know how to deal with you. See, when a guy can sand-table you, that means you're predictable. You heard [unintelligible]. You want to make it so he can never sand-table you.

[slide 107]

Okay, with that in mind, let's go on to look at guerrilla/counter-guerrilla. Some key points here. Remember, they need a cause, sup-

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COUNTER-GUERRILLA CAMPAIGN

Action

- Undermine guerrilla cause and destroy their cohesion by demonstrating integrity and competence of government to represent and serve needs of people—rather than exploit and impoverish them for the benefit of a greedy elite.*
- Take political initiative to root out and visibly punish corruption. Select new leaders with recognized competence as well as popular appeal. Ensure that they deliver justice, eliminate grievances and connect government with grass roots.*
- Infiltrate guerrilla movement as well as employ population for intelligence about guerrilla plans, operations, and organization.
- Seal-off guerrilla regions from outside world by diplomatic, psychological, and various other activities that strip-away potential allies as well as by disrupting or straddling communications that connect these regions with outside world.
- Deploy administrative talent, police, and counter-guerrilla teams into affected localities and regions to: inhibit guerrilla communication, coordination and movement; minimize guerrilla contact with local inhabitants; isolate their ruling cadres; and destroy their infrastructure.
- Exploit presence of above teams to build-up local government as well as recruit militia for local and regional security in order to protect people from the persuasion and coercion efforts of the guerrilla cadres and their fighting units.
- Use special teams in a complementary effort to penetrate guerrilla controlled regions. Employ (guerrillas' own) tactics of reconnaissance, infiltration, surprise hit-and-run, and sudden ambush to: keep roving bands off-balance, make base areas untenable, and disrupt communication with outside world.
- Expand these complementary security/penetration efforts into affected region after affected region in order to undermine, collapse, and replace guerrilla influence with government influence and control.
- Visibly link these efforts with local political/economic/social reform in order to connect central government with hopes and needs of people, thereby gain their support and confirm government legitimacy.

Idea

- Break guerrillas' moral-mental-physical hold over the population, destroy their cohesion, and bring about their collapse via political initiative that demonstrates moral legitimacy and vitality of government and by relentless military operations that emphasize stealth/fast-tempo/fluidity-of-action and cohesion of overall effort.

* If you cannot realize such a political program, you might consider changing sides!

port of the people, and a crisis that's really of the government's own making. What I'm saying, crisis and vanguard represent the marriage of instability and initiative that create and expand guerrilla effort. Hence, events occur, if that's the case, those are the root causes, we should be going after that in the counterguerrilla. That's what we should be going after. Not search and destroy.

[slide 108]

Okay, so look at the counterguerrilla campaign. Pretty busy chart in one chart. That's the kind of things we should have been doing. You might see my bullet down here, I've got an asterisk at the bottom [laughter]. You've got my asterisk. If you can't do it, you better start getting on the other side, otherwise life's going to get goddamn uncomfortable pretty soon. So, you better get with the program, is what I'm trying to tell you. Why lose? It's more fun to win, huh?

Note what we're doing. These two bullets are the most important because it really sets up everything else, doesn't it? These two

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NOTE

We have indicated again and again the importance of popular support for guerrilla or counter-guerrilla success. Why?

INSIGHT

Without support of people the guerrillas (or counter-guerrillas) have neither a vast hidden intelligence network nor an invisible security apparatus that permits them to "see" into adversary operations yet "blinds" adversary to their own operations.

are very important. That's what Magsaysay understood. It sets up everything else, and then you can play the game. If you don't get that right, you don't even get to play a lot of this stuff. That's why the first two are very important. That sets up the rest. Instead, we start operating down at this level and don't pay attention, and then it goes on, and on, and on. We'll never get there. The ideas are actually very simple, but for some reason we resist the goddamn thing. I mean really, the ideas are very simple. Maybe that's why we don't like them. They're not sophisticated enough or something. I don't know.

[slide 109]

You can see they're very simple. They're very useful. I have a little note directed to this. Remember, we said importance of popular support, and the reason was because that's a lot of basis for your intelligence. In other words, in a sense, when you get the people on your side, the government is blind. Or if you're the government, you can get them sucked away from the guerrillas and the guerrillas will become blind, they don't know what's going on. Just don't think of formal intelligence operations associated with the military. The people are going to give you enormous intelligence, if you exploit it and take advantage of it.

[05:00] In fact, there was an interesting case during World War II, which got me on to this, to see that so beautifully. I saw it. Really get inside and get the *fingerspitzengefühl* for it. I can't remember what book I read it in, but it was very interesting story. It was an histori-

cal account of an American advisor. I believe—it might have been a Marine, I'm not sure. But with the Chinese Communists, 8th Group Army over in China, either prior or during World War II. I think it was prior to World War II.

And they were going against the Chinese Nationalists. No, it was against the Japanese at that time. And it's really interesting. So, the Communist commander said, "I want you to look at my operation and critique it so you can tell me what I'm doing wrong." The advisor has free access, he came back and says, Jesus Christ, you know, no patrols, no recce, you know, that's bullshit. You've got to get those guys out there. And the communist commander just smiled. He says, no we don't need that recce. The guy says why not? He says, we get all the people out there, they're all recce, we know exactly what those other people are doing. That was his intelligence, recce, all the people. He said, I don't have to use my troops for that. We got it all, all those people are doing it. That means they really understood the intelligence/recce operation. They got all kinds of things [unintelligible]. The guy goes, that's really interesting.

[slide 110]

[slide 111]

Very important. I'm not saying you should dispense with it, but he's trying to make a point, he had that. Okay, let's get into categories of conflict. We've gone through all this stuff, and now we can start wrapping some things up here. Okay, recall in the beginning, as we've gone through this historical study, we can divide it up three ways. Another three ways you can divide them: attrition warfare, maneuver conflict, and moral. These are not exhaustive examples. It's just some interesting examples. Attrition warfare as practiced by people in maneuver conflict. And note we're talking about attrition warfare as practiced by the Emperor Napoléon and maneuver conflict by the general Bonaparte. Plus Stonewall Jackson, Grant, Hitler's generals, and Americans under Patton and MacArthur. A little differently, Patton primarily in the tactical or operational sense, MacArthur primarily, we'd call it strategic sense, and in that sense, they operated at different levels but they were doing it. And then moral conflict, practiced by the Mongols and most guerrilla leaders. And a very few counterguerrillas. Magsaysay would be one.

[slide 112]

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CATEGORIES OF CONFLICT

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CATEGORIES OF CONFLICT

- Now looking back and reflecting upon the panorama of military history we can imagine three kinds of human conflict:
  - Attrition Warfare—as practiced by the Emperor Napoleon, by all sides during the 19th century and during World War I, by the Allies during World War II, and by present-day nuclear planners.
  - Maneuver Conflict—as practiced by the Mongols, General Bonaparte, Confederate General Stonewall Jackson, Union General Ulysses S. Grant, Hitler's Generals (in particular Manstein, Guderian, Balck, Rommel) and the Americans under Generals Patton and MacArthur.
  - Moral Conflict—as practiced by the Mongols, most Guerrilla Leaders, a very few Counter-Guerrillas (such as Magsaysay) and certain others from Sun Tzu to the present.
- With these comments in mind let's look into the essentials of each.

Now, let's examine those in order. First, some attrition observations. Firepower as a destructive force is king. You really want to build up the body count and smash all those targets out there. That's king, everything else is subordinate to firepower. Protection. Whether it be trenches, armor, dispersion, it's used to weaken or dilute the

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ATTRITION OBSERVATIONS

- Firepower, as a destructive force, is king.
- Protection (trenches, armor, dispersion, etc.) is used to weaken or dilute effects of enemy firepower.
- Mobility is used to bring firepower to bear or to evade enemy fire.
- Measures of success are (now) "body count" and targets destroyed.
- Seize and hold terrain objectives replaces Napoleon's dictum: Destroy enemy army.

effects of enemy fire power. Mobility—to bring firepower to bear or evade enemy firepower. Measures of success are now body count and targets destroyed. Not only that, pretty soon you start getting interested in terrain objectives. Violating Napoléon's dictum, destroy enemy army. You want to take out the force. Okay, if we pull all that together, you can get an idea of the essence of attrition warfare.

[slide 113]

Destructive force. Whether it be weapons, mechanical, chemical, et cetera. To kill, maim, or otherwise generate widespread destruction. Protection. To minimize the enemy doing the same thing to you. And mobility, either to bring it to bear or move away from your adversaries. The payoff: break the enemy's will to resist. Remember, those have been used words. Seize and hold terrain. And compel enemy to surrender and sue for peace. We haven't said that many times, you know, they've got to show up. If they don't show up, it's not so good. What kind of image do you get out of that, anybody?

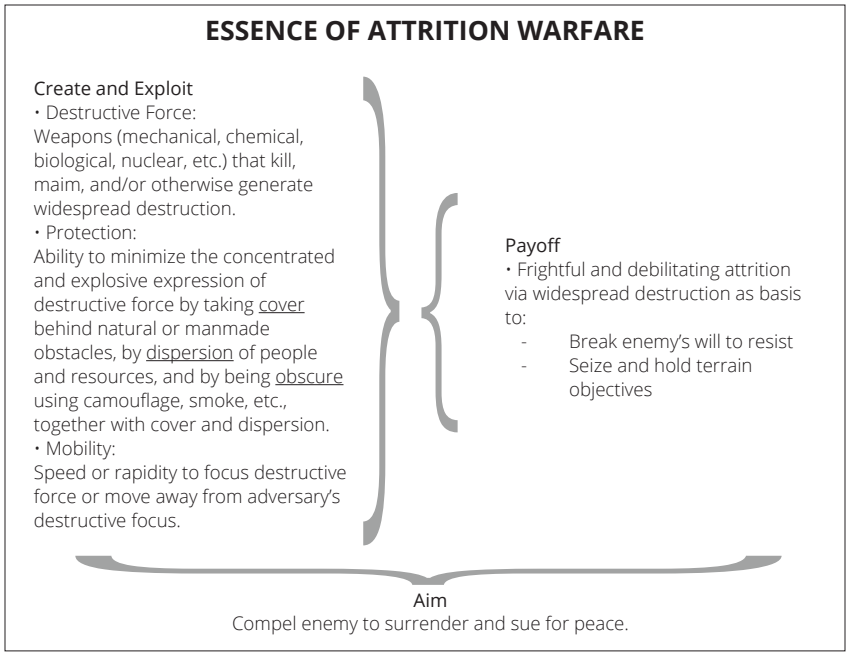
Audience: Futile. Sledgehammer.

Boyd: That's not a bad one.

Audience: Self-defeating.

Boyd: That's another one. But what I'm trying to tell you— if you look at this, there's not much moral or mental content. It's high phys-

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ical content. Remember, we talked about the different levels, moral, mental, and physical? This just has a physical dimension. You're not playing the moral and mental. In fact, you might be playing the moral and mental dimension against yourself by doing that. You're really—your emphasis on the physical content. You're not playing the moral or mental content.

[slide 114]

Okay, now let's go on to maneuver. Observations regarding maneuver. We do these kinds of things, ambiguity, deception, novelty, mobility, et cetera, to generate surprise and shock. Fire and movement used in combination. People think maneuver's just movement. No. It's fire and movement, using it in combination. Like *cheng*/*ch'i*. Tie up, divert, or drain away, the idea is to generate, expose his vulnerabilities and get at those weaknesses. Okay?

[10:00] The indication of success is no longer quantitative but qualitative. Any phenomena that suggests inability to adapt to change. In fact, Guderian, going through France, he said, now's the

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OBSERVATIONS REGARDING MANEUVER

- Ambiguity, deception, novelty, mobility, and violence (or threat thereof) are used to generate surprise and shock.
- Fire and movement are used in combination, like Cheng/Ch'i or Nebenpunkte/Schwerpunkt, to tie-up, divert, or drain-away adversary attention and strength in order to expose as well as menace and exploit vulnerabilities or weaknesses elsewhere.
- Indications of success tend to be qualitative and are related to the widespread onset of confusion and disorder, frequent envelopments, high prisoner counts, or any other phenomena that suggests inability to adapt to change.

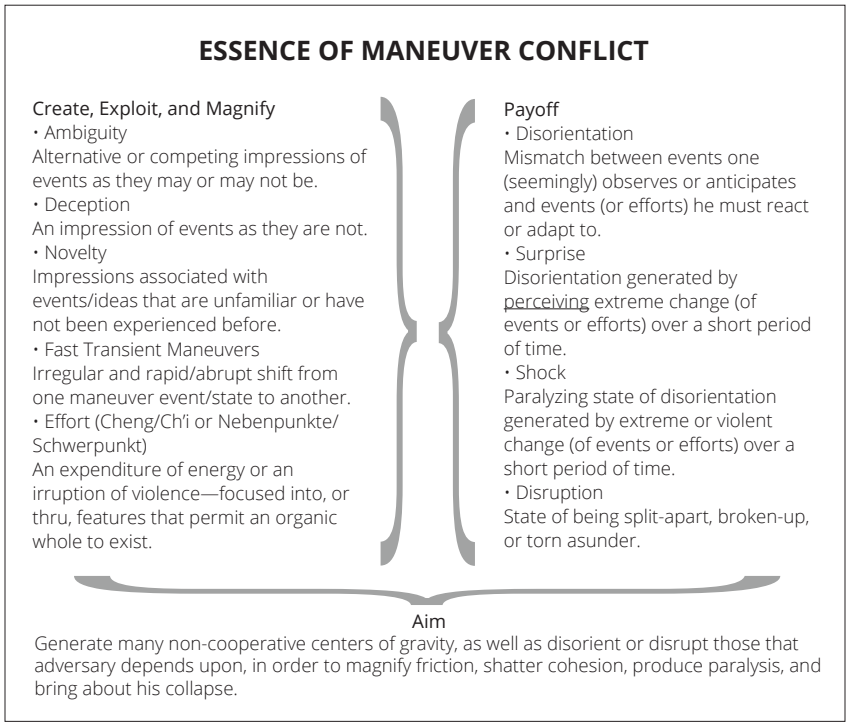
time to go for it. The French Army is falling apart. Tells his commanders, just go for it. In other words, you just sensed it. Just like you can sense in a basketball game, when the other team is falling apart and the other guy is scoring. What's the first thing the guys do? Tim, boy, we got to get our act back together. You can't measure that.

[slide 115]

Okay, so then, if we paste all that together, here's the essence of that. You want to generate alternative or competing events in a guy's mind, as many as possible. He can't figure out what the hell is going on. That's ambiguity, because they may or may not be. You're trying to generate is mental confusion and disorder so he can't cope with unfolding circumstances. That's what ambiguity is. Deception, an impression of events as they are not. Really a neat picture, only it's a wrong picture of what's going on. Let's juxtapose them. If you look at ambiguity, it's easier to generate than deception. In other words, you can generate confusion and disorder more rapidly than you generate an order, even though it's a false order. It takes longer to generate a deception over ambiguity.

Ambiguity is also less risky than a deception. Less risky. That doesn't mean you shouldn't have a deception. In Normandy—the

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Normandy case is a good example, because if you can realize it, you get enormous leverage out of deception. But remember, it's riskier and it takes longer. We really didn't understand that during World War II. In fact, I don't think many of us understand it to this day.

Let me give you an example. Operation Torch, the invasion of North Africa. We set up a big deception campaign. We virtually got on Scot-free but hit some problems later on after we drive in on it. We got in there, got a free ride in, in a sense. But then after they looked at it, they ran a critique on it, and the deception masters had to admit that the deception campaign didn't succeed. Instead, they said it was a success of security. Well, when you read into it—Christ, the Germans didn't know what we were going to do. They had all—we created all kinds of impressions, so it was a success of ambiguity. That's what it was. And Normandy is the opposite case. We had a lot of time to set that thing up. Lots of time.

So, we created in the German mindset the idea that we were going to come in the Pas-de-Calais area, and even after we landed at Normandy, we kept up the deception, so they think it was only a secondary effort. And they still had that for over thirty days in their mind, while our whole effort was in Normandy. It was Normandy. Which is an extraordinary deception. In other words, they didn't stop it once we got there, they kept going all the time, thinking we were still going to land.

And to show you we didn't understand it, once again in Italy, they said how come we couldn't get a deception to work there? We didn't have time. Christ, we were exploiting an existing situation after Sicily, going to Italy, and that's the advantage of an ambiguity. You don't need a lot of time. Deception takes a lot of time to set up.

And that's what blitzkrieg does. Once you may have an initial deception, but once you start riding, you're riding on what? You're riding on ambiguity, not on deception. You can't stop the operations to set up a new deception. You ride on ambiguity when you're exploiting an existing situation.

And another thing, novelty. That's one thing technology gives you, are new ideas. In other words, create situations the guy's never been aware of before. He didn't know what to do. He's never experienced it before. Whether it's technology, whether you've got a new wrinkle in how to set up an operation, or whatever. You face a novel situation, can't cope.

And then fast transient maneuvers. Not only rapid, but also irregular and rapid, so he can't get an image of what's going on. And your effort, directly against those features that permit him to retain his organic wholeness.

So, if you pull all those together, what's your payoff? You're deliberately trying to generate a disorientation in his mind, mismatch between what he anticipates and that which he must react to, to survive. A mismatch. Now if you think about that, you can redefine surprise. Surprise is nothing more than a disorientation. It doesn't say that, but that's what it is. You can get it either from ambiguity, deception, or any combination. It may take a long period of time, but generally it's a disorientation generated by perceiving an extreme change. It doesn't mean it happened over a short period of time, but you perceived it. All of a sudden you say, my God, what happened? It

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NOTE

Surprise and Shock can also be represented as an overload beyond one's immediate ability to respond or adapt. In this context, we may view the "ESSENCE OF MANEUVER CONFLICT" a bit differently—

may have been working itself out for a long, or it may be just speed.

So, surprise is nothing more than a form of disorientation. Likewise, shock, except in this case shock is so awesome, it's so paralyzing, Christ, you don't know what to do. You go into a state of shock. I look at shock as nothing more than a hard surprise. You can look at surprise as a soft shock. They're both forms of disorientation.

[15:00] And disruption, the state of being split apart, broken up, or torn asunder. So, all these things, you're trying to realize this kind of an aim. But now we've done something interesting here. Since we've defined surprise and shock as a form of disorientation, why not just remove them from the board and look at disorientation and disruption? Before we do that, let's look at it a little bit more carefully. We may want to do it, but let's look at it a little bit more carefully.

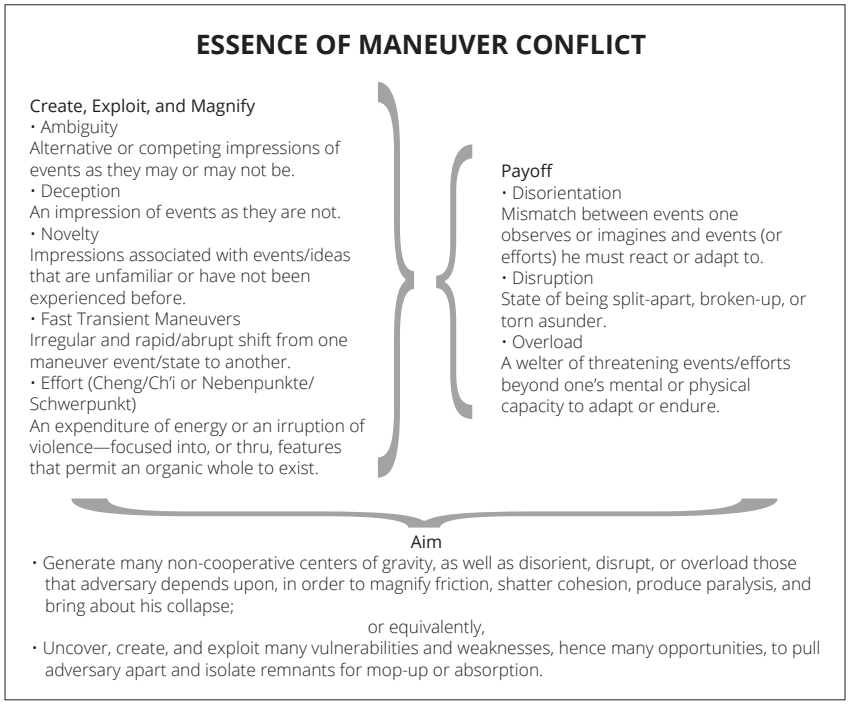
[slide 116]

When you begin to examine it—and that's what this note's directed to here—you can also say, surprise and shock also can be represented as an overload beyond one's immediate ability to respond or adapt. In other words, they can't respond or adapt because of that sense of surprise, or shock, or both.

[slide 117]

So, what you really want to do is put them in an overload condition, so they can't respond. So just take out surprise and shock on the next chart, and substitute overload. Not that we don't want to surprise and shock them. But another way of looking at it. The right and left side is still the same. I just adjusted the right side. So, I get

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disorientation, disruption and overload. That's what you're trying to do. Disorient the guy, disrupt the guy and overload him. Then you realize this aim or equivalently state it that way. So, maneuver warfare is just not a bunch of guys going down the highway at a high speed. That's what I'm trying to tell you. Not just a bunch of guys going down a highway at high speed. There's movement.

So, if you look at this, the content of this has a heavy, what? Mental content. Whereas attrition has a heavy, what? Physical content. So, we're back to the moral, mental and physical. The attrition is related primarily to the physical and the maneuver related to the mental. So, you can leverage that guy. Remember what I said, terrain doesn't fight wars, machines don't fight wars, people do it and they use their minds. That's exactly what we're working on in here. So, don't let yourself be sucked into the thing where all maneuver warfare is a bunch of troops going at a high speed down some highway, or across some plain in a tank or something like that, or a bunch of

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OBSERVATIONS RELATED TO MORAL CONFLICT
GEN. HERMANN BALCK

Theme
- No fixed recipes for organization, communications, tactics, leadership, etc.
- Wide freedom for subordinates to exercise imagination and initiative—yet harmonize within intent of superior commanders.
- Heavy reliance upon moral (human values) instead of material superiority as basis for cohesion and ultimate success.
- Commanders must create a bond and breadth of experience based upon trust—not mistrust—for cohesion.

How is this Atmosphere Achieved?
- By example leaders (at all levels) must demonstrate requisite physical energy, mental agility, and moral authority to inspire subordinates to enthusiastically cooperate and take initiatives within superiors intent.

What is the Price?
- Courage to share danger and discomfort at the front.
- Willingness to support and promote (unconventional or difficult) subordinates that accept danger, demonstrate initiative, take risks, and come-up with new ways toward mission accomplishment.
- Dedication and resolve to face-up to and master uncomfortable circumstances that fly in the face of the traditional solution.

Benefit
- Internal simplicity that permits rapid adaptability.

tanks. Okay? It's a little bit more sophisticated, if you really want to think about it. Okay?

[slide 118]

With that in mind, let's look at the moral, some moral issues here. And I got this from Balck, very good. And what he makes very clear, this theme. No fixed recipe for organization, communication, tactics, and leadership. Variety. Remember, you want to remain unpredictable, and he makes that very clear. Wide freedom for subordinates to exercise imagination, yet harmonize within intent of superior commanders. Brings that over. Heavy reliance upon moral, instead of material superiority, as basis for cohesion and ultimate success. And what he says is that commanders must create a bond and breadth of experience based upon trust, not mistrust. Most important thing you can do is build up bonds of trust between the commander and subordinates, or among the subordinates themselves.

Because when you do that, then you've got an organic whole. And if you don't do it, you don't have it. And when the squeeze comes on, you're going to come apart.

Well, how is this atmosphere achieved? I only know one way, by example. The leaders have to set the example. If they're going to be a leader, they're going to have to set the example. If they don't want to set the example, kick the bastards out. Or at least don't put them in a situation that goddamn, is going to pull you apart. You have to set the example if you want to run the show.

If you want to be good, and you like to win, which I sort of, I think that's more attractive than losing. I don't know why I have that funny feeling. It's a lot more fun winning than losing. So that's the only way. You have to have the physical energy, mental agility, and moral authority. Which leads back to the trust. When it's mistrust, you've lost your moral authority, there's none there.

Remember a few years back, they wanted to have morale officers. There's only one guy responsible for morale, and who's that?

Audience: The commander.

Boyd: Goddamn right. And if you have to have a morale officer, the commander just said he doesn't know what the hell he's doing. That's exactly right.

So, what is the price? There really isn't a price, got to use those words. Courage to share danger and discomfort at the front. You've got to be able to share that with your people. To understand what they're going up, also they respect you if you're willing to do that, and they understand you're out there playing the game, too. Also to get a feeling for what the hell is going on.

Willingness to support and promote unconventional or difficult subordinates that accept danger, demonstrate initiative, take risk, come up with new ideas, et cetera, et cetera. *[20:00]* In fact, in an old German equivalent to our OER—officer effectiveness report—they had a code word in there, they put in there when they wanted a guy to get promoted. This guy is a "difficult subordinate." That meant promote early. In our system, it's "two." Because they recognize when you get this kind of guy with these kinds of characteristics, he's going to be difficult because the system is not used to it. He's trying to change ways. To make them better. He's a pain in the ass to a lot of people. Because they get nice and comfortable doing things the

same old way. They've got all these preconceptions in their mind. They're very comfortable with the way the world's going on. And so, this guy comes along, like, son of a bitch, get rid of him. Big mistake. Huge mistake.

It's going to give your organization vitality. Now, you know, if he goes too far and gets a little bit obstreperous, then you'll have to hold him down. In the meantime, you're going to have to give him a little leash, give him some headway. Be possessed of vitality. That's your ability to thrive and grow. Win rather than lose. Be adaptable rather than rigid. Dedication and resolve, to face up—face up and master uncomfortable circumstances that fly in the face of the so-called traditional solution.

Now if you can do these things, the benefit is you'll have internal simplicity that permits rapid adaptability, because you'll have an organic whole. You can make those adjustments. If you don't, you're going to have to have detailed orders, move like molasses in January. Everybody going off in the wrong direction and you're still trying to control them. The one thing you don't have is the very thing you want, control.

See, those bonds of trust, that common outlook, that's where your control exists. Not through having a guy slavishly do this, or do that, or do this. Treating him like an automaton or a robot. In fact, some of the latest management guys, they say your control exists—you read some of the management yourself, some I'm going to hit you with it: control exists through what?

Audience: Excellence.

Boyd: Through what? It's through your value system. Your systems of values are the things that are important. That's how your control exists. And if you've got that common theme, you've got control. And our management people are just beginning to wake up to that, some of them. I won't say all of them. Go ahead.

Audience: We have a guerrilla war to fight with the American people on that issue.

Boyd: A friendly guerrilla war.

Audience: Well, a friendly guerrilla war.

Boyd: I understand what you're saying, but we don't want to make it hostile. It's a friendly guerrilla war. I understand what you're saying.

Audience: It's one that has to be not fought, or else we cannot, we can't act if—

Boyd: No problem. But we got to inculcate that, but it's what I call a friendly guerrilla war. We don't want to make enemies of them, but we're going to say hey, there's a game that can be played here and we're all part of the team. I mean, I think that's what you're suggesting, right? Did I misread you? I hope I didn't misread you. Maybe I did.

Audience: No, I don't think so. The president was recently criticized, President [Ronald W.] Reagan, for having that style of management, and that was the same style of management. In other words, he delegated, he had a value system [unintelligible].

Boyd: As long as you hold the value system.

Audience: When his subordinates, when one of his difficult subordinates got difficult, the American people then have to understand, well, this is going to happen, he's now going to take that under control.

Boyd: Reagan has been admired for defending his subordinates. He might have made some mistakes, but one thing he's been admired for is generally for defending his subordinates. Sometimes he might have gone too far, but if the guy's a bastard and he's violating—see, if a guy violates those value systems too, you know, he's earned discipline then, you know, stringent measures against him, because you've given him an opportunity to act in that value system. You give him freedom of action. If he goes against that, you know, you can't give him a free load, because other people are going to do it and the whole thing comes apart.

Audience: The guerrilla war you're talking about, is the press on the side of, you don't know what your people are doing? The press should take the side of, well, nobody can know what everybody's doing all the time, all they're doing is exercising the—

Boyd: But then we have to educate the press. Say, look, do you know all of your editors? I can hit the press back. Oh, you're one of these goddamned geniuses. You know exactly everything that's going on in your paper, huh? You do know that, Mr. Reporter? Of course, he has to say no. Then I say, why do you expect me to then? You know, put him on the goddamn defense and stick it up their rear. They don't know either.

Audience: Maybe I took it out of context when you said impose the value systems. I don't think—it's fruitless. You don't want to impose values. That's a relative note of importance to that individual, like you were alluding to earlier.

[Cross talking]

Boyd: You don't. You don't want to impose it, but you want to show them a set of values that's going to be beneficial to them as well as yourself in that. That's what's got to be done. In other words, they got to readily accept those values. They got to be able to inculcate it within themselves, and that can be done.

Audience: *[25:00]* Well, a friendly guerrilla war because—

Boyd: That's why I call a friendly guerrilla war—

Audience: —we all have those values. It's just—it's sort of like the same issue with Wright. When we accept them, when it's going our way, we notice [unintelligible].

Boyd: That's right. But see, there's a lot of people there, that's what I'm trying to say. So, if you wind up where a little group gets the benefit and everybody else is getting screwed, they've got to go. You can't do that. You're going to pull the organization apart. That's like having cliques. That's what hurts organizations. You get a little clique inside, and they're taking care of themselves and opposing everybody else, but trying to make it look otherwise. We've seen that, and I've seen it in other organizations that fail. Okay?

[slide 119]

So, here's the book that I read shortly after I talked to Balck, and I got the thing for 25 cents [unintelligible] tremendous buy. I just ran into it in one of the bookstores and happened to think, hey, this is very interesting. And these pages particularly got it, by Cyril Falls. And the underlines are mine and I'll let you read it, but note what he's talking about.[86] If you look at all three pages, they're all related, even though they're—one case, two cases they're talking, the first two cases are [pages] 124 and 161, accounts of World War I, 165 about the German Army in World War II.

And he's hitting on a moral issue. In this particular case up here, these first two, you know they're experiencing things they've never experienced before, and they're having a hard time coming to grips

[86] Cyril Falls, *The Art of War: From the Age of Napoleon to the Present Day* (New York: Oxford University Press, 1961).

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OBSERVATIONS RELATED TO MORAL CONFLICT
CYRIL FALLS—"THE ART OF WAR FROM THE AGE OF NAPOLEON TO THE PRESENT DAY" —1961

Page 124
"In the First World War 'cellar life' had been a feature of the adversities of Paris, which actually came under the fire of specially built long-range guns in 1918, as well as aircraft bombing. In the East End of London air raids caused a tendency to panic in the latter part of 1917, and, whether there was a raid or not some 300,000 people crowded each night into the underground railway stations and slept on the platforms. . . There was little organized civil defence beyond the reduction of lights."

Page 161
"The Germans, who were far ahead of any rival in the science of lighter-than-air construction, refused to accept the general belief that the future lay entirely with the heavier-than-air. Their Zeppelins . . . were employed chiefly in night attacks on England. On one occasion a single airship did a million pounds worth of damage in a raid, but on the whole their success was mainly moral and measured in terms of absenteeism in factories and sensational drops in production of warlike material."

Page 165
"Early in the war the German Armies owed much in their victories in Poland, Belgium, and France to their dive-bombers. These aircraft acted in close support to the armour and infantry. . . . They often put hostile artillery out of action, but generally by driving the detachments from their guns. The successes were won for the most part by moral rather than material effect to troops unused to them, especially the French divisions of low categories, they proved extremely unsettling."

with them. Now I'm going to define *moral* differently in my view, when we get around and I give you my strategy brief.[87] [unintelligible] There's another way of looking at moral that I think is more profound and more powerful, but this is a way of looking at it, and it's okay. There's more than one way to skin a cat. Okay?

[slide 120]

Now, thinking about that, let's see if we can make some sense of all this. So, what we've got here are some insights regarding Falls's statement and Balck's ideas. Now Falls's comments, we know, you take all this stuff, and at a quick glance at these words and phrases are all directly related to one another, all those phrases that I underlined. Even though they're from different times, they're all pretty much directly related to one another. That's one point.

[87] Boyd refers to his briefing "The Strategic Game of ? and ?."

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OBSERVATIONS RELATED TO MORAL CONFLICT

Insights Regarding Falls' Statements and Balck's Ideas

- From Falls' comments we note (with slight alteration) the following words and phrases: panic . . . moral . . . absenteeism . . . sensational drops in production . . . divebombers success were for the most part moral . . . to troops unused to them . . . they proved extremely unsettling. A quick glance shows that all these words and phrases are directly related to one another.
- Going even further we can say: Falls' comments on pages 124, 161, and 165 suggest that moral effects are related to the menace posed by the zeppelins and divebombers, and the uncertainty associated with not knowing what to expect or how to deal with this menace. Put simply: Moral effects are related to menace and uncertainty.
- For a first cut this suggests that moral strength represents mental capacity to overcome menace and uncertainty.
- On the other hand, this first cut seems to leave out something that humans either need or must overcome for collective moral strength. Fortunately we have some clues:
  - First: Remember that Guerrilla Commanders (see Modern Guerrilla Campaign) stress use of propaganda, civil disorders, selected terrorism, etc., as basis to generate mistrust and discord.
  - Second: Balck emphasizes the importance of trust—not mistrust—for cohesion.
- Now, recognizing that both Balck and Guerrilla Commanders work in a hostile environment (of menace and uncertainty) that naturally breeds mistrust, it is clear that moral effects must include this factor.
- This suggest moral strength represents mental capacity to overcome, menace, uncertainty, and mistrust.

Going further, we can see that his comments, what do they say? The moral effects in some sense are related to the menace posed by the zeppelins and dive-bombers, and the uncertainly associated with not knowing what to expect or how to deal with it. At least that's the message he's bringing out to you. Whether you like it or not, that's the message. So put simply, from that viewpoint, moral effects are related to menace and uncertainty. That's the first thing.

So, I say for a first cut, this suggests that moral strength represents mental capacity to overcome menace and uncertainty. But we're left a little bit uneasy with that. On the other hand, it seems to leave out something humans either need or must overcome for collective moral strength. In other words, I'm bringing in the organic whole.

So, we've got to remember, going back, and looking at some of, remember those guerrilla commanders, they're trying to stress propaganda, civil disorder, they're trying to generate mistrust so they

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OBSERVATIONS RELATED TO MORAL CONFLICT

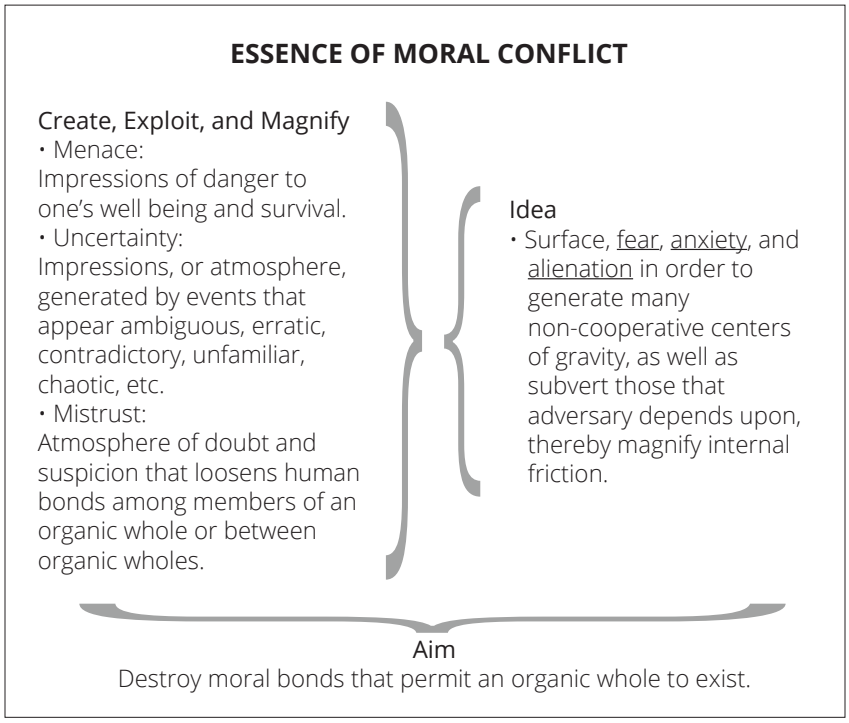
- Now by using moral strength as a point of departure—and by feeding in those unsettling or threatening experiences (a'la Clausewitz) that either bring out fear, anxiety, and alienation, or their more noble counterweights: courage, confidence, and esprit—we can evolve the following related notions:
  - Moral Strength: Mental capacity to overcome menace, uncertainty, and mistrust.
  - Moral Victory: Triumph of courage, confidence, and esprit (de corps) over fear, anxiety, and alienation when confronted by menace, uncertainty, and mistrust.
  - Moral Defeat: Triumph of fear, anxiety, and alienation over courage, confidence, and esprit when confronted by menace, uncertainty, and mistrust.
  - Moral Values: Human values that permit one to carry on in the face of menace, uncertainty, and mistrust.
  - Moral Authority: Person or body that can give one the courage, confidence, and esprit to overcome menace, uncertainty, and mistrust.
- Finally, by stripping away and recombining essentials—from these notions as well as from the ideas and experiences of Clausewitz, Balck, and Falls—we can evolve the Essence of Moral Conflict.

can pull the government down and then build up bonds of trust for their own, for the people they're trying to swing over to their side. And Balck emphasized the importance of trust, not mistrust. That being the case, then we're getting on to something. Recognizing that these guys really know how to operate in these environments, suggests moral strength in some sense represents mental capacity to overcome menace, uncertainty, and mistrust. Overcome them, then you've got the moral strength. That ability to counter that mistrust, trust the men.

[slide 121]

That being the case, we can start making some definitions here again. Start peeling some ideas back to Clausewitz then. Remember, we talked about things that bring out fear, anxiety, and alienation or their counterweights, courage, confidence, and *esprit*. We've already said what moral strength is. Moral victory is the triumph of courage, confidence, and esprit over fear, anxiety, and alienation, when con-

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fronted by menace, uncertainty, and mistrust. In other words, you're bringing out those positive virtues, rather than what we call those more negative qualities. You know, we have them, as human beings, we have these things. Fear, anxiety—what you want to do is be able to bring these, well these up over these, and therefore you're going to deal with that menace, uncertainty, and mistrust. That's what you want to be able to deal with then. Moral defeat, of course, is just the opposite. In that case, fear, anxiety, and alienation, they well up, the others suppress [unintelligible]. And moral values, those that permit one to carry on in the face of that. Moral authority. That person or body that permits you to deal with that.

[slide 122]

So, now by pulling it apart and bringing it all back together again, we come up with the essence of moral conflict. So, we're going to create and exploit these: *[30:00]* menace, uncertainty, mistrust. Here's

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SUSPICION

- The essence of moral conflict, as presented, seems to be one-sided and emphasizes the negative or dark side of one's moral make-up

?—RAISES QUESTION—?

- How do we bring out the positive side? In other words—if courage, confidence, and esprit represent the positive counterweights to fear, anxiety, and alienation—what are the positive counterweights to menace, uncertainty, and mistrust?

the idea: surface fear, anxiety, and alienation in order to generate many noncooperative centers of gravity, pull the guy apart. And the aim is very simple. Destroy those moral bonds that permit an organic whole to exist. It can't function. Does that chart bother anybody? It should. It bothers me. I'm trying to get at something here, and then in this follow-on chart.

[slide 123]

If you think about that a little bit, it's all one side, is what I'm doing here. I'm saying that the essence of moral conflict, as presented in the previous chart, it tends to take the negative or dark side. So, let's see if we can bring out the positive side. In other words, if courage, confidence, and esprit represent the positive counterweights to fear, anxiety, and alienation, what are the positive counterweights to menace, uncertainty, and mistrust? So, let's see if we can kind of come to grips with the thing.

[slide 124]

And we begin to look at it, you begin to see something here. You work it backwards and begin to say, okay, presence of mistrust implies there's a rupture or loosening of human bonds, so you have to build up harmony in a group in order to build up that trust. So, that seems to be a counterweight. In dealing with uncertainty, you can't say we're going to have certainty. All you have to do is you have to be adaptable, that's the only way you can deal with uncertainty. You have to be adaptable, build adaptability and flexibility into the orga-

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INSIGHT

- In addressing this question we find that the counterweights to menace and uncertainty are not at all obvious unless we start with mistrust and work in reverse order. Proceeding in this way we note that:
  - The presence of mistrust implies that there is a rupture or loosening of the human bonds or connections that permit individuals to work as an organic whole in harmony with one another. This suggests that harmony itself represents an appropriate counterweight to mistrust.
  - In dealing with uncertainty, adaptability seems to be the right counterweight. Otherwise, how can one adjust to the unforeseen or unpredictable nature of uncertainty?
  - Finally, with respect to menace one cannot be passive. Instead, initiative is needed otherwise menace may obliterate the benefits associated with harmony and adaptability. Intuitively, this suggests that initiative is the right counterweight here.
- Using these ideas, together with the previous ideas already uncovered, we can modify and enrich the essence of moral conflict as follows:

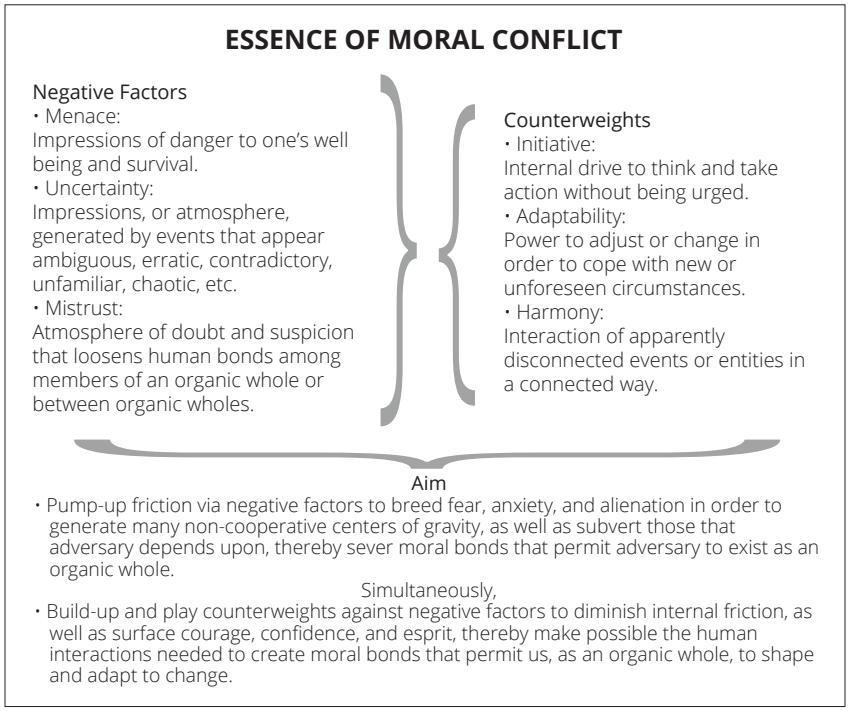
nization to deal with it. Life is inherently uncertain. Don't say, well, we're just going to have certainty. That's bullshit. You're not going to get it. You may think you are, but you aren't.

And with respect to menace, the only way you can deal with that, you're going to have to take the initiative. You can't sit there. So, if you pull all that together, then we can reconstruct that previous chart, the essence, we'll leave the left side the same, and we have the negative factors as well as their counterweights. That's a way of dealing with it.

[slide 125]

I haven't changed the left side, just called them "negative factors" and "counterweights." Initiative, internal drive to think and act. Adaptability. Harmony. Then you've got a negative aim as well as a positive aim, and now you can see it from both sides of the argument. We want to get the negative on our adversary and we want the positive on our side, obviously. That's what—the guerrillas where

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they see it, that's what instinctively they're doing all the time. Trying to build up the negative atmosphere on their adversary and trying to build up a positive atmosphere in their system. Remember what Napoléon said: the moral is to the physical as three to one. They understand that, whether they know those numbers or not, and they're using that in a very powerful way.

Okay, it's 10:00 o'clock. So, I think we ought to stop it tonight. I guess we're going to have to get together and take the synthesis later on, we spent a lot of time on it. The rest of the stuff goes fast if we can set that up, Mike, if we want to set that up, because I'm going to be here for a while.

Wyly: Okay.

Boyd: So, we've done the hard part, and the rest of it goes very rapidly. And so, all we have to do now is do the synthesis, the application, and the wrap-up. And that goes very rapidly. Because now what I'm going to do, I'm going to pull all these things we've looked

at, we're going to pull it all together. What are we really talking about?

Any questions before we leave tonight? We took a lot of time, we made those digressions, but I think they're important because we're trying to address certain issues. People want to get to it, and I feel that, okay, if we want to get to it, we're going to get to it. It takes time.

Wyly: You're suggesting we do it next week sometime. I don't see how we can do it this week. [Cross talking] Nobody probably wants to, so we'll set it up.

Boyd: If it's okay with you. So, we can get the synthesis and the wrap-up.

[multiple audience members talking over each other]

Audience: One of your wrap-ups has to be how we adapt this to a nine-month curriculum for a 35-year-old major.

Audience: It's bigger than that, because we're talking about forged leadership from the corporal to general. So, the whole profession—

Boyd: So, you want the lowest guy all the way up to the commanding general to have these attitudes.

Audience: Corporal to general. We've got to cover the whole spectrum.

Boyd: They're all part of the team.

Audience: Yes, sir. It's a long term—we do a pretty good job—private to generally, really—

Boyd: Not corporal, private. I want to go through private all the way up to the Commandant.

[Cross talking]

Audience: We do a great job on the corporal and below level. It's when we get to our lieutenants that we don't trust them and we don't give them the leeway for initiative. In boot camp, they get the esprit, the trust, the initiative—

Boyd: You need to educate all your people, not just a piece of them. To play the game. Because you really want to build up this whole organic philosophy, so you can operate as a family. Just like a family— really like a family. We say we operate like a family, but a lot of it is hype, it's not quite there. But you really want to operate like a family, and you're a very large family. But then you want the whole

family's got the *fingerspitzengefühl*. You understand what I'm saying? You want to get them all that *fingerspitzengefühl*.

Audience: But on a larger scale than what we were talking about, we're talking about this idea of warfighting, *[35:00]* the concept and repeated application in peacetime so it becomes the fingertip, inherent. We're missing the procedures to do that in wartime, but in peacetime, here's the idea. To repeatedly do it, to practice in peacetime what we want to do in wartime. The trust. What's missing from my mind are the education and training tools to take this—

Boyd: Oh yeah, and we're going to have to develop that so you can get that, so you can inculcate it, and it becomes a natural part of the whole system then, that's what you're really saying. You want to make it very natural. Not some foreign substance.

Wyly: We were talking about, I just use the Germans as an example, here you have a society, that for a number of reasons, placed a high value on education. And we don't do that. And I think therein lies the difficulty. If education comes naturally, and it's something we know how to do, that would make the job a little bit easier. But it's not, it's not. We give out the quotas and sometimes it's not through a whole lot of education.

Boyd: [laughter] Yeah, but that's done all over. It's unfortunate. You know, that's why the sergeant's comments are quite applicable. The military's not the only one that has this problem. You look at industry, industry's got some horrible problems.

Wyly: Absolutely. It's a society-wide problem.

Boyd: We've got a big problem. Somehow, we got to pull it together. We're having problems around the world—

Wyly: I was saying to this gentleman here during the break, I think maybe the Marine Corps has a better chance of solving that problem than any other segment of society. I just think maybe that, idealistically I think that. I see we've got some control over our future. The other Services are too big, the rest of the society is too chaotic.

Boyd: In a sense, somebody's going to have to set the example. If somebody doesn't set the example, the rest aren't going to do it anyway.

Audience: Sir, I'm trying to think of an example where a military organization could function, at least for some period of time, by using the menace and uncertainty and mistrust. Can that be done?

I guess one example, and I know it's not a good example, maybe Shaka Zulu, and the way he brought the Zulu tribes together by just killing anybody that screwed up, and driving them to the point of utter fear and exhaustion.[88] Yeah, he was successful against the British for quite a few years until he went bonkers, and his brother-in-law put a spear through him.

Boyd: Well, if he's done that, what kind of a culture do you have in order to do that in, and did we misread that? Is that what we're saying, because he's the enemy, and he's a bad guy, so we want to constitute all evil in him and we want to constitute all the good in ourselves. I'm very worried about that, having seen that happen before. Since he's the enemy, goddammit, he's all evil. He's done everything wrong and we're pure and all that.

Audience: Well, the Soviets and the KGB and the way [Joseph] Stalin—

Boyd: I'm not saying he didn't do that. Well, Stalin was a son of a bitch. Yet, we ascribed to him during World War II, we'd call him Uncle Joe and all that stuff. In the meantime, Christ, he claimed he made Hitler look like a piker. He cleaned out 20 million people. Hitler only pumped out only around, other than the war, about 6 million or so.

Audience: So how can a military function based on, at least in part, menace and uncertainty and mistrust? What you're telling us tonight, it can't be done—

Boyd: Remember—wait a minute, I'm going to come back to that. Remember, when Hitler invaded Russia, what happened then? Remember, they wanted to be on Hitler's side. They all went against Stalin because of that, and then Hitler became, behaved even worse than Stalin did, so therefore it became a Great Patriotic War. You go read the history. They were signing up—so what happened, they said Christ, this guy's even more menacing than Stalin, we'll keep Uncle Joe, at least he's one of us. You read that. For the early part of

[88] Shaka Zulu was king of the Zulu kingdom in what is now South Africa, 1816–28. During his reign, he initiated a number of programs to strengthen the Zulu Empire's military and political power, sometimes quite ruthlessly. Shaka was finally assassinated by two of his half-brothers as a result of draconian mourning measures imposed by Shaka following the death of his mother.

those campaigns, they were welcoming the German invaders. Finally, we're going to get rid of this goddamned yoke we've had over our heads.

You've got to be very careful when you examine them. That's what I'm saying. Don't look at it, don't isolate them in context, understand the culture and try to examine it from a total situation standpoint. And so, maybe, what's his name, Shaka, I haven't studied the Zulu but maybe, you know, remember, you can't just look at the Zulu, you got to look at the British, how were the British behaving toward them, and even though Shaka's ideas and actions might seem stringent, maybe what the British were doing to them were even more uncomfortable than what he was doing. Therefore, they could accept his measures, because it was at least for the Zulus rather than for some foreign interloper, so to speak. I mean, I don't know but I would look at that carefully. *[40:00]* I can't answer that, because I'm totally unfamiliar with that. Any other questions?

Audience: Colonel Wyly, is there any other option besides next week? None of us will be here—

Wyly: Well, it depends on how long Colonel Boyd's going to be here. I don't think you've really decided on when you're going back. I see Friday as an option, I think normally—

Boyd: What about tomorrow night?

Wyly: We may not be back.

Boyd: You think the Commandant'll keep us there?

Wyly: I don't know, but sometimes he gets wound up—

Boyd: He's the Commandant. If he wants us to stay, we stay.

Wyly: I just hate to make a commitment for tomorrow night, with that in mind. I really hate to do it for tomorrow night.

Audience: Sir, how long will it take for the wrap-up?

Boyd: What, this here? Jesus, you've got me very nervous. I was supposed to do this in two nights. I'm afraid to make a prediction about that. Normally the wrap-up would take about 45 minutes, but I'm afraid to say that. I think we'd better allow for two hours.

[nonpertinent cross talking about meeting the next night]

[41:56]

[End of tape 4, side 2]

[Begin tape 5, side 1]

Boyd: It can have a protracted character, on the other hand, it may not be. Now one of the reasons why they say that is, well, look at the Philippines. I already put the dates up there, 1946 to 1954, and as the gentleman back there pointed out, we had the Malayan campaign. What was that? Eight or 10 years also, in Malaya. But really, they finally figured out what to do and the last couple of years, they went pretty good. It was because the dummies in the beginning couldn't figure out what the hell to do. Magsaysay came on board, he said, "I got the picture." He cleaned it up real fast. And they were on the verge of defeat, too. Of course, it's not so cleaned up right now, it was sort of a temporary respite, because now they're back in trouble, again.

Audience: But you know, two years of [unintelligible] of conflict, for two years, that could be a protracted war for us, based on how the public views it.

Boyd: You trumped me. I said, you trumped me. And I agree with you. When I say, you trumped me, in a sense you're right. In other words, our "two-year war" that's not—that's too long.

Audience: So how is our military [unintelligible]?

Boyd: But see—but that's—whose fault is that? You made a good point there. Whose fault is that if they think it's too long? Whose fault is that?

Audience: United States government.

Boyd: Goddamn right, it's our fault. Whether we're in uniform, or in other parts of the government, to make sure that people understand that you can't do it any other way. So, the fact that we let them have that perception, it's the government's fault. If they look in the mirror, he's the son of the bitch. Government guy looking in the mirror, he should look, there's the son of the bitch that did it, and he's the one. That's him. See, because I think you could put out a compelling message on that. Of course, you got to know what the message is, how to handle it and all that stuff. But you don't know what you're doing, you can't put out the message.

Audience: What's the message?

Boyd: Well, what's at stake in this whole thing? And the fact you just can't run a goddamn—a thousand-tank operation through some jungle somewhere, a blitzkrieg operation, or leave the perception

in their mind that it's strictly going be a high-intensity conflict like we had over in Europe, and we're going to win the goddamn thing. European scenario.

Audience: I guess, my question was more, I understand that. But getting the American people, I mean, just—I think we're still singeing from Vietnam and anything that's more than a weekend long like Lebanon, when you're in an op before the press can still be—

Boyd: Why? Why?

Audience: Just because of how—

Boyd: Because we haven't got the message out, and I blame it on ourselves.

Audience: Well, I say, this is—

Boyd: You got to blame it on yourself. If you don't do anything, what? If you don't blame it on yourself, you're not going to change. It's important you blame it on yourself because you say, "Goddamn, we're dummies. Let's get the damn thing straightened out." It forces you to do things that you wouldn't otherwise do, and come to grips with the problem.

Audience: I think we realize that—

Boyd: See, now what you're doing is, you're making yourself come to grips with the problem. That's my opinion on it.

Wyly: I'd take it a step further. It's not just that we have not gotten the message out. That thinking that you just described, that we could take a bunch of tanks down there and roll them through Nicaragua, or wherever, and drop a lot of bombs, and then when the war—I find that mentality still exists within the military at very senior levels. At very senior levels. So, not only have we not gotten the message out, but we haven't learned how to do it.

Boyd: Not only haven't you gotten the message out, you haven't even gotten it in within the services. Not only out, but not even in.

Audience: Well, you could win the war in Nicaragua in a couple of weeks, with a bunch of tanks to show intent. That's not what the problem is. The problem is, what's involved in national level that'll sound good.

Wyly: Yeah, Nicaragua is the wrong—

[Cross talking]

Boyd: Nicaragua's the wrong one. Yeah. You're right.

Audience: So, the point is, that we really need to explain to people, after we've learned it ourselves, is that we're talking 10, 20 years. We started dealing with the Salvadorians, sir, we wanted to hear a 3-year war, they said 10. Well, now we've been committed since '80, basically, and it's almost 10, and Duarte gets on TV three months ago and says, "Well, 35, 40."[89] Really, it's a permanent commitment. We haven't convinced ourselves that, but if we ever do that—

Boyd: But if you have a permanent commitment, you also got to know how you're committing yourself. And because we didn't know how to commit ourselves, and our leaders in many areas—maybe some of them were malicious, but many of them weren't—in a sense, they were lying to the American people. Sometimes they didn't even know they were lying, and their guys looked at them, and they got madder than hell.

[multiple audience members begin talking over each other]

Audience: They were two factions, essentially. One that wanted to put U.S. guys on the ground, and one that wanted to do what we're doing. Show up to this country, within the limited context of their capabilities. They still think that helicopters' recon is the answer. The point is, that I don't think you'll ever sell that you're, you know, politics being what they are. You'll never sell the American public on a 40- or 50-year commitment at X millions of dollars, that they don't understand.

Audience: Depends on the level of how you approach it.

Boyd: That's right.

Audience: What does that commitment entail? If it means putting in some advisors, as we did in Vietnam initially, they might buy off on that if you really hit them with the rationale for it.

Audience: But it's much more than that now—

Audience: And convince them of it.

Audience: It's equipping them, it's arming them, and it's to this tune of 70, 100 million dollars a year.

Audience: *[05:00]* Well, what was the initial—

[Cross talking]

[89] Jose Duarte was the president of El Salvador from 1984–88, at the height of a civil war against Communist insurgents. He received both overt and covert financial and military assistance from the United States as part of a larger effort to push back Communist influence in central America.

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SYNTHESIS

Audience: No. I don't agree with it.

Audience: What was the initial cost of Vietnam, putting in the gaps? What did that cost us?

Audience: I don't know. But what I'm saying is, you're not going to put U.S. guys on the ground and you advise them—places like Salvador, or [unintelligible], and you have to equip them, and you're going to have to continue to arm and supply them. That costs a lot of money.

Audience: Well, if we're not willing to do that, we'll lose it. The military can sell that message.

Audience: There you go.

Boyd: Let's kick off and get back to that. I'll get back to that. I got some things that you mentioned, I'll get back to it. Let's get back to [unintelligible] otherwise, we're going to miss something. Okay. We're up to the synthesis now.

[slide 126]

What, basically, what I want to do is, we looked at all these various wars, and conflicts, and the various ways we approach it. Tactically, strategically, grand tactically, and all that. And we've pulled things apart and put them back together. Now what I want to do is go into a super synthesis. In other words, we're going to take advantage of all that information we've been gathering, and we're going to start stuffing it together in terms of a, sort of a conceptual way we can look at this thing. And remember in the beginning, I made a promise to you. I said, not only are we going to look at categories of conflict, we're going to look at the tactics, strategies, and grand

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PATTERN FOR SUCCESSFUL OPERATIONS

- Goal
- Plan
- Action
- Support
- Command

strategies. And that's what we're going to get at right here in the synthesis. Okay.

[slide 127]

So, first of all, one of the things I said we wanted to look at was the pattern of operation. The pattern for a successful operation. First of all, you've got to have some kind of a goal in mind. Where in the hell are you going? Then you're going to have to have some kind of a plan to feed that goal. And some kind of action to feed the plan, and support. And a command structure to glue the whole thing together. Without that, you don't glue it together, nothing's going to happen. So, you can kind of think of it that way.

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So, knowing that, and thinking about what we've been through here, some words you could put to it in a very general sense, the goal would—in a sense, what you're trying to do, is you're trying to diminish your adversary's freedom of action. Cut his ability down to do the kind of things that he wants to do, at the same time, improve your ability or improve your freedom of action. As a result, you can shape and cope with events and efforts as they unfold. He will be unable to stay up with you. That's sort of your goal. You want to lay that on, in a very general sense. I don't want to make this specific now. We're not talking about going to Nicaragua, or Chile, or wherever you're going. Or even in our own country. We're just saying, we want a gen-

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PATTERN FOR SUCCESSFUL OPERATIONS

Goal
- Diminish adversary's freedom-of-action while improving our freedom-of-action, so that our adversary cannot cope, while we can cope, with events/efforts as they unfold.

Plan
- Probe and test adversary to unmask strengths, weaknesses, maneuvers, and intentions.
- Employ a variety of measures that interweave menace-uncertainty-mistrust with tangles of ambiguity-deception-novelty as basis to sever adversary's moral ties and disorient or twist his mental images, hence mask-distort-magnify our presence and activities.
- Select initiative (or response) that is least expected.
- Establish focus of main effort together with other (related) effort and pursue directions that permit many happenings, offer many branches, and threaten alternative objectives.
- Move along paths of least resistance (to reinforce and exploit success).
- Exploit, rather than disrupt or destroy, those differences, frictions, obsessions, etc., of adversary organism that interfere with his ability to cope with unfolding circumstances.
- Subvert, disorient, disrupt, overload, or seize adversary's vulnerable, yet critical, connections, centers, and activities that provide cohesion and permit coherent observation-orientation-decision-action in order to dismember organism and isolate remnants for absorption or mop-up.

Action

Observe-orient-decide-act more inconspicuously, more quickly, and with more irregularity as basis to keep or gain initiative as well as shape and shift main effort: to repeatedly and unexpectedly penetrate vulnerabilities and weaknesses exposed by that effort or other effort(s) that tie-up, divert, or drain-away adversary attention (and strength) elsewhere.

Support
- Superior mobile communications
- Only essential logistics

} to maintain cohesion of overall effort and sustain appropriate pace of operations within available resources.

Command
- Decentralize, in a tactical sense, to encourage lower-level commanders to shape, direct, and take the sudden/sharp actions necessary to quickly exploit opportunities as they present themselves.
- Centralize, in a strategic sense, to establish aims, match ambitions with means/talent, sketch flexible plans, allocate resources, and shape focus of overall effort.

eral idea. What are we really trying to achieve here? In a very general sense. Remember, I want to keep it very general now.

Okay, knowing that, we say, let's look at our plan. Straight Sun Tzu. You got to know your enemy. Remember he said, "Well, you got to know yourself." Strength, weakness, maneuvers, intentions. Remember what I said Palmer said, and what Krepinevich, we never knew our enemy over there. We got to reach inside his system. And if you don't reach inside, how are you going to exploit weakness? It's kind of tough. Or expose vulnerability? Play the weakness vis-a-vis the vulnerability. It's going to get very tough.

And then apply a variety of measures. Menace, uncertainty, and mistrust. We put in the moral dimensions, as well as ambiguity, deception, and novelty. That way, you have a basis for not only breaking down his ties but also disorienting or twisting his mental images. So, he can't even cope with the world, with that environment you're

exposing him to. Therefore, in a sense, we magnify our presence and activities. In other words, Christ, they think we're everywhere but nowhere, like the Mongols. And like what Liddell Hart discusses.

And then, you want to select an initiative or response that is least expected. Some people say unexpected. Well, you've got to expect his best. But at least, least expected, so he can't cope with it. And not only a physical sense, we're talking about moral and mental sense as well. Remember, we're always keeping the moral, mental, and physical in mind.

Then you want to set up your focus of main effort, or if you want to call it your focus of effort, together with your other related effort, and pursue those directions that permit—note what I'm saying here—permit many happenings. Because you only have one thing and that gets blocked, the game's over. You want to have many things, because what you're doing, you're trying to put him in a position where he can't keep up with the activity; he can't discern what's going on. Also, many branches. It doesn't mean you're going to pursue them all, but what you're doing, you're giving yourself the opportunity to lever him on your terms, keep the initiative. And threaten alternative objectives. Remember, I said Liddell Hart had brought that up. In other words, have more than one objective so you can shift gears and always keep him rolling under your punch. Okay?

Then move along those paths. In fact, what you do by doing that, you're really setting up the paths of least resistance. By setting it up, maybe getting him to reveal himself, so now you can roll through those paths of least resistance. Morally, mentally, and physically. Either reinforce or exploit successes. And then here's something important. Note what we want to do. We want to exploit, rather than disrupt or destroy, those differences, frictions, obsessions, et cetera, that interfere with his ability to cope with unfolding circumstances.

Let me give you an example there. The guerrillas do it very nicely, and this is what I mean by this. Let's say there's a guerrilla operation going on, as you want an example, and there's a corrupt province chief in there. Well, normally, the people tend to try to go through the guerrillas, to get them to try to take out that corrupt province chief. The guerrillas say, "Bullshit. No, no. Don't take out the corrupt province chief." I'm going to show you how these guys are tough. Instead of taking out the corrupt province chief, by having him there,

he becomes a recruiting poster for the people to come over to their, against his side. So, they resist that until they got the whole thing, then they'll take his head off. Because he's a recruiting poster—if they put a good guy in there, then it's going to make their job tougher. See what I'm getting at?

[10:00] I mean, this is why you got to think through this stuff. Now, if they make too big a fuss, then they're going to have to take him out. But they sort of would like to use him as long as they can, as a recruiting poster. It's a very subtle, very insidious game. And then, subvert or— I'm just using that as one example.

And then these concepts, subvert, disorient, and the idea is go after those critical connections. In other words, find out—to generate those many noncooperative centers of gravity that we're talking about here. So you can break down their cohesion and then you can mop them up. Absorption or mop them up, as the case may be, that's what you're trying to do. So these are the kinds of things you sort of want to—you don't memorize. These are the sort of things that you just kind of get as part of your thinking, sort of in the back of your head. Don't get them too present, because pretty soon you can't think. You're only worried about filling squares. They're just sort of back there.

And then your action. Observe, orient, to be more inconspicuous, do it quicker, and be more irregular. Remember what I told you about Jomini. About the Cossack cavalry. Had a big a discussion between the Cossack cavalry and these other cavalries, like the French cavalry. And he talked about, boy, the irregularity, was hard to figure out what they're doing and all that, but yet, they seem to do things to a common purpose. And he said, he made the remark that, oh, Lloyd, the guy that preceded him. He said he recognized that was—the Cossack cavalry was better than the other cavalries because of that. But then, as he looked at the evidence, he said, "In a sense, Lloyd was right. But we all know the regular cavalry is better." So, he voted against himself, even after he looked at his evidence. But we don't do that today. We don't vote against ourselves, even after we see the evidence. Only Jomini does that. And that's what I'm trying to tell you. When you see it, don't fight it. You say, "God, is it true? Do I [unintelligible]?" And you say, "It's true." And so therefore, you're going to have to get over your preconceptions, say, "Goddamn, we're

going to have to face that thing." And Jomini didn't face it. That's a good example.

I showed Mike in there. You go to get the book, it's right in there like that. It's very clear. You read it, you say, "I can't believe this!" Clear as a bell. He voted the wrong way. And just like I told you, in the Civil War. You're looking at the book, *Attack and Die*—I don't know how many people read it. And *Forward into Battle*. What you wanted—it's Civil War, I mean, not—yeah. *Attack and Die* was Civil War, *Forward into Battle* covered a lot of those wars in the nineteenth century.[90] And where these formations would break down, because they broke down, the attack would succeed. And so, they thought they just blundered into a victory. They didn't realize that the formation, these regular formations, were making them unable to succeed. Once again, voted the wrong way. The writing's right here. I looked at it and said, "My God, here it is." And they couldn't see their own evidence, because they had their biases fixed by all those drill regulations they'd been looking at for 20, 30, 40 and 50 years. We all know that they're good drill regulations.

And that's why you've got to always try to—one thing I haven't brought up. You always should try to unravel your own ideas. When you look at it, say, try to keep unraveling your own preconceptions. Make that an honest process within yourself. I mean, you're not doing it to have chaos, you're just doing it to be sure you don't have biases that are not allowing you to face the situation. So, these are the kind of things. The basic idea. By doing it—look at this. More equipped to be more irregular. Christ, the other guy says, "What the hell's going on here?" See, that allows you to get inside his loop. So therefore, you can shape your main effort and go out and unexpectedly penetrate vulnerabilities and weaknesses exposed by that effort, or the other efforts you've got going on, that tends to free things up. In other words, sort of like a *cheng/ch'i* idea that we talked about. Okay?

And then, your support. Your communication, your logistics. The other—one is to maintain cohesion of the overall effort, and the oth-

[90] Grady McWhiney and Perry D. Jamieson, *Attack and Die: Civil War Military Tactics and the Southern Heritage* (Tuscaloosa, University of Alabama Press, 1982); and Paddy Griffith, *Forward into Battle: Fighting Tactics from Waterloo to Vietnam* (Sussex, UK: Antony Bird Publications, 1981).

er one is so you can operate at appropriate base of operations. Want to be sure you have that.

And then finally, your command. Look, I call this command with a light touch. Decentralize in the tactical sense, in other words, you want those guys to be tigers. Give them freedom of action within a common outlook, a common frame of reference. And then, by doing that, as they see those opportunities open up, they go through. They streak through. I call this command with a light touch. Remember, the more you try to control somebody—what we were talking about before—the less control you really have. You want to exert control through your value system, through your common ideas, common outlook. That's your control measure. Not say, "Do this exactly this way," because you lose your control when you do that. And I can't overemphasize that.

And then centralize in the strategic sense, because that's the overall—where you're worried about establishing aims, matching ambition to the means and talents, sketching flexible plans, allocating resources, shaping the overall focus of effort. Even Patton understood that. He told his colonels, "Get the hell out of the tactics. You're only going to muck up the operation." You probably saw that. Remember you saw—

Wyly: Oh, sure. I found that in the—

Boyd: Yeah. I'm not quoting him, but I'm paraphrasing.

Wyly: No, I'm afraid you are. I quoted them in a [*Marine Corps*] *Gazette* article.

Boyd: Yeah. "You're going to screw up the goddamn operation. Get the hell out of the tactics. That's not your job." Told his colonels that, now stay the hell out of it. So, he understood that.

Okay? Knowing that, now what I want to do is, I want to sort of focus on this plan and action. I want to play with that a little bit, you see what I'm saying? So, let's play with that. *[15:00]* You're going to see why in a minute. So, the impressions I'm trying to create there with those plan and action movements. One, we're trying to penetrate adversary system and mask ours against his penetration. So, he can't get inside our system.

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Two, we want to create a variety of impressions of what is occurring, or about to occur. In other words, once again, it makes it diffi-

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IMPRESSIONS

- Plan and Action statements suggest that we are trying to:
  - Penetrate adversary system and mask own system against his penetration;
  - Create a variety of impressions of what is occurring and what is about to occur;
  - Generate mismatches between what seems to be and what is;
  - Push adversary beyond his ability to adapt.
- Intentions that make-up Plan cannot happen without application of transients that make-up Action.

cult for him to keep track and know what's going on. And because of that, you want to generate a mismatch between what seems to be and what is. In other words, he's got an image or images of the world that really don't correspond to what's going on. Got it?

And finally, you want to push him beyond his ability to adapt. So, he can't even keep up or keep pace with what's going on. And I call this, for lack of a better word, we'll just call that first impression. First bullet and substatement. And second, remember, the intentions that make up the plan cannot happen without application of transients that make up the action. You know, you have a good plan, but you don't have no initiative to execute. Baloney. So, you got to execute. Okay?

And I call this the second impression. Now let's work—look at the first bullet, the first impression. And I go back to Napoléon. Some comments made by Napoléon. I'll let you read them. And what I'm showing you here, his comments really fit in very nice with our plan and action statements. Fit in nice, I mean, his—yeah. These tactic—these, Patton strategic and tactical—you know, the plan, you're sort of thinking strategically, the action you're thinking tactically. You see what I'm saying? In that sense, they fit in nicely with the following comments by Napoléon. I'll let you read it and then comment on it. Getting tongue-tied here.

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FIRST IMPRESSION

- Note how these strategic and tactical ideas, that we evolved from the Plan and Action statements, fit-in nicely with the following comments by Napoleon:
  - "The art of land warfare is an art of genius, of inspiration. . . . A general never knows anything with certainty, never sees his enemy clearly, never knows positively where he is. When armies are face to face, the least accident in the ground, the smallest wood, may conceal part of the enemy army. The most experienced eye cannot be sure whether it sees the whole of the enemy's army or only three-fourths. It is by the mind's eye, by the integration of all reasoning, by a kind of inspiration, that the general sees, knows, and judges."
  - "The first quality for a commander in chief is a cool head which receives a just impression of things; he should not allow himself to be confused by either good or bad news; the impressions which he receives successively or simultaneously in the course of a day should classify themselves in his mind in such a way as to occupy the place which they merit; because reason and judgment are the result of the comparison of various impressions taken into just consideration."
- Above comments, by Napoleon, reveal ever-present vulnerabilities and weaknesses that commanders and subordinates alike must accept.

hence

- If we turn these comments around and connect them with the tactical and strategic ideas presented thus far, we surface a modern notion of Grand Tactics.

[long pause as audience reads slide]

Anybody? What does that—what do those two paragraphs tell you? Or those two passages. What do those two passages really tell you? What's Napoléon tell you? Just give it to me very condensed, what he's saying. I want it very condensed, very succinct.

Audience: Fog of war. It's always there.

Boyd: That's right. Which means what then? What do you want to do? Knowing that all—what he's saying, all human beings, even the genius that he was, Napoléon and the commanders, this is a big problem for him. And it's something they have to resolve, right? I mean, that's what he's saying. I mean, I don't care whether you like his language or not, but basically, that's what he's telling you. You might say, "Well, I wish he would have said it different." That's not the argument. I don't care whether he said it differently or not. That's the message. And if you think about it yourself, that's really a true message. That's really true. What is he really saying? If that's the case,

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WHICH BECOMES:

Grand Tactics

- Operate inside adversary's observation-orientation-decision-action loops, or get inside his mind-time-space, to create a tangle of threatening and/or non-threatening events/efforts as well as repeatedly generate mismatches between those events/efforts adversary observes, or anticipates, and those he must react to, to survive;

thereby

- Enmesh adversary in an amorphous, menacing, and unpredictable world of uncertainty, doubt, mistrust, confusion, disorder, fear, panic, chaos, . . . and/or fold adversary back inside himself;

thereby

- Maneuver adversary beyond his moral-mental-physical capacity to adapt or endure so that he can neither divine our intentions nor focus his efforts to cope with the unfolding strategic design or related decisive strokes as they penetrate, splinter, isolate or envelop, and overwhelm him.

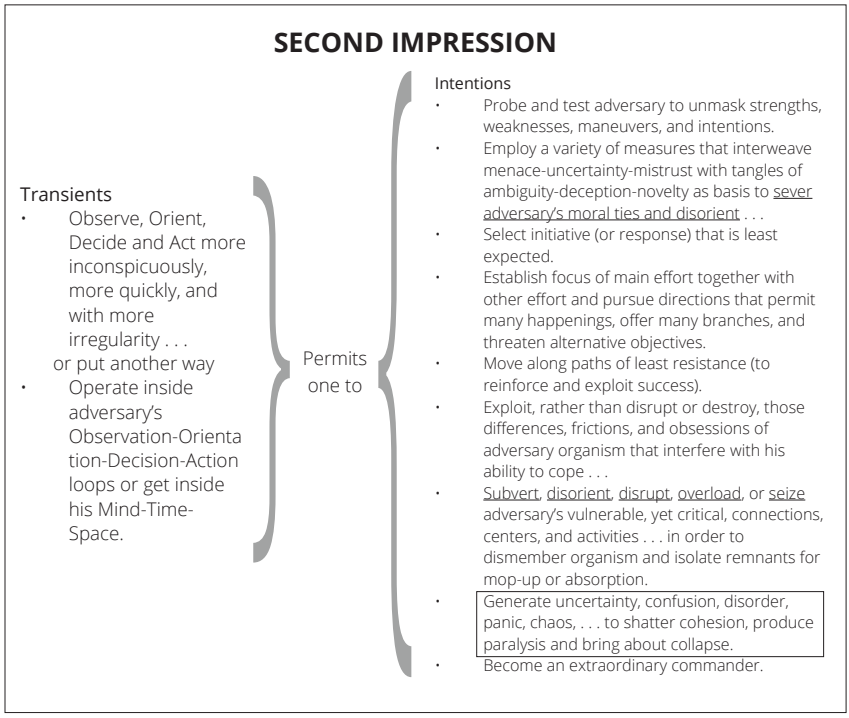
that's a vulnerability that all human beings have. What you want to do is feed that vulnerability to them. That's a weakness or vulnerability. You want to turn the argument around, say, "Oh, is that the problem? We're going to make it even tougher, then he'll never be able to do it." Reveal ever-present vulnerabilities. What is this? So, if we turn these arguments around, you want to play to that. You want to lever that, because it's a natural human condition. You want to lever that natural human condition, if you're in a conflict situation. Okay? So, we're going to do that.

So, putting together the stuff we've been talking about here, when you want to think about grand tactics, or operational level, or whatever you want to call it, or like you Marines like to call it, campaigning, which is all right too. I just use the old-fashioned term.

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And note what I'm saying here. This then sets up this, which sets up this. Note what I'm saying. Get inside his, by doing these kinds

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of things. Create tangles of threatening or nonthreatening efforts. Generate mismatches between those things he observes, and those kinds of things he's going to have to react or adapt to. Now if you can start doing that kind of stuff, thereby that allows you to enmesh him in an amorphous, menacing, unpredictable world of all these kinds of things.

As a matter of fact, not only that, you literally fold him back inside himself, because now he's out of touch with his environment. And what happens when that happens? Doubt, uncertainty, panic, chaos, unglued. And see, thereby, that sets up your—maneuver adversary beyond his capacity to adapt or endure, so he can neither divine our intention or focus his efforts to deal with it. You just pull him apart. More than bit by bit. Chunk by chunk, bit by bit. So that's the sort of a philosophy you want to have. Okay?

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WHICH LEADS TO:

Strategy

Penetrate adversary's moral-mental-physical being to dissolve his moral fiber, disorient his mental images, disrupt his operations, and overload his system, as well as subvert or seize those moral-mental-physical bastions, connections, or activities that he depends upon, in order to destroy internal harmony, produce paralysis, and collapse adversary's will to resist.

With that in mind, then, let's go to the second impression. Where I said the transients—you have to have the transients to feed the intentions, which make up the plan. So, remember—I don't care whether you write it this way. But you want to get inside his tempo or pace, or get inside his OODA loop, whatever you want to call it. Get inside his mind-time-space. That, by doing that, that permits you to realize these intentions. And these are nothing more than a replay of the statements I had under what? The plan and the pattern of a successful operation.

But note what I underlined. Note these underlines. The reason why I underlined those, those underlines, actually, if you look at those words, *[20:00]* it's implicit in all those statements. The things that are underlined are implicit in every statement there. And by doing this—all this, you can realize the statement inside the box, was what you're trying to realize. You're trying to realize that statement. So then, if you take this and merge it with this, you glue the whole thing together. Just synthesize it. You see what I'm doing? I'm merging. What am I doing when I use the word *merge*? Synthesis. I'm not analyzing now, I'm synthesizing. I put it together. And so when I put it together, now you can come up with a generalized strategy.

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We talked about generalized tactics, generalized grand tactics, and here's your strategy. You want to penetrate his moral-mental-physical being to dissolve his moral fiber, disorient his mental im-

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NOW ALTOGETHER

Tactics

- Observe-orient-decide-act more inconspicuously, more quickly, and with more irregularity as basis to keep or gain initiative as well as shape and shift main effort: to repeatedly and unexpectedly penetrate vulnerabilities and weaknesses exposed by that effort or other effort(s) that tie-up, divert, or drain-away adversary attention (and strength) elsewhere.

Grand Tactics

- Operate inside adversary's observation-orientation-decision-action loops, or get inside his mind-time-space, to create tangles of threatening and/or non-threatening events/efforts as well as repeatedly generate mismatches between those events/efforts adversary observes, or imagines, and those he must react to, to survive;

thereby

- Enmesh adversary in an amorphous, menacing, and unpredictable world of uncertainty, doubt, mistrust, confusion, disorder, fear, panic, chaos, . . . and/or fold adversary back inside himself;

thereby

- Maneuver adversary beyond his moral-mental-physical capacity to adapt or endure so that he can neither divine our intentions nor focus his efforts to cope with the unfolding strategic design or related decisive strokes as they penetrate, splinter, isolate or envelop, and overwhelm him.

Strategy

- Penetrate adversary's moral-mental-physical being to dissolve his moral fiber, disorient his mental images, disrupt his operations, and overload his system, as well as subvert or seize those moral-mental-physical bastions, connections, or activities that he depends upon, in order to destroy internal harmony, produce paralysis, and collapse adversary's will to resist.

Strategic Aim

- Diminish adversary's capacity while improving our capacity to adapt as an organic whole, so that our adversary cannot cope, while we can cope, with events/efforts as they unfold.

ages, disrupt his operations, and overload his system. As well as subvert or seize those moral-mental-physical bastions, connections, those things that he depends upon. In order to destroy his internal harmony, produce paralysis, and collapse his whole ability even to carry on. That's your strategy in a generalized sense, regardless of where you are.

Now, obviously, you're going to have what? Many specific strategies. But they at least should subsume under them. Or like grand tactics, you can have as many grand tactics or operational things, maneuvers you're going to have, but they should be subsumed under that, because that, you're working—this is the human dimension. You're working his mind. Remember I said, terrain doesn't wage wars, machines don't wage wars, people do and they use their minds. And if you can get into their minds, you've got the people, you've got the machines, you've got the terrain. Okay?

[slide 134]

Now, let's look at them all together. And if we look at all these—question?

Audience: Are you saying this is one of the main objects of terrorists?

Boyd: Oh, goddamn right.

Audience: I mean, that—

Boyd: A lot of this that I've got—a lot of this stuff that I've showed you—well, this is a summation, but all I'm doing is to say let's take it all together. Tactics, the grand tactics, the strategy, and the strategic aim—am I answering your question? The tactics feed the grand tactics, that feed the strategy, that feed the strategic aim. And there's overlap. The whole thing's coherent, too. Do you see what I'm saying? It's all coherent.

Now, answering your question, where did I get a lot of this? I looked at the guerrillas, I say, "Hey, these guys are really gifted at this stuff." I mean, it's in the blitzkrieg too, but you really see it in the guerrilla operations and that kind of stuff. They're really gifted. I mean, they cause us enormous problems. And look what the Afghanis did to the Russians. The Russians, when they went to Afghanistan, the idea wasn't to leave. They wanted to stay. They left with their tail between their legs. To this day, they still can't believe it. In fact, they're calling it their Vietnam now. You see it on TV where they say, "Well, we're having our Vietnam."

And they still—they're all screwed up. Their veterans all are pissed off, they're all arguing with one another, they still can't figure out what happened. Have you looked at it? They're talking just like our guys. They had the same problem. They didn't realize they had to be in the village and not attack the village. I mean, in a different sense. It's not like Vietnam, I'm just trying to say there are connections.

Audience: Colonel Boyd, the difference between it is, I think they had handled it worse than we did. They once—

Boyd: They figured by just being hard-nosed they're going to make a take. Well, they had to leave. They had to depart the scene. I mean, they're looking at themselves, they still can't figure out why they had to depart the scene. Because here, they were the champion revolutionaries. But we were revolutionaries before those—when

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!—AN ALTERNATIVE PORTRAIT—!

Now, after some introspection, it is not difficult to see that these tactical and strategic statements are very definitely destructive in nature. Keeping these words in mind, while working backwards thru this presentation, one is left with the impression that the destructive attrition-maneuver-moral ideas played-out in the Categories of Conflict aren't much different than the tactical and strategic ideas that we have just discussed. As a consequence, by stripping-down and recombining the ideas associated with both these conceptual streams, we can evolve an alternative portrait of ruin as follows:

we fought the British. We did those kinds of things. And now, meantime, everybody's doing it to us, and also the Russians.

Forgot something along the way. We forgot something along the way. So did they. They thought they were invulnerable. They're not. But you see what's going on here. It all plays together. It's all very coherent. Okay? I'm just pulling it all together.

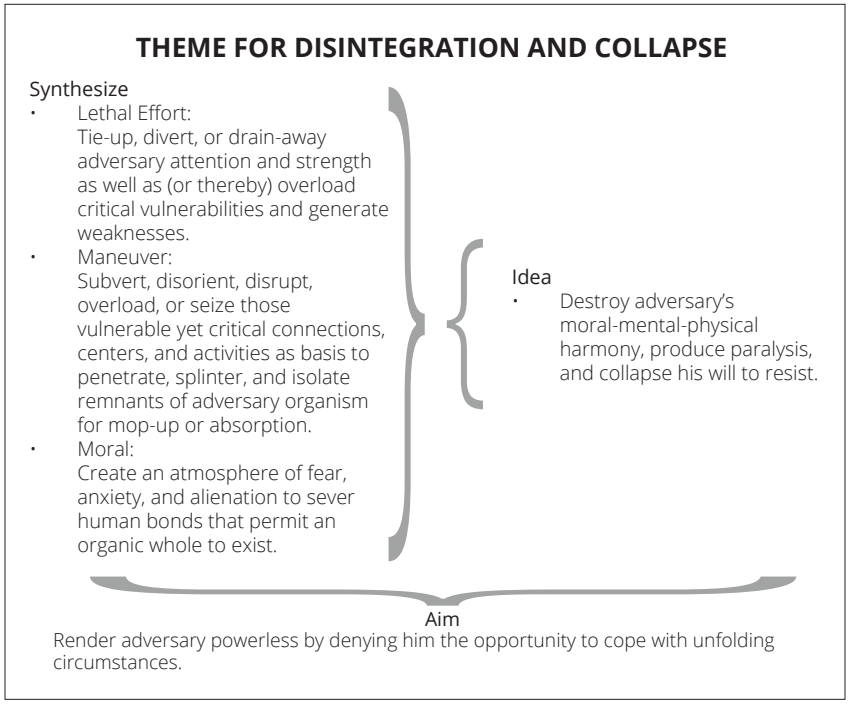
[slide 135]

Now, let me give you an alternative portrait. I'll let you read this chart. I mean, you can look at it that way, I just want you to look at it other ways, too, and think of your own ways. Remember I said, the important thing is to be able to look at these from many different viewpoints. So, now let's just—let's pull it apart and look at it another way. But you'll see it's very similar. So, we want to look at that pyramid from a few different sides.

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So, here's another way I can look at it. Synthesize these things. Lethal effort, maneuver, and moral. Lethal effort, this is the kind of things. Maneuver, these are the kind of things. Moral, you're trying to work them in. Pull it all together, here's your basic idea then. You can think of it that way. And you say, "Well, hell, I can think of another

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way." I say, great! Think it, write it down, good! *[25:00]* And the aim's very similar.

But if you think about it, this is not much different than the previous chart. I mean, it's got a little different focus. But you see the same kind of themes in there, it's just an alternative way of thinking about it. And maybe in some cases, this might be a better way of thinking about it than the other way, or maybe your own way. Okay?

Now what I want to do, now let's step all the way back to the beginning, because we worked our way all the way through. Sun Tzu, Mongols—I mean, Napoléon, Mongols, blitzkrieg, guerrilla war, counterblitz, counterguerrilla war, categories of conflict. There's something that keeps repeating itself over and over again. A theme that begins to show up. And this is it right here.

[slide 137]

Read that first box. An underlying insight. Note what I'm saying

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UNDERLYING INSIGHT

Unless one can penetrate adversary's moral-mental-physical being, and sever those interacting bonds that permit him to exist as an organic whole, as well as subvert or seize those moral-mental-physical bastions, connections, or activities that he depends upon, one will find it exceedingly difficult, if not impossible, to collapse adversary's will to resist.

Which leads to

THE NAME-OF-THE-GAME
Morally-mentally-physically isolate adversary from allies or any outside support as well as isolate elements of adversary or adversaries from one another and overwhelm them by being able to penetrate and splinter their moral-mental-physical being at any and all levels.

there. And I underlined the key word, penetrate. Unless one can penetrate adversary's moral-mental-physical being, and sever those bonds, or connections, that permit him to exist as an organic whole, as well as subvert or seize those things that he depends upon, you will find it exceedingly difficult, if not impossible, to collapse adversary's will. If you can't penetrate and do that, why should he throw the towel in? He won't.

And so, even though Russians made a physical penetration of Afghanistan, they didn't penetrate the other stuff, therefore, they didn't throw the towel in, instead, they had to get out. Just like we did in Vietnam. You think back over everything we've talked about the last two nights and tonight, work your way back from Sun Tzu, Mongols, Napoléon, Clausewitz, Jomini, World War I, World War II, blitzkrieg, counterblitz, guerrilla, counterguerrilla, that's what's going on. Which leads to what I call "the name of the game." With that penetration, then it permits you to isolate him from his allies or isolate themselves from one another. In other words, you're generating those many noncooperating centers of gravity, they don't have a

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?—RAISES QUESTION—?

How do we connect the Tactical and Strategic notions
or the Theme for Disintegration and Collapse
with the National Goal?

base of support that nurtures, that keeps the operation going. It just withers away. It withers away.

Now, if you're going to have principles of war, which I'll get into, these are two good principles. Penetrate and isolate. Two of them, at least. You want to penetrate that guy, they're outwardly focused—you want to isolate those components one from the other and then subdue or overload those components so you can get him to do what you want him to do, not what he wants to do. That's part of it, and I'll come back to it later on.

[slide 138]

Okay. Now, which raises an interesting question. We want to step up to a higher level. How do we connect these notions, or the theme for disintegration and collapse with the national goal? Remember that other thing we called "theme for disintegration and collapse," that alternate view. How do we do that? So, let's look at that. And these are the kind of things you should be interested in.

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One, it should support the national goal. Two, we should pump up—we should set it up so it pumps up our resolve, drains away adversary resolve and attracts the uncommitted. That's where we lost in Vietnam. We lost at the grand strategic level. We pumped up their resolve, drained away ours, and they attracted the uncommitted. We had to come home. We lost at the grand strategic level. So did Hitler. He had some good tactics. He'd pumped up the other adversary's resolve, drained away—he didn't really drain away his, they held together pretty well. But he did cause—because their opera-

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—VIA A SENSIBLE GRAND STRATEGY THAT WILL:

- Support national goal.
- Pump-up our resolve, drain-away adversary resolve, and attract the uncommitted.
- End conflict on favorable terms.
- Ensure that conflict and peace terms do not provide seeds for (unfavorable) future conflict.

tions caused the enemies to attract the uncommitted. He also lost at the grand strategic level.

And you want to end conflict on favorable terms. Obviously, ensure that peace terms do not provide seeds for future conflict, or in the event they do, at least not unfavorably towards you.

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So, if you paste all that together, you can come up with a basis for grand strategy. Here's the basis for you. You better have this basis, because, otherwise, you're not even going to be able to play that game. Sun Tzu had two-thirds, remember he said, "Know your enemy, know yourself." You got know your enemy, you know yourself, and also, those third parties out there. It's not just a two-cornered stool, it's a three-cornered stool.

Audience: Is this the level above us as military people though?

Boyd: You, as a military person, better understand that, particularly if you get caught in a guerrilla operation.

Audience: I understand. I understand. But how—

Boyd: But the politicians better understand this, otherwise, they can get us in trouble if they start doing the wrong things. If that's your nature of your question.

Audience: But once we're committed, we're well beyond this, and this is out of our hands.

Boyd: Wait a minute. No, no, no. You get in a guerrilla war, like I

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GRAND STRATEGY

Essence

- Shape pursuit of national goal so that we not only amplify our spirit and strength (while undermining and isolating our adversaries) but also influence the uncommitted or potential adversaries so that they are drawn toward our philosophy and are empathetic toward our success.

Basis

- An appreciation for the underlying self-interests, critical differences of opinion, internal contradictions, frictions, obsessions, etc., that we as well as the uncommitted and any potential or real adversaries must contend with.

said, you can get inside the villages, instead of attacking the villages, in a sense, you're playing this kind of a game.

Audience: Sorry, this is proactive? You can do this before the conflict starts?

Boyd: Of course.

Audience: —is what we should be doing, before the goddamn conflict starts.

Boyd: Of course. Before, and even afterward, but it gets tougher afterward. *[30:00]* Your point is well taken. It's harder. But it can still be done. It's got to be done very delicately. But, you know, you can't think of running a couple hundred tanks in there and blowing away villages, because all you're going to do is alienate—you're, pretty soon, it's "that dirty son of a bitch," they're against you then.

Audience: But we should be doing this before the conflict starts, to begin with.

Boyd: Exactly. You know when we should be doing it? Right now.

Audience: Right now.

Boyd: Right now. The answer to your question, absolutely. Right now, we should be doing it.

Audience: Not waiting for the conflict to start, when we have—

Boyd: Yeah, you want to get on top of it. Get that leverage. Not only that, you build up friends. Not only that, you're not hosing a lot of people, except the guys you're trying to beat. [Cross talking] getting beat.

Audience: Maybe I was getting too much down into the weeds. By the time they send me in, I don't have the opportunity to go into Grenada prior to, and try to make friends, try to get into the village to work with them.

Boyd: That could happen. When you're sent in that kind of operation, you've already been given the order to do it. But you can't disobey the order.

Audience: Very true.

Boyd: But then, what that is, that's a screw-up on their part because we got pushed into that position to do something like that. In other words, now we're attacking the village, instead of trying to get inside the village. And you can't say, "I'm not going to do it," because they're going to court-martial you. But it's still a screw-up. You understand what I'm saying?

Audience: Yes, sir.

Boyd: It's still a screw-up. And we got to recognize it. We don't recognize it, we're going to continue to make more and more screw-ups. That's all I'm trying to say. And so, it's not only know your enemy and know yourself, but also, the third parties out there. And understand their culture in all those different countries, so then you can play this game.

And like the gentleman back there—what's your name? If you're not prepared to play that game, you know what my recommendation is? Stay the hell out, because you're only going to muck it up and embarrass yourself before your country and everybody else. Which was your point, the other night. You're going to screw it up, that's all. And the people lose confidence in you, like right now, Christ, we're having a hard time running that third-world operation, because every time you try to think of something like that, when we're trying to help people out, "Vietnam," right away they raise the flag. The very thing you're talking about. They raise the goddamn Vietnam flag,

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PATTERN

National Goal
- Improve our fitness, as an organic whole, to shape and cope with an everchanging environment.

Grand strategy
- Shape pursuit of national goal so that we not only amplify our spirit and strength (while undermining and isolating our adversaries) but also influence the uncommitted or potential adversaries so that they are drawn toward our philosophy and are empathetic toward our success.

Strategic Aim
- Diminish adversary's capacity while improving our capacity to adapt as an organic whole, so that our adversary cannot cope, while we can cope, with events/efforts as they unfold.

Strategy
- Penetrate adversary's moral-mental-physical being to dissolve his moral fiber, disorient his mental images, disrupt his operations, and overload his system, as well as subvert or seize those moral-mental-physical bastions, connections, or activities that he depends upon, in order to destroy internal harmony, produce paralysis, and collapse adversary's will to resist.

Grand Tactics
- Operate inside adversary's observation-orientation-decision-action loops, or get inside his mind-time-space, to create tangles of threatening and/or non-threatening events/efforts as well as repeatedly generate mismatches between those events/efforts adversary observes, or imagines, and those he must react to, to survive;

  thereby
- Enmesh adversary in an amorphous, menacing, and unpredictable world of uncertainty, doubt, mistrust, confusion, disorder, fear, panic, chaos, . . . and/or fold adversary back inside himself;

  thereby
- Maneuver adversary beyond his moral-mental-physical capacity to adapt or endure so that he can neither divine our intentions nor focus his efforts to cope with the unfolding strategic design or related decisive strokes as they penetrate, splinter, isolate or envelop, and overwhelm him.

Tactics
- Observe-orient-decide-act more inconspicuously, more quickly, and with more irregularity as basis to keep or gain initiative as well as shape and shift main effort: to repeatedly and unexpectedly penetrate vulnerabilities and weaknesses exposed by that effort or other effort(s) that tie-up, divert, or drain-away adversary attention (and strength) elsewhere.

then they all—everybody starts trembling. "Well, we can't do that." Even though you're right. Okay?

[slide 141]

So, we paste all that together, now we invert again. Remember, I went from bottom up. Tactics, grand tactics. So now we're going top down. Your national goal. Of course, you already know what I'm going to say: we got national goal, grand strategy, strategic aim, strategy, grand tactics, and all these groups. So, you don't have to read them all.

The point I'm trying to bring out here, if you look at these, the upper two tend to be constructive in nature, yet they operate over a longer timeframe. Whereas, the bottom four, which is—he was sort of alluding to—tend to be destructive in nature, but they operate over a shorter timeframe. So, the question is, how do you harmonize these two things that sort of have opposing tendencies? Short-term versus long-term and constructive versus destructive? You sort of

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INSIGHT

On one hand, as shown on the previous chart, the National Goal and Grand Strategy tend to be constructive in nature. On the other hand, the Strategic Aim, Strategy, Grand Tactics, and Tactics are destructive in nature and operate over a shorter time frame. In this sense, the upper two and the latter four notions, as expressed, appear to be in disharmony with one another. Yet, application of these latter four strategic and tactical notions permit real leadership to avoid high attrition, avoid widespread destruction, and gain a quick victory. This, combined with shattered cohesion, paralysis, and rapid collapse demonstrated by the existing adversary regime, makes it appear corrupt, incompetent, and unfit to govern. Under these circumstances, leaders and statesmen offering generous terms can form the basis for a viable peace. In this sense, the first two and the latter four notions can be in harmony with one another.

have to—you know, that's the way the world is. You're going to have to face up. How do you deal with that kind of stuff?

[slide 142]

And so, this little note here, this message under this insight here, is a way of thinking about it. I'll let you read it in a formal sense, and I'll deal with it even more simply after you read it. I'll let you read it first.

[Long pause as audience reads slide]

Boyd: What am I really saying here? Anybody? What am I really saying? What I'm saying is very simple. That if you go in there, and not only get a quick victory, but behave afterward, the people are going to tend to be on your side. Why? Because here, if they spent money over a number of years, building up their defense establishment, and the whole thing collapses away in no time, they're going to think they're a bunch of corrupt bastards. So, you got that working for you.

But if you go in there and come down heavy-handed, you lose it all. You lose it all. Think about it. Remember, let's say our country

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FURTHER ELABORATION

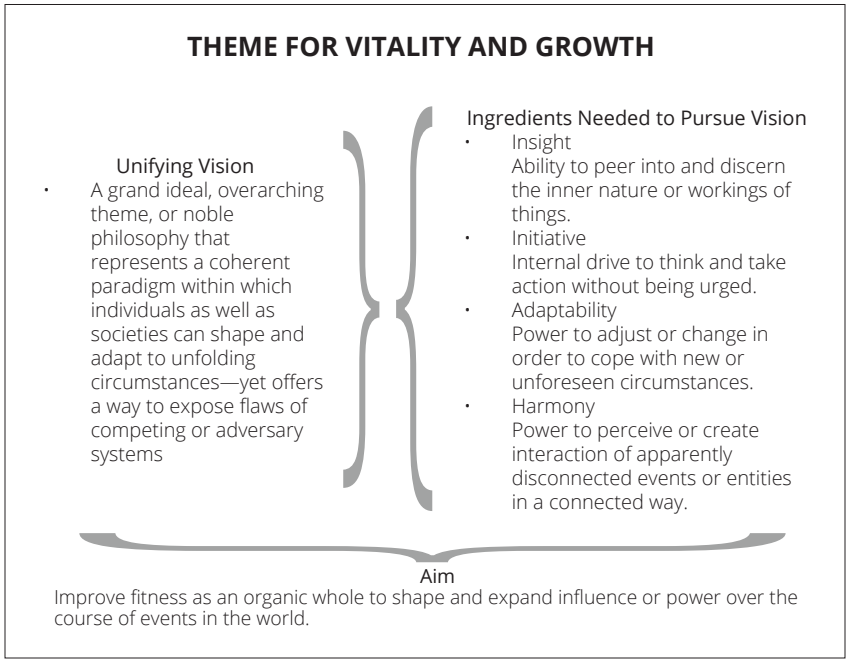
Up to this point—by repeatedly adding, stripping-away, and recombining many different, yet similar, ideas and thoughts—we have examined the nature of conflict, survival, and conquest in many different ways. A review and further manipulation of the ideas and thoughts that make-up these different ways suggests that, for success over the long haul and under the most difficult conditions, one needs some unifying vision that can be used to attract the uncommitted as well as pump-up friendly resolve and drive and drain-away or subvert adversary resolve and drive. In other words, what is needed is a vision rooted in human nature so noble, so attractive that it not only attracts the uncommitted and magnifies the spirit and strength of its adherents, but also undermines the dedication and determination of any competitors or adversaries. Moreover, such a unifying notion should be so compelling that it acts as a catalyst or beacon around which to evolve those qualities that permit a collective entity or organic whole to improve its stature in the scheme of things. Put another way, we are suggesting a need for a supra-orientation or center-of-gravity that permits leaders, and other authorities, to inspire their followers and members to enthusiastically take action toward confronting and conquering all obstacles that stand in the way. Such a scheme can be portrayed as follows:

got invaded and here we spent years, billions of dollars for defense, and somebody came in here and took us over very fast. You'd say, "Those dirty bastards. They didn't even know how to do it." But then if a guy comes down hard, then you reunify them. In a sense, that's what happened with Hitler against Russia. Remember, they were welcomed in, but then, Hitler came down harder than they—Stalin, they said, "Well, we're going to have a dictator, we're going to have our own." *[35:00]* So it's very delicate. You've got to be very careful. Okay.

[slide 143]

Now let's have a further elaboration. Let's build up to a higher level. Build up a philosophy. Pull it apart and put it back together again in a different sense. Working up to a higher level. I'll let you read that. In other words, what we're talking about here is what I like to call a unifying vision, or a unifying theme for all this stuff. You can

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think of tactics, you think of grand tactics, or strategies, goals, but also you want to work a big, huge unifying theme.

[Long pause as audience reads slide]

[slide 144]

Okay? And this I call a "theme for vitality and growth." Remember, we had the "theme for disintegration and collapse." Now we got a theme for—juxtaposing it, for vitality and growth. Unifying vision. This kind of a thing. Now the Marxist stuff, they had one there for a while, but since then, their systems been tested and it's not holding up. And that was the theme that the world was going to march to. A unifying vision. They were trying to show the flaws in the other systems. You develop that, you better be sure you have that looked at pretty carefully. In other words, you're trying to really build up a super-organic whole. On the other hand, you got to be very careful. You make it too rigid, then you lose these things.

Well, here's the ingredients needed to pursue that vision. Insight, initiative, adaptability, harmony. Those kinds of ingredients.

Now too often, when people build a unifying vision, they lose this. In the U.S., we're the other way. We tend to have this [references left side of slide, "unifying vision"], and not this [references right side of slide, "ingredients"]. They're sort of opposite—they're sort of in tension with one another. You go one way, you tend to lose the other. You go the other way, you tend to lose the other. So, there might be some times you're like, this is more important, you might lose a little bit. And other times, you want to play this. This is less important. So, you're always trying to work that balance. It's an endless game, always trying to work that balance.

Now there was one time when we sort of had the good balance. When was that? I mean, talking about a time of real crisis. World War II, because we had Hitler out there, you see. So, we got everybody unified, we can use him as the basis, he's the evil, and therefore, we can still have these two things together. Go ahead.

Audience: That's easy to understand, because we were threatened. We were hit at Pearl Harbor and things like that. But when you take a look at Vietnam, or even the present situation—

Boyd: Note what you just said. No, wait—let's stop. I'm going to let you pick it up. What'd you just say? Go back up what you just said. Very important what you just said.

Audience: When we were directly threatened.

Boyd: You were hit at Pearl Harbor.

Audience: Yes.

Boyd: So, what happened?

Audience: Well, we hit back.

Boyd: We used that as a basis to unify. In other words, these guys doing that. That's what I'm trying to tell you. That's why you got to be very careful about being heavy-handed. So, if you do something like that, you can unify your adversary. And that's particularly important in guerrilla war. That's why I said, note what you just said. The Japanese unified us. Before that happened, we had "America First" units, we had the German-American Bundt, that—all that stuff. If you look back in history, I was a young kid at that time and I remember that. And as soon as they did that, the whole country unified. Goddamn it, if they're going to play that kind of game, we're going to kick them in the ass and win this thing.

Audience: With our [unintelligible] situation is not—

Audience: —country that ever consistently worked. I think in our society—

Boyd: Say again.

Audience: In our society, what I can see, you look at the history. To unify us, as a society, the way you're talking, is an attack on us. It was on our soil—

Boyd: What you're really saying, in a sense, we need a kick in the ass.

Audience: That's right.

Boyd: Yeah. Unfortunately.

Audience: Short of that, doesn't give us that unifying threat.

Boyd: That's tough. That's what I'm trying to tell you.

Audience: Vietnam, Grenada, none of that—

Boyd: But some way, if you know how to play the moral and mental game, and show people are really undermining you, and you really are in that crisis, if your people are clever enough, you can do that. Maybe not to the extent because of a Pearl Harbor, but it's sufficiently enough so you can play the game. That's what I'm trying to tell you. But if you don't know how to do that, and a guy says, "Fuck them. We're going to bomb them back to the Stone Ages," you lose it all. You lose it all.

Audience: It's not the same. In my battalion, you can almost see it. With what happened with the *Stark*, in the Persian Gulf, and then shoot-down of the Iranian airliner, I've thought many times to myself, if we had shot down that airliner just five years ago, seven years ago, I think that the whole reaction of the country and the media would have been completely different.[91] And yet so, when that happened, basically, the attitude of the American—

Boyd: Why'd we get away with it?

Audience: *[40:00]* I say, I think because relating it to the Stark, short time earlier. Look, out of everything that's happened—

Boyd: Not only that, and the way the Iranians were behaving,

[91] In 1987, the USS *Stark* (FFG 31) was deployed to the Persian Gulf in the middle of the Iran-Iraq War. On 17 May, an Iraqi aircraft fired two antiship missiles that hit the *Stark*, killing 37 American sailors. On 3 July 1988, Iran Air Flight 655 was shot down by the USS *Vincennes* (CG 49), killing all 290 passengers and crew aboard. The *Vincennes* had mistakenly identified the aircraft as an F-14A Tomcat fighter flown by the Iranian Air Force.

and sinking those ships, and shelling those ships, that just warned everybody off and so they, the people, said, "Okay. We shouldn't have done it." You remember, people thought we shouldn't have done it.

Audience: Right.

Boyd: But it was a goof, and it wasn't intentional. Where if you were saying it was done in peacetime, they'd want to see generals fired and politicians fired. You're right.

Audience: They were shooting at America.

Boyd: That's right. But see, the circumstance, it was a different environment. In other words, it wasn't really morally justified, what we did. But it was recognized as a goof, there wasn't an intent to do it. They could get away with it. That's my point.

Audience: Absolutely. Absolutely. If we had said—

Boyd: And we didn't want to do it. It's obvious the guy that did that, didn't want to do that. It was a goof. Just like the Iraqi guy, pumped—at least, we think he pumped one into his cutter. I mean, we didn't like it. We were supportive. I mean, so the guy goofed, he got—he probably looked at the scope, "God, I've got a big goddamn Iranian target out there, let me launch one." Two, I mean.

Audience: But I think if the same situation had happened—

Boyd: Because remember, they pumped two missiles into the Stark—

Audience: The late '70s, even. Even though it was a goof. I don't think it would've been accepted by the American people. I think we would still be beating up, because of the times.

Boyd: But because of circumstances. See, that sets the moral climate, that's what I'm trying to tell you. But in that case, we weren't attacking Japan or Germany and that. When they made an attack on Pearl Harbor, they just unified the nation.

Audience: Got a lot of national resolve when those hostages were taken by the Iranians—

Boyd: Yeah, the Iranians helped us out there, too.

Audience: That's right. And the press. But I think, unless you have something like that, you're being some of our Central American [unintelligible].

Boyd: Yeah, but let me show you. That's why I want you to hear my strategy brief, I address a lot of those things more specific and in the very way. I show you how to use those mismatches, but use it to

your advantage. There's mismatches there, and how you use those, you could lever the situation. But it also demands a certain way you have to behave, and if you don't behave right, you could lose it all.

Audience: Do you agree that it's got to be in spite of what the politicians are doing to each other?

Boyd: Well, the politicians can undermine the whole thing if they do some dumb things. So they have to be careful, and people have to say, "Listen, tiger, that doesn't help us." Why is Jim Wright in trouble right now?

Audience: I think he's in trouble because they went after Pamela Small?[92]

Boyd: Well, that's one reason. That's part of it. I'm sure that's it. Look, why do you—I told you the other night. Why are these guys in trouble? You know what happens if—see, right now, we got a huge national debt. I mean, it's going in—what do you call it? The deficit financing. We got our trade balances going to hell. We're paying these huge things. Our standard of living is going to hell for a lot of people. Maybe in the military, you're better off and some of the guys, the rich people are better off. There's a lot of people out there are not doing well. They're on fixed incomes and everything's sliding away from them. They're even getting less income. I mean, I'm out there and I'm watching. I'm not in the Washington area inside the Beltway, Christ, smoking a cigar, having a nice glass of wine and living a good life, or a *Washington Post* reporter, who does all his goddamn work out of the press room up there and Christ, he's got a nice word processor and all that, and Christ, the editor, kiss his ass in order to get a good story and give him a good salary. And they do all their work inside the goddamn Beltway. And they're not sensitive to what's going on. There's people who are horned off.

And that 51 percent pay raise, it outraged the whole—I was down in Florida, and man, they were sore. They would have strangled some of the guys if they could have gotten a hold of them. Why do you think that Congress gave it up? They really wanted that pay raise. They knew they were in trouble if they went for it. And you know what they said down there? They said, "When they start deliv-

[92] Boyd is again referring to the scandal embroiling congressman Wright and his aide.

ering the goods, getting rid of the debt, and doing what they're supposed to, then we can talk about pay raises." In fact, you know what they said, they said, "Wait, we ought to give them a 51 percent pay cut." We'll give them the money based upon what they do. They haven't been doing anything, except grabbing money for themselves.

And if the goddamn job is such a poverty job, why is everybody fighting to retain their seat? Remember that 99 percent reran. And if it's such a goddamn—but why are they fighting to retain that seat in Congress? Couldn't be too bad, or at least they like being poor. I mean, you should have seen. I saw them talk to. Their people said they were out—it was terrible, they were outraged. Boy, they were really sore. And then you got these idiots in the Post, David Broder and the rest of them, "Well, they deserved it." And boy, is he getting $150,000 or $200,000 a year. He doesn't know what the hell's going on out there. He's comfortable inside the Beltway.

I'm just picking on the *Post* because they're inside the Beltway. They're not the only— See, that's—we're getting down to some very fundamental things. And that's why they're mad at Jim Wright. If they were picking the pockets and all that, yet the other people were doing very well, they say, "Oh, well, life goes on." But not only are they playing that game, in the meantime they're hosing others, and the other people are getting screwed in the process. Say, "Oh, no." Then it's too much.

Audience: *[45:00]* Politicians sort of have an innate guerrilla ability to flow like water themselves.

Boyd: Well, they sure did flow on that one, didn't they? And I forgot the pay raise.

Audience: Depending on the national sentiment, the American people adopted an attitude that the politicians immediately shook.

Boyd: I think they thought they could get that 51 percent, and the American people would just sit there with little grumbling, and get away with it. Well, it blew up in their face. They didn't do just a little grumbling. They raised a fuss. You heard about the letters? "You go for it, we're going to throw you out." That's the constituents on it. "You go for that, and you vote for it, we're throwing you out. You're not going to be reelected, we guarantee." And one guy said, "Holy Christ. I want to be reelected." He forgot that pay raise.

SLIDE 145

APPLICATION

Audience: Another source of resentment is the back-door approach that they took, which they know is—

Boyd: Which is a filthy approach.

Audience: Right.

Boyd: So, they didn't have to take any—

Audience: If I don't vote, then it happens.

Boyd: Yeah. They don't have to vote. In other words, they didn't even take responsibility for it. They couldn't even put it up front. They tried to do it under the table, so to speak. Not only did they want to get 51 percent, they knew they wouldn't get it if they had it up front, so therefore, they tried to sneak it in under the table.

[46:11]

[End of tape 5, side 1]

[Begin tape 5, side 2]

Boyd: They're holding their constituents in contempt by doing that. And so, they reacted. Now they're afraid to vote anything. Because there's people out there waiting, "let them come in again, we'll beat up on them again." You know, because they know they're going to probably come in for 20 percent or 25 percent, they said we'll go after them one more time. Because now they're sensitized, you understand? They're out there, sensitized out there. Okay.

[slide 145]

Now, what I want to do, application. I'll skip the thing on the blitz/counter blitz, it's sort of like what I had on the counterblitz for the other thing, just in more detail. I call it "a'la Sun Tzu."

SLIDE 146

COUNTER-BLITZ
a'la SUN TZU

[slide 146]

I'll let you do that, but I want to go to the Manstein stuff. As soon as I can get my glasses on here. Skip that and we're going to go to Manstein. You can do that at your own leisure, it's pretty easy to follow if you want to talk about it. [Boyd shuffles through slides 147–55, section "Counter-Blitz a'la Sun Tzu"; see appendix] What number is that, please?

Audience: 156, sir.

[slide 156]

Boyd: Yeah, 156— 157, that's the one I want. 156, 157, "Blitz/Counter-Blitz Strategic Design" or what I call "Manstein Divined." You'll see why I say "Manstein Divined." How many people here read *Lost Victories*? Also, Balck talked about it very heavily when he was in this country. Everybody else said boy, that guy, he was their best strategist, one of the best field commanders, Manstein. The guy was a genius of war. And that's why I have it "Manstein Divined." So let's look into it, okay?

[slide 157]

This is going to be up at the operational level, grand tactical level. First of all, I'm going to talk about the background, I'm going to lay out some background for you before we begin talking about it, and then the strategic design that plays to that background. So let's look at the background.

[slide 158]

In the background, remember we talked about—I'm just using this as sort of a scheme, don't play it too tight. We talked about fighting the Battle of Leuctra and Leuthen, which what was the big thing

SLIDE 156

BLITZ/COUNTER-BLITZ STRATEGIC DESIGN
OR
MANSTEIN DIVINED

SLIDE 157

OUTLINE

- BACKGROUND
- STRATEGIC DESIGN

SLIDE 158

BACKGROUND

- BATTLE OF LEUCTRA AND LEUTHEN
- BATTLE OF CANNAE
- SCHLIEFFEN STRATEGIC MANEUVER

when I talked about Leuctra and Leuthen? Remember, this is people's minds, the commanders' minds. Remember, they were examples of successful what? Single outflanking, or single envelopment scheme, remember. Remember we talked about the circumstances surrounding it, that's all I'm talking about when I use that. Not that we're going to fight it like Leuctra or Leuthen, but the fact they represent the single envelopment or single outflanking scheme.

The Battle of Cannae, double outflanking, double envelopment scheme, remember? And the Schlieffen strategic maneuver was on a grand scale, all it was, was a single envelopment scheme. Okay. And I just trying to play back and you look at—how many ever read about Napoléon's Ulm maneuver? That's a big, huge, wheel too, but except it was a fluid wheel, not the rigid wheel that they had in Schlieffen. And as a result, in fact it was his best maneuver, he pulled it off, and Mack didn't know what the hell to do, so he surrendered. Threw his whole force in, didn't even fight, threw the towel in. Yet people talk about how great Napoléon was at Austerlitz, Jena-Auerstedt, you know, other battles. But note the word, those were battles, the other was a maneuver and the guy threw the towel in, threw in his whole force.

Got so screwed up by the way it happened, he couldn't keep up, cope. Yet, it's hardly ever mentioned. Okay? Okay, with that in mind then, the point that I want to make here, and I'm going to make an observation. Your single envelopment scheme, whether you want to think of Leuctra, Leuthen, Schlieffen, or whatever you want, they usually take less force then the double envelopment scheme, a'la Marathon or Cannae, to achieve the same benefit. Remember, we talked about that before.

[slide 159]

Okay, so in a sense what I'm taking here is sort of a Jominian mindset to look at how you set up these operations. One of the reasons why I'm taking this as a mindset, these guys had those kinds of mindsets. The commanders, not necessarily bad, providing you use it in the right sense, okay?

[slide 160]

Now, with that in mind, we'll pretend we're looking at it from the German viewpoint, World War II, the German viewpoint. First Poland, then France, then Russia, so we'll look at Poland first, okay?

SLIDE 159

OBSERVATION

Single envelopment schemes (a'la Leuctra, Leuthen, or Schlieffen) take less force than double envelopment schemes (a'la Marathon or Crumae) to achieve the same benefit.

SLIDE 160

STRATEGIC DESIGN

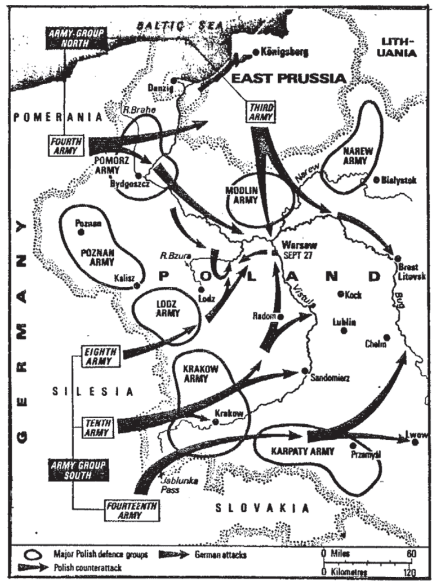
- POLAND
- FRANCE
- RUSSIA

[slide 161]

You look at Poland, and what do you see there? You see a lot of thrusts. You know to the uneducated eye, there's a lot of goddamn happenings here. Not only that, they're not—they're really more than that because remember, they're just showing you Army-level thrusts. They're not down in the thrusts inside thrusts, which is all

SLIDE 161

POLAND 1939



CONCENTRIC CANNAE WITH LEUCTRA/LEUTHEN UNDERTONE

these kinds of these operations going through there. And of course they enveloped all these forces, you know, they cleaned out Poland in no time.

Not only that, you can look at that, there's not much of a concentration there, is there? The word concentration doesn't have much of a meaning. There's a focus. Okay, and what's my point? In a large scale, what it is, it's a Cannae operation. In other words, it's a double huge, double, you know, just look at the flow, it's a huge double envelopment scheme, with what I would call a Leuctra/Leuthen undertone. Because there's more weight that's shifting in this direction from the other direction. So, there's sort of a combination of the two, to bag the forces.

Now can you see anything else there besides that? I showed you that. If you want to look at it through a Leuctra/Leuthen mindset, is

there another mindset you can look at it through? And if so, what is that mindset? *[05:00]* You might want to use both, go ahead.

Audience: I should say the Mongols with the flying columns?

Boyd: That's one. Remember the Mongols were doing that kind of stuff.

Audience: Multiple thrusts.

Boyd: Say it.

Audience: Multiple thrusts.

Boyd: That's right, that's multiple thrusts. Why are they using multiple thrusts? Let's pin it down. Why are they using these multiple thrusts, that's what I'm trying to pin down, that's exactly right.

Audience: Confusion.

Boyd: Confusion, that's great, in other words the guys can't figure out what's going on, go ahead.

Audience: To disclose the surfaces or the gaps.

Boyd: I didn't hear what you said.

Audience: Surfaces and gaps.

Boyd: They're finding surfaces and gaps, that's true. Remember, it doesn't say surface, in fact in your new manual, FMFM-1, it doesn't say "surface" and "gap," it says "surfaces" and "gaps." So, if you're using the words surfaces and gaps, you've got to think multiple thrusts. Yet, some people still don't.

Audience: They have to see whether they can have success and exploit that—

Boyd: You're still—you're not quite getting what I want you to get. I want you to get at something very fundamental. You're on to it, you're all saying the right thing, what am I getting at? If I can't penetrate my adversary, how can I envelop them or isolate them? I can't. So, the reason why you're having the multiple thrusts is so you can penetrate into his system, isolate the components from one another. What it really is, is a penetration/isolation scheme. So, those Leuctra/Leuthen maneuvers are penetration/isolation schemes. I mean, you know, if they all walk up in a line and try to go into it, they can't penetrate it.

And that's the idea, the surfaces and gaps. I mean that's the thought behind it, what are you trying to do, you're trying to duck the surface and shoot the gap, because you're trying to penetrate his system. And then isolate, break down their organic integrity, and

SLIDE 162

POLAND 1939

KEY POINT
GERMANS HAD MORE FORCES THAN POLES

then scarf up the components, as you like to call it, and like the military likes to call it, in detail. Scarf them up in detail. Which you cut them off in all levels from their supporting, or their support bases as you might call, if you want to call it, and their supporting and nourishing elements.

So, it's simply a penetration/isolation scheme, that's all it is. And then of course the overload, where you can subdue them at all levels. In this case, I'm just showing you the operational level. Okay?

[slide 162]

And key point, you've got to keep in mind. Remember, the Germans did have more forces than Poles. It's important, in other words, they weren't the deprived aggressor here, to say the least. They had not only more forces, but better forces, because they had tanks and Poles were trying to run cavalry against tanks if you recall. Okay?

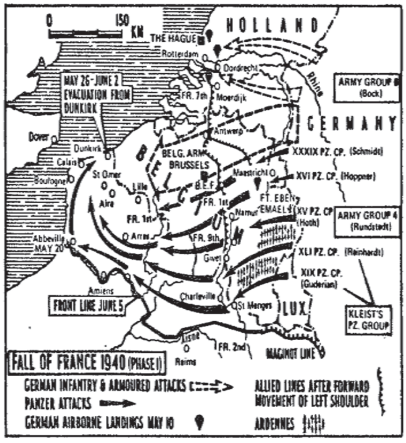
[slide 163]

Now, let's go to France, and you can lay it out in two phases. And I lifted these right out of some history books, all these charts. And you see the first phase, phase one here, you see what's happened, remember they had this other sort of what I call the *nebenpunkte* or the *cheng* going up north here, and then the *schwerpunkt* coming out of the Ardennes, sweeping around until they threw the British out of France, and then the second part, where they conquered all of France. And this is strictly a, really a Leuctra/Leuthen operation, a single envelopment scheme you're playing out here. And here, you

SLIDE 163

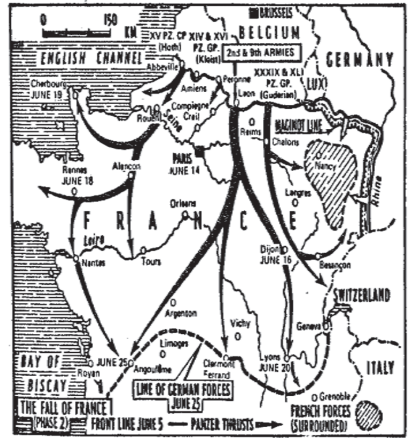
FRANCE 1940

PHASE I



LEUCTRA/LEUTHEN

PHASE II



ECCENTRIC CANNAE WITH LEUCTRA/LEUTHEN WINGS

see a couple, you see, a sort of a inside out Leuctra/Leuthen, another one here. So, it's an eccentric Cannae with what I call Leuctra/Leuthen wings. Eccentric meaning it's going outward rather than inward, in that sense.

But once again, what are they doing here? Penetration, isolation, penetration, isolation, that's what I'm trying to get at you. No penetration, no isolation, no penetration/isolation, the guy's not going to throw the towel in, you're not going to subdue him, you're just going to go on and on and on.

Wyly: But at the same time, that noncooperative center of gravity—

Boyd: Yeah, what's you're doing—

Wyly: —it's going on.

Boyd: Not only that, what you're doing is you cut those connections. You generate those many noncooperative centers of gravity so he can't function. That's what the isolation does, see. Remember, I said the inverse Clausewitzian. Not go after the center of gravity

SLIDE 164

FRANCE 1940

KEY POINTS
- GERMANS HAD FEWER FORCES THAN ALLIES BEFORE PHASE I.
- GERMANS HAD MORE FORCES THAN ALLIES BEFORE PHASE II.

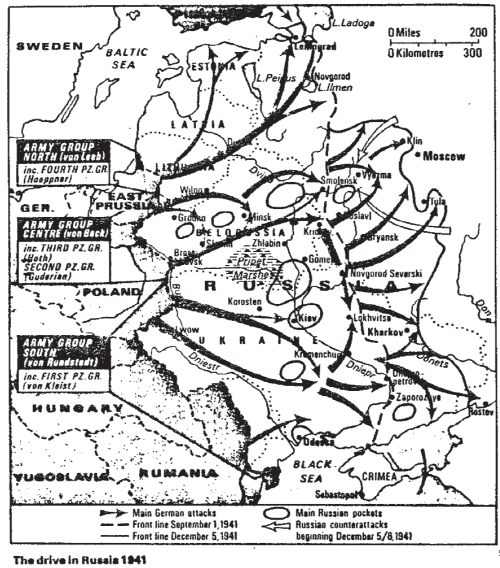
per se, because you may not, but generate many noncooperative centers of gravity, and then scarf up the debris. That's what I'm trying to tell you. And so, you know, how do you call this a concentration [unintelligible]? You know, it's sort of not the right word, is what I'm trying to tell you. It's some excess baggage we've got from the seventeenth, eighteenth, and nineteenth century, it doesn't fit. There's a focus, oh definitely that, that's why focus is a good word. You have a focus of what? Efforts or focus of thrusts, so multithrusts. You see what I'm getting at? What's focus, right? Damn right. Focus and direction. Okay?

[slide 164]

Now, France 1940, key points, I'm sorry. Germans had fewer forces than Allies did before phase 1, yet we call them the "hordes," *[10:00]* when you look in the history. They actually had fewer forces. Not only that, we had about the same number of tanks that they did. But they knew how to use them and we didn't. And when I was a kid I remember that, before Germans made their push on France, because of the Maginot Line, I was about, what, 13 then. And in fact, they said the best army in Europe was France. Well, that was until they went through the Ardennes. They weren't any army, they were done.

The Germans had more forces than the Allies before phase two, the second phase here, because they threw the British out and con-

RUSSIA 1941



The drive in Russia 1941

ECCENTRIC CANNAE WITH LEUCTRA/LEUTHEN WINGS

quered half the French Army, so then they could use all these, more of the double envelopments. Their first phase single envelopment, the next one double envelopment scheme. But once again, it's penetration/isolation. So, you can generate not only penetration, multiple penetrations, multiple isolations, because the multithrust operation, see, to generate these many noncooperative centers of gravity and then scarf up the debris.

[slide 165]

Okay, Russia, '41. And we see here *Army Group North*, *Army Group Center*, *Army Group South*. Actually, their main effort was supposed to be *Army Group Center*. But they had a number of efforts here, look at all this, whole front, multiple thrusts. So, it's an eccentric Cannae with two Leuctra/Leuthen wings. Okay, and then of course, this is the first phase, another phase of the operation here before the winter weather set.

SLIDE 166

RUSSIA 1941

KEY POINT
GERMANS HAD FEWER FORCES THAN RUSSIANS

[slide 166]

But what you have to understand, the Germans had fewer forces than the Russians, in other words they had grandiose plans and they were spread out, and they also leaped off with even fewer forces than the Russians. Had fewer forces than the Russians. Okay now—let's go on to another, 1942, what they did. Caucasus/Stalingrad campaign, you have *Army Group B* and *Army Group A*. And once they came down, their initial intent was to go on and mask off Stalingrad and conquer the Caucasus.

[slide 167]

But then of course you know what happened, Hitler said we've got to take Stalingrad, because it was named after Stalin and that, figured would act as a moral victory for him over Stalin. So, then he used his strength to go against Stalingrad, and you know what happened, instead of going strength against weakness, he started going strength against strength. And blew his panzers away and everything else and eventually lost it. Really screwed up the operation.

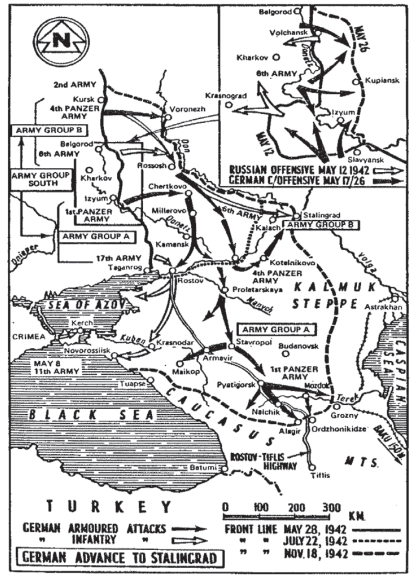
But once again they trying to do the multiple thrusts, but then later on, they couldn't penetrate and they kept pounding away, just kept pounding away. So, they're violating their own philosophy of going strength against weakness, and they paid the price. Because he was obsessed with taking Stalingrad. The obsession.

[slide 168]

So, if we look into this, World War II, blitz/counterblitz strategic design and many other ones, what we see is Leuctra/Leuthen/Schlieffen. Manstein was the architect of phase one. Anybody that

SLIDE 167

CAUCASUS/STALINGRAD 1942



LEUCTRA/LEUTHEN FOLLOWED BY ECCENTRIC . . .

has read anything about the German operation, Manstein came up with the idea where they came crawling out of the Ardennes, or I mean not crawling, roaring out of the Ardennes against the French. Manstein had a beautiful operation. The question mark, I'll address that in a few moments. Manstein—Kerch Peninsula, anybody ever look at *Lost Victories*, that Kerch Peninsula operation? He was outnumbered by the Russians on a very narrow front, and you should see how nice he slickered them to get in behind. And at the same time he usually called a *Groddeck Brigade*, remember that? He sent them down the whole length just to make the Russians, to put their attention on them so they couldn't realize his true purpose.

It's a beautiful operation. In fact, I thought it was one of the most beautiful operations, because if you look at the circumstances and the terrible circumstance, he had fewer troops, it was a narrow front,

SLIDE 168

BLITZ/COUNTER-BLITZ STRATEGIC DESIGN

Leuctra/Leuthen/Schlieffen
- Manstein — France (Phase I) 1940.
- ? ? ? ? ? ? ? ? ? ? ? ? ?
- Manstein — Kerch Peninsula 1942.
- OKW/OKH — Caucasus/Stalingrad Counterstroke 1942.
- Manstein — Donetz Counterstroke 1943.
- Manstein Proposal — Counterstroke from Kharkov to Sea of Azov 1943.
- Rundstedt/Rommel Proposal — Normandy 1944.
- Ardennes — 1944– 45.

Cannae—with Leuctra/Leuthen/Schlieffen Undertone
- Poland — 1939.
- France (Phase II) — 1940.
- Russia — 1941.
- Kursk — 1943.

and yet he was able to still penetrate the front, capture a couple, 200 thousand Russian soldiers and roll over the whole Kerch Peninsula. You've got to read it. I said goddamn, that's beautiful! So, he had, psychologically, he's totally inside of them, they didn't know what the hell hit them, totally inside of them.

Okay, the Caucasus/Stalingrad counterstroke. Once again, this is a Manstein operation. No, no, excuse me, this is the OKW, this is why I call it a counterstroke. Initially, it was supposed to be a stroke. The Russian intelligence got wind of the German operation, in fact I should have shown you that in the previous chart, let me go back to that. I don't know if it showed it or not. It doesn't show it here, it doesn't show it. But initially, the Russians got wind of the German operation, so they knew it was coming because their own intelligence penetrated the German intelligence. So what they did, they leaped on with a preemptive offensive against the Germans. The Germans then, as they pulled into the German system, they didn't

panic, they just pulled out and let them come in, choked them off, got about a couple hundred-thousand troops, leaped in the back of them and spooked—still blew the operation, then they went against Stalingrad. So, their thing that was initially set up as a stroke, took on the aspect of a counterstroke. In other words, a bait and envelop.

And it's real interesting. To the Germans' credit, instead of panic, they just adjusted to it, *[15:00]* and bagged a couple hundred-thousand Russian troops, and then leaped into the void. And then still blew it. I mean they had everything going for them, and then they still blew it.

Okay, Man—. This is the one I was trying to think of, Manstein—Donetz counterstroke. This is after Stalingrad. And this is Manstein, what I call his reverse blitz. And Hitler was furious at him. He's made what he called this long step backward, all the way back to the Donetz River. Way back, just pulling his forces, pulling them back further and further. What he wanted to do, he wanted the Russian fangs really to come out, "We've got those sons of bitches running," they're going for it, see. And he's back, and I forget the name of the city, and Hitler visited him. He says you're crazy, but Hitler's afraid to fire him at that point, because Stalingrad was so bad. And so he says, "When are you going to launch the counterstroke?" He says, "Not until I can see him outside my headquarters. I've got 'em stretched out as far as Ploske." So, Hitler got in his plane and whoosh, took off, pissed off at Manstein. And he didn't launch until he could see the smoke of the tanks coming in. He says, *"Now!"* Whoo, chopped it off and in two weeks they had gained everything back they'd lost, all the way back to the previous—not to the, to Stalingrad, but previous to the Stalingrad operation.

And then of course, the spring rains set in and they couldn't go any further and everything bogged down, everything bogged down. It was beautiful operation, it was a reverse blitz. If you want to read it, it's beautiful. But then, like he said, like Balck said, all you've got to do, in fact, Balck talked about it, he said it was beautiful. He said, all you've got to do, is you've got to have nerve to do it. Just all you need is iron nerve. He said, and Manstein had that iron nerve.

Manstein proposal for counterstroke from Kharkov to Sea of Azov. He proposed that in lieu of the Kerch operation, pinching off Kerch. He recognized that preparations were going too long, he felt

the Russians had wind of it, and he said, well, why not really thin out our forces down in the southern sector, the southern wing? Thin them out and do it, even though it looks like we're trying to hide it, don't hide it too much, so the Russians can get wind of it, because their fangs are still out. They'll make a huge stroke into our system, and when they start streaking way out past the Sea of Azov, then they're going to launch, they're going to gather, the Germans will have their forces against up there north, I'll show you what I mean, this chart, if they got, it's upside down.

They have Kharkov, yeah, Kharkov here, [refers back to map on slide 167] he wanted to thin out the whole southern sector here and let them go through, and then loop down here, and then pinch them off against the Sea of Azov and the Black Sea and roll them up in the rear, the whole southern Russian wing. And of course, Hitler said, "You're mad. We defend every foot." Wouldn't let him do it. It was a brilliant idea. Because if we can do that, then we'll take out a huge bunch of their forces and then we can go back in the offensive mode again. Disapproved, wouldn't let him do it. And Balck and a lot of the other guys said it was good, but they didn't have enough guts to take on Hitler, they should have made more of a noise. He was already in a weakened position because of Stalingrad, they said if they would have pushed it, they probably could have pulled that off.

So, that was down-voted. See, once again, what was he doing, a super reverse blitz. Okay, and then Rundstedt/Rommel proposal—Normandy, they wanted to do a similar thing in Normandy. And then of course, the Ardennes in '45, you know about that.

Then the Cannae, Poland '39, France Phase Two, Russia '41, and the Kursk operation. You know about them. Okay, now notice I have questions marks up there, why do I have those there? Well, it's a natural question. How come the Germans didn't attempt a Leuctra/Leuthen, in other words, a single envelopment, grand single envelopment scheme, because they knew they had less forces than the Russians, particularly in 1941. So, they didn't get stalled out, outside of Moscow. And if they did want to come up with one, how would they do it? Guess what you find out in Liddell Hart, one of the few good things I found in his book.

[slide 169]

[slide 170]

SLIDE 169

?—NATURAL QUESTION—?

HOW COME GERMANS DID NOT
ATTEMPT A LEUCTRA/LEUTHEN
STRATEGIC MANEUVER AGAINST RUSSIA IN 1941??

SLIDE 170

B. H. LIDDELL HART—"THE GERMAN GENERALS TALK" —1948
Page 184

Rundstedt
"The 1941 operations in Russia should, in my opinion have had their main effort directed, not at first towards Moscow, but towards Leningrad. That would have linked up with the Finns. Then, in the next stage, should have come an attack on Moscow from the north, in co-operation with the advance of Field-Marshal von Bock's Army Group from the west."

And I'm quoting him, on page number, *The German Generals Talk*.[93] Note this, he's quoting von Rundstedt. "The 1941 operations in Russian should, in my opinion, have had their main effort directed, not at first towards Moscow but towards Leningrad." In other words, you're still going to do it down in the central part of the front, but then you're going to loop up toward the Leningrad area, and

[93] B. H. Liddell Hart, *The German Generals Talk* (New York: William Morrow, 1971).

then you're going to roll up the northern wing of the Russian forces against the Baltic. The Germans controlled the Baltic at that time, and you'd wipe them out.

And then, after you got that whole area up there set up, you're going to have a second phase of the operation, a two-pronged phrase, two large prongs, many pronged, and you're going to loop down out of the Leningrad area, and also the one coming in from the west. And that way, you're going to bag, you're going to roll up the whole front from north to south. And the advantage of that is, the Russian communications, the railroads and that were very good down that front, so they could not only have a good port for all that having it, but they just roll up the whole front.

[20:00] And just like a huge goddamn Venetian blind, take out the whole front, all the way down to the Sea of Azov. Just pumping them in, roll up, pump them in and roll up.

But then what we don't know is whether they thought about it ahead of time. And the advantage to that is one, the Germans controlled the Baltic, two, the communications up north were better so they could make that operation, three, the other advantage of it is because the north-south communications were very good, where they had a problem with that transportation going directly into Russia, the railroads, the roads, and all that kind of stuff.

And so, we saw, what I don't know is whether that was proposed ahead of time. I looked it up very carefully, I couldn't see it, it looks like Rundstedt prodded this after the fact, not before the fact. Because I talked with Balck, and I mentioned this idea. He says well, he didn't think so, and I talked to von Mellenthin, I spent some time with both of them when they were here. And they said no, that was a good idea, but he said it wasn't thought of ahead of time, and it should have been. And Balck said it probably still wouldn't have worked. He said the operation would have worked, and I said why not, he said it's very simple. It's because Hitler, the way he behaved in Russia. He said we probably could have won the other way because the people were on our side, but then he came down heavy-handed with the SS group, and then of course, they turned against him.

Wyly: You know, it's amazing how many times I've found that in military history, where generals after the fact, including a lot of American generals, you know. Some of these ideas, and I've done

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BLITZ/COUNTER-BLITZ STRATEGIC DESIGN

Leuctra/Leuthen/Schlieffen
- Manstein — France (Phase I) 1940.
- Rundstedt Proposal — Thrust to Leningrad followed by thrust (roll-up) to South and take Moscow — 1941.
- Manstein — Kerch Peninsula 1942.
- OKW/OKH — Caucasus/Stalingrad Counterstroke 1942.
- Manstein — Donetz Counterstroke 1943.
- Manstein Proposal — Counterstroke from Kharkov to Sea of Azov 1943.
- Rundstedt/Rommel Proposal — Normandy 1944.
- Ardennes — 1944– 45.

Cannae—with Leuctra/Leuthen/Schlieffen Undertone
- Poland — 1939.
- France (Phase II) – 1940.
- Russia — 1941.
- Kursk — 1943.

the same thing, I'd look to see if they were thinking about it before. And usually they have but after the fact.

[slide 171]

Boyd: So then, therefore, I said okay, I'll give him credit for it, even if it's after the fact. To do that kind of an operation, which it does go after the fact.

[slide 172]

Of course, here's the message I'm trying to convey to you here, on their side. And one of the problems the Germans have is, we reformers have been criticized for using a lot of the German ideas. And they say after all, they lost the war. But you've got to ask yourself, at what level did they lose the war, they didn't lose it at the tactical level, they lost it at what? The strategic level. They did not lose it at tactical level, they lost it at strategic level, that's where they lost it. Their tactics were superb. Their strategy sucked. So, the British and the Americans, particularly the British and the Russians, the Americans

SLIDE 172

MESSAGE

Only Manstein (and few others) knew how to synthesize and apply the experiences and ideas of Napoleon, Clausewitz, Jomini, Moltke, and Schlieffen in a strategic as well as a grand tactics sense.

SLIDE 173

WRAP-UP

actually did a better job of strategy. They lost at the strategic level, is where they lost it.

[slide 173]

Okay, with that in mind, let's go into the wrap up. Any questions on what I—but note through all that, what is the theme? It's always that penetration/isolation where you might bias it one way or the other way, and you're doing it many levels, so you just pull that guy as far, generate those many noncooperative centers of gravity, and then just scarf them up.

[slide 174]

Okay, and here's the message, so I'm giving you a little wrap-up here. I'll just summarize what we've done here in about 10 minutes, and then—

[long pause as audience reads slide]

You want—my point is, do you want to be hoser or the hosee?

SLIDE 174

WRAP-UP

Message

- He who is willing and able to take the initiative to exploit variety, rapidity, and harmony—as basis to create as well as adapt to the more indistinct—more irregular—quicker changes of rhythm and pattern, yet shape focus and direction of effort—survives and dominates

or contrariwise

- He who is unwilling or unable to take the initiative to exploit variety, rapidity, and harmony . . . goes under or survives to be dominated.

[slide 175]

In continuing that then, here's the game we're sort of playing. Use that as a basis to do this, thereby you can realize that, and how you do it. Quite simple when you put it all up. Note that word again, penetrate, to sever his moral—and see what I'm saying? Probably should have underlined it, but I don't like underlining all the time. Without the penetration, you can't get there from here, is what I'm trying to tell you. Well, you know, one thing we ought to keep, we obviously got to be more indistinct, and more irregular.

Why did we go to camouflage uniforms, why do we not wear, you know, red coats and white trousers, and all that? Because, you know, you're kind of revealed. What you try to do is you try to blend into the background, that's why we wear that. There's other ways of blending into the background, to operate in an irregular fashion so they can't do it to you. You want to do all the things you can do so the other guy can't discern what you're up to.

SLIDE 175

WRAP-UP

Game

- Create tangles of threatening and/or non-threatening events/efforts as well as repeatedly generate mismatches between those events/efforts adversary observes or imagines (Cheng/Nebenpunkte) and those he must react to (Ch'i/Schwerpunkt)

as basis to

- Penetrate adversary organism to sever his moral bonds, disorient his mental images, disrupt his operations, and overload his system, as well as subvert or seize those moral-mental-physical bastions, connections, or activities that he depends upon

thereby

- Pull adversary apart, produce paralysis, and collapse his will to resist.

How

- Get inside adversary observation—orientation-decision-action loops (at all levels) by being more subtle, more indistinct, more irregular, and quicker—yet appear to be otherwise.

And frequently change what you're doing, so you're always giving a screwed-up picture of what's going on. Don't let your troops get comfortable, because then you're going to get sand-tabled. They're going to want to get, oh I've got [unintelligible] once again, while you're there, the enemy recce's always working a problem on you, in a patrol action. They're going to start knowing your outlines and they're going to start to figure out how, where your weakness are, they're going to be able to penetrate that and cause you problems. But if you're moving about, you're giving, you're screwing up their mental picture all the time.

[25:00] That's what you turn to, so you can pull them apart, produce, and do this. Okay?

[slide 176]

I'll let you read this chart, then I want to talk to this one, this is important, the implications behind this. You all want to understand in

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WRAP-UP

Implications

- In a tactical sense, these multi-dimensional interactions suggest a spontaneous, synthetic/creative, and flowing action/counteraction operation, rather than a step-by-step, analytical/logical, and discrete move/countermove game.
  - In accepting this idea we must admit that increased unit complexity (with magnified mental and physical task loadings) does not enhance the spontaneous synthetic/creative operation. Rather, it constrains the opportunity for these timely actions/counteractions.

    or put another way
  - Complexity (technical, organizational, operational, etc.) causes commanders and subordinates alike to be captured by their own internal dynamics or interactions—hence they cannot adapt to rapidly changing external (or even internal) circumstances.
- In a strategic sense, these interactions suggest we need a variety of possibilities as well as the rapidity to implement and shift among them. Why?
  - Ability to simultaneously and sequentially generate many different possibilities as well as rapidly implement and shift among them permits one to repeatedly generate mismatches between events/efforts adversary observes or imagines and those he must respond to (to survive).
  - Without a variety of possibilities adversary is given the opportunity to read as well as adapt to events and efforts as they unfold.

a tactical sense, these multidimensional interactions suggest a spontaneous, synthetic/creative, and flowing rather than a step-by-step, analytical/logical, and discrete move/countermove game.

And of course, the two dashed statements below that are related. In other words, what I'm saying, without that, if you don't get the *fingerspitzengefühl*, you get all these goddamn procedures and checklists, these complicated plans, well what is it going to do, [makes raspberry sound] just grinds you down, slows you down, slow as molasses in January. So put it another way. Complexity—I don't care whether it's technical, organizational, operational—that causes commanders to be captured by their own internal dynamics or interactions, hence they cannot adapt to rapidly changing external, or as a matter of fact even internal circumstances.

On the other hand, war is complicated. So, you're going to have, you're going to tend to have complexity, how do you get around

that? Because remember, you want to have the variety and rapidity, so how do you get around it? That's what we've been talking about now, for two days. And this is the third day.

How did I say get around that? Come on, you know the answer, you just won't feed it to me. I told you about the fighter pilots doing all that. You take groups of people, have them work together, and throw them against a whole bunch of different situations. And pretty soon it becomes part of them. In other words, that's the *fingerspitzengefühl* they build up. And with the *fingerspitzengefühl*, once you have that, in a sense then things don't look so complicated.

You know a basketball game, to the uninitiated, the way all that stuff happens it looks complicated, but the guys in there, Christ, they're blowing everything, do you understand what I'm saying? Same thing. And it can be done. We know it can be done, the Germans did it with some of their commanders and troops.

Audience: I think a real good example of that is that everybody here is familiar with is Pegasus Bridge, where Howard went in and they practiced over and over and over again every night, night after night after night.[94] Attacking this bridge and knocking out the Germans that were there, and so they could almost do it in their sleep. And when they actually—

Boyd: They didn't even have to think about it.

Audience: That's right.

Boyd: Because it was in their subconscious.

Audience: It was a piece of cake, once they—they just knew what to do.

Boyd: No matter how the other guy adjusted, they were on top of it, they just keep getting on top of it. You've experienced that, do you ever notice when you're—some days when you're in some kind of a sport, with a lot of complicated, and all of a sudden, everything

[94] Refers to the assault on a canal bridge between Caen and Ouistreham undertaken by D Company, 2d Airborne Battalion, under the British 6th Airborne Division, on D-Day. Commanded by Maj John Howard, D Company achieved total surprise against the German defenders and secured their objectives in 10 minutes while incurring only very light casualties. Their success came from an intensive training program in which Howard prepared his men for night fighting and urban combat under highly realistic conditions.

seems to gel, no matter—in fact, you ever notice when you're good at something, everything else seems like it's in slow motion.

Did you ever get that feeling? I used to get it when I fly the fighter, everything was really good, everything else just seemed very slow to me, and you're just carving that son of a bitch up, going after the other guy, whipsawing in here, and I've heard ground troops say the same thing. It's just that, Guderian said that, get that feel, that *fingerspitzengefühl*, and you've got everything, you just know it, and you're adjusted. Balck, same way, he kept saying you gotta have that *fingerspitzengefühl*, all the time.

And that's what we're talking about here. In a strategic sense, these interactions suggest we need a variety of possibilities, so the other guy can't get wise, rapidly implement, and why? Ability to have these and generate many different possibilities and permits one to repeatedly generate those mismatches. You want to get mismatch on top of mismatch on top of mismatch. In other words, you really want to screw up his image of the world. Or give him multiple images of the world. Because what does that do? Doubt, uncertainty, paralyzes his counteractions, et cetera. And if you don't have a variety of possibilities, you give him the opportunity to read into what you're doing, which means then you're not going to do too good, in fact you're going to get your head handed to you. So that's why you've got to have variety, rapidity, harmony, initiative, you see what I'm saying? All plays together.

Audience: Sir, you said one thing, you have to have the feel all the time.

Boyd: Well, sometimes you may be surprised.

Audience: If you lose it, hopefully you—

Boyd: But you want to get it back.

Audience: Come back, yes, sir.

Boyd: And there's another thing I hate, and we talked about it in the car today coming back. I've heard people say I'll never be surprised. I just start laughing, that's horseshit. Because now they have a perfect image of the world and never going to be surprised. You're going to get surprised, you'd like to minimize it. What you want to do is set yourself up so when you're surprised, you can adjust to it and get back on top. You're going to get surprised, you can't say you're not going to be. That's a horseshit argument. The question is, can

you cope with it? And if you've learned how to do all these different things, you start gathering yourself together to try to get back and you may have some problems. But you gather yourself together and get back on top of it.

Audience: I guess your example you use about the basketball team, you have to fight to say time out, time out.

Boyd: Yeah.

Audience: Be patient enough to work through it.

Boyd: That's right.

Audience: It's hard too.

Boyd: But I heard guys say, you know, I've heard it, I say get the hell out of here, that's bullshit.

[30:00] In other words, you're God, you're a perfect human being. That's baloney. Have you ever heard guys say that they're not going to get surprised, they're going to set themselves up so they are never going to be surprised, huh? I know some of you have heard it, I can't believe you haven't. I've heard people say it and I just laugh. Now if you want to say we want to set ourselves up, so we're not surprised all the time, you want to diminish the possibility of it, that's a different thing. But nevertheless, you've got to be expecting, when you get a surprise you're going to get on top of it.

[slide 177]

Okay, so now let's look at all these things—look at all these things we've been talking about, Clausewitz, grand tactics, strategy, and that; remember variety and rapidity, what does that allow you to do? Variety and rapidity, in other words we're throwing variety and rapidity at our adversary. It allows you to magnify adversary friction, stretch out his time to respond in directed ways. It will take him longer to cope.

Harmony and initiative, what that permits you to do is diminish own friction, compress own time and exploit that variety and rapidity, because you're trying to build up this *fingerspitzengefühl* to a higher-level harmony, so you can exploit that relative to your adversary.

So, if you glue all that together, variety, rapidity, harmony and initiative together, it allows you to get inside his OODA loop. Put uncertainty, doubt, mistrust, confusion, and all that stuff we've been talking about into his system, or fold himself back inside himself, so

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WRAP-UP

- Alternatively—by stripping away and recombining some of the comments associated with "Clausewitz", "Grand Tactics", "Message", "Game", "How", and "Implications"—we can say:
  - Variety/Rapidity allow one to:
    Magnify adversary friction hence stretch-out his time to respond in a directed way.
  - Harmony/Initiative permit one to:
    Diminish own friction hence compress own time to exploit variety/rapidity in a directed way.
  - Altogether Variety/Rapidity/Harmony/Initiative enable one to:
    Operate inside adversary's observation-orientation-decision-action loops to enmesh adversary in a world of uncertainty, doubt, mistrust, confusion, disorder, fear, panic, chaos, . . . and/or fold adversary back inside himself so that he cannot cope with events/efforts as they unfold.
- Simultaneously—by repeatedly rolling-thru O-O-D-A loops while appealing to and making use of the ideas embodied in "Grand Strategy" and "Theme for Vitality and Growth"—we can:
  - Evolve and exploit Insight/Initiative/Adaptability/Harmony as basis to:
    Shape or influence events so that we not only amplify our spirit and strength (while isolating our adversaries and undermining their resolve and drive) but also influence the uncommitted or potential adversaries so that they are drawn toward our philosophy and are empathetic toward our success.

he can't cope with events as they start rolling over him and just start scarfing him up.

And simultaneously, by looking through these things, evolve and exploit insight, initiative, adaptability as the basis to shape or influence events, et cetera. In other words, we're looking at it from a destructive viewpoint up here, and a constructive viewpoint down here primarily.

You see the two different themes? There's constructive themes and there's destructive themes. Sometimes you have to use destructive themes, or you have to use destructive themes in conjunction with constructive themes. Not just "we're going to bomb the bastards back to the Stone Ages." Because then they get mad, and they fight longer and harder. Okay?

[slide 178]

And the final chart under the wrap-up. What I call it, pretend

SLIDE 178

WRAP-UP

—or summarizing in another, yet similar way—
We have in a nutshell:

The Art of Success

- Appear to be an unsolvable cryptogram while operating in a directed way to penetrate adversary vulnerabilities and weaknesses in order to isolate him from his allies, pull him apart, and collapse his will to resist.

yet

- Shape or influence events so that we not only magnify our spirit and strength but also influence potential adversaries as well as the uncommitted so that they are drawn toward our philosophy and are empathetic toward our success.

we're a modern Sun Tzu, the art of success. I just said we're thinking like a Sun Tzu so it would be "Art of Success." And see, that's your game when you're in a conflict situation. You're always playing a destructive way against the constructive. It's guerrilla war, regular war. Today with vast communications, you need those third parties out there, otherwise they can cause you enormous problems.

[slide 179]

[slide 180]

Okay, now let's go on to my epilogue. Remember what I told you, after I've gone through this, and thought about all of this, then mentally, not that I wanted to, I sort of started juxtaposing these things as the principles of war, the stuff we've been uncovering. And I was a little bit disturbed. So, it left me a little bit unsettled, so I want to take them head on. So, let's illustrate it by looking at some principles of war.

[slide 181]

And these aren't always the same, these all weren't drawn up at the same time, they were drawn up at different times, but you'll see in a minute, it feeds my argument.

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EPILOGUE

SLIDE 180

COMMENT

- Reflection upon the previous discussion and reflection upon the various Principles of War that are bandied about leave one unsettled about the real value associated with these principles.
- To illustrate, let's take a look at some of the Principles of War (or Military Art).

For USA, you've seen these, United Kingdom, in fact ours are very similar to the United Kingdom, because actually we got them from J. F. C. Fuller and we've modified it a little bit, but basically are about the same. And the Soviet Union—but notice the Soviet Union, where we don't have anything about speed or tempo, their first one is mobility and tempo. Where the hell did they get that? Because they got their head handed to them by the first part of the blitzkrieg, they didn't have it before World War II.

Audience: Didn't Fuller, after he wrote the "Principles of War," shortly afterwards says all this is a bunch of—

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PRINCIPLES OF WAR

USA	UNITED KINGDOM	SOVIET UNION	FRANCE
·Objective ·Offensive ·Mass ·Economy of Forces ·Maneuver ·Unity of Command ·Security ·Surprise ·Simplicity	·Aim/Goal ·Coordination ·Offensive ·Freedom of Action ·Concentration ·Economy of Efforts ·Surprise ·Security ·Morale ·Control of Rear	·Mobility/Tempo ·Concentration ·Surprise ·Combat Activeness ·Preservation of Combat Effectiveness ·Conformity of Goal/Plan to Actual Situation ·Coordination/ Interworking	·Concentration of Efforts ·Freedom of Action ·Economy of Forces

Boyd: Yeah, after he put it together, he said, when he saw people were using it, he says toss it out, it's bullshit. And then guess what we did, we went for it even harder. That's exactly right, that's exactly what Fuller did. I'm glad you mentioned that.

Wyly: In fact, J. F. C. Fuller waited years before he said toss it out, it's bullshit. He kept changing them, and I think it was in 1925, we looked at them, and adopted them, and they've stayed in concrete ever since. So, then he changed them for several years, and then finally, threw them all out.

Boyd: Yeah.

Wyly: And the American ones and the British ones initially looked exactly the same—

Boyd: I think they were exactly the same.

Wyly: In fact, ours lasted longer, we kept his old ones longer than the British, the British list in 1925 would have been just like our list.

Boyd: Yeah.

Wyly: And ours stayed in concrete the longest.

Boyd: Now these were drawn up in the Soviet Union right after World War II. And any—how many—some of you people might have read some of those—used to have translated documents, *The Op-*

erational Art, *[35:00]* they've got them listed in there, you know, the book by Savkin.[95] Are you familiar with the book I'm talking about by Savkin? And that's where they're laid, you can just look, and you can see them all. And he has long goddamn dialectic conversations on them, most of it's horseshit, but you know, if they don't get—I think it's about if they don't have one-third of their document full of dialectical materialism, they won't publish the thing.

And so, you've got to work your way through all that baloney. It's terrible stuff to read. You know, every time I read that stuff, I got to sit there every five minutes and say, "Hang in there, Boyd, it's going to better," knowing it's not. [audience laughter] Knowing that it's not, it's terrible. Drink a lot of coffee, "Come on, tiger, it's going to get better," I'm giving myself a pep talk, knowing that it's never going to get any better. I got to deceive myself.

And then France, you'll see this, concentration of efforts, freedom of action, and economy of forces. In fact, they had different ones in their country. They argue about the, you know, the typical French, you know, different factions are going to have different principles of war.

And then of course the Germans—they might have them now—they didn't even have any. Well, isn't that interesting? They didn't even have principles. I don't know whether they do—do they have them now, I don't even know?

Wyly: Not that I know of.

Boyd: They might, I figured after they might have learned from us, but they don't even have principles. So, the question is, you know, will the real principle stand up? Who's right or who's wrong, or what are we talking about here? And here's my critique.

[slide 182]

Second bullet is the important bullet. In other words, you know, Newton's second law of motion is not different for different countries, it either fits or the goddamn thing doesn't fit.

My point is, instead they seem to me to be some kind of a goddamn laundry list or checklist you're going through. I don't know what the hell else you'd use them for. To put it mildly, I'm very turned

[95] V. Ye. Savkin, *The Basic Principles of Operational Art and Tactics (A Soviet View)* (Moscow: USSR Ministry of Defense, 1972).

SLIDE 182

CRITIQUE

- A list of principles does not reveal how individual principles interact nor the mechanism for doing so.
- Scientific laws and principles are the same for all countries and tend to change little over time.
- On the other hand, we note that the Principles of War are different for different countries and change more dramatically over time. Furthermore, they do not make evident the importance of variety/rapidity/harmony/initiative as basis to shape and adapt to circumstances—a necessary requirement for success in the uncertain and everchanging environment of conflict or war.
- This would suggest that the principles are not principles. Instead, they seem to be some kind of a (shifting) static check of laundry list of what should be adhered to.

off. Not only that, they've got them mixed up. Let me go back to the list again. [flips back to slide 181] Christ, they've got input mixed up with output and all that. You look at it, they've got it all—this is us, this is us, or we'll take this one, we get objective, offensive, mass, maneuver, security, surprise. That's output. Some of them are your input, then they got output—they can't even separate the input from the output. Surprise is what you're getting the other guy, concentration is what you do. Same with Soviet Union, mobility, tempo, and surprise, output. I mean that's what you're trying to get out of your adversary. Mobility, that's you.

So, the whole thing is all gomered up. That's my point. You see what I'm getting at? What do you do and what are you trying to get out the other guy? So, it's—let's put it this way. It's not too well thought out. Not very well thought out.

[slide 183]

SLIDE 183

ALTERNATIVE POSSIBILITY

- With this critique in mind, if we still feel we need some guidance why not evolve statements that reflect the essence of conflict dynamics in a connected sense

or put another way

- Why not collect appropriate bits and pieces and assemble them in a coherent way to present a more satisfying picture.

In any case, maybe there's an alternative possibility, way to think about this stuff. Not only that, I wouldn't get too keen on some of these scientific principles, because they're blowing a lot of them over right now. They've got stuff you know, the super—superconductors, you know. They had theories to explain that, and now they don't explain it. They get turned over too, not as frequently, but they get turned over. Or maybe not the whole thing, but certain aspects of it.

But here's an alternative, maybe we can come up with something that might help us. In other words, putting a—why not do this? If we need some guidance, then we evolve statements to reflect at least the conflict dynamics and some kind of a connected sense, where it plays together.

Or put it another way, why not collect appropriate bits and pieces and put them together in a coherent whole? In other words, let's do an analysis and a synthesis and see what we've got. There's a way of doing it, we've already done it, we've just got to look at it.

[slide 184]

So, I'll do it in a simplistic fashion. You want to keep things simple. First of all, I think we want to compress our time and stretch out adversary time. Or do you want to do it the other way? Do you want

SLIDE 184

APPROPRIATE BITS AND PIECES

- Compress own time and stretch-out adversary time.
- Generate unequal distributions as basis to focus moral-mental-physical effort for local superiority and decisive leverage.
- Diminish own friction (or entropy) and magnify adversary friction (or entropy).
- Operate inside adversary's observation-orientation-decision-action loops or get inside his mind-time-space.
- Penetrate adversary organism and bring about his collapse.
- Amplify our spirit and strength, drain-away adversaries' and attract the uncommitted.

to stretch out your time and compress his? You're going to get taken to the cleaners if that's the case.

You want to generate unequal distributions as basis to gain superiority and leverage against him. We just see that piling up all the time. You want to diminish your own friction, or if you want to think like a modern twentieth-century guy, diminish your entropy while pumping his up, his friction or entropy. In fact, that goes right along, friction and time. You pump up your friction, you're going to stretch out his time. If you diminish your friction, you diminish your time for doing things, see what I'm saying? They go together.

So, the more I can put friction in the other guy's system, the longer it is going to take to get his act together to do something. You're going to give him more and more delays, whether it be mental, whether it be moral, whether it be physical, or combinations thereof. And as a result of doing all these things then, that permits you to get inside his OODA loop. If you don't do this, you're not going to get inside his. Or get inside his mind-time-space.

[40:00] All this together then allows you to penetrate his organ-

SLIDE 185

CENTRAL THEME

Evolve and exploit insight/initiative/adaptability/harmony together with a unifying vision, via a grand ideal or an overarching theme or a noble philosophy, as basis to:

- Shape or influence events so that we not only amplify our spirit and strength but also influence the uncommitted or potential adversaries so that they are drawn toward our philosophy and are empathetic toward our success,

yet be able to

- Operate inside adversary's observation-orientation-decision-action loops or get inside his mind-time-space as basis to:
- Penetrate adversary's moral-mental-physical being in order to isolate him from his allies, pull him apart, and collapse his will to resist.

ism and pull him down and bring about his collapse. And that's the destructive side. The same time, you want to amplify our spirit and strength, drain away his, and attract the uncommitted. So, let's glue it all together.

[slide 185]

And this is my last chart, and it's five after nine, getting late. Here's the central theme, what we've been talking about through the whole presentation in a very simplistic way. Now there is a subtlety there, I'm hoping somebody notices. It's my last chart, the next chart's just sources. You see it?

Audience: The noble philosophy is not stated. It needs to be the theme, an element of the theme.

Boyd: That's not what I'm getting.

Audience: But we have to actually construct the noble philosophy.

Boyd: You have to construct that, that's correct. But apart from that, there's a point that I'm trying to make here.

Wyly: Well, it's a destruction and creation value—

Boyd: Go ahead, Mike, you're onto it.

Wyly: —both the positive and the negative.

Boyd: Note what I went through, sometimes I go from the negative to the positive, but in the end, you always want to start with the positive and go to the negative. In other words, you don't want to start off beating a guy up and then trying to add that, you always want to start on the positive side, and only do this when you have to, whereas before I showed it to you the other way. If you've been following my presentation, I invert it, I'm do a lot of inversions all the way through so you look at both sides. I don't know if you notice that, I construct that one way and then flip it up and go to the other direction. You should do that in your thinking. Turn your argument around, and then how does it play. You can say ooh, it plays differently.

Audience: Kind of *yin* and *yang*—

Boyd: That's right, so keep flip-flopping your arguments back and forth,

Audience: Destroying the will to resist can occur before the conflict actually begins.

Boyd: Of course.

Audience: And that's the constructive aspect of it—

Boyd: But you see, here's the constructive part, here's the destructive—whereas I showed you in a previous one, remember I showed you destructive first, then the constructive. And see, when I say this, I didn't say "yet." In the other one, I had this chart, I said, "yet do it." This one I said do this, yet be able to, I didn't say to do it, be able to. Because if you're not able to, you may get in trouble. So, try to play that positive side as much as possible.

Because see then you justify, like we were against Iran, see if we have a noble [unintelligible], they play hard ball, even though we shoot down some airplanes we shouldn't have done, we don't look too bad. Which is the point you were trying to make. And that's sort of the idea we're talking about here, do you see what I'm saying? And when you get into a guerrilla operation, low intensity operations, that kind of stuff, this moral stuff becomes super important. Oth-

erwise, you'd lose the whole nine yards. I mean everybody would turn against you, Christ, it's all over, like Mike found out. I think we were talking about that last night. You're going to be in there, you're going to stay with us, yeah, we're going to stay here. So, then they moved out because the commander ordered them to move out, they slaughtered the people who cooperated with them, they never trusted them again. Could never get anything out of them, right, Mike?

Wyly: That's right.

Boyd: That was the end of the line, done. So, you people can't just be combat officers and sticking something into somebody or shooting something at them. You've got to think in many different ways nowadays. It's a much more complicated world. Particularly as officers. And otherwise, you can go into the thing. I mean not because you're malicious, because you really didn't think it through.

Audience: I just want to make sure I get it straight, you can work either side. You can go from constructive to destructive or vice versa.

Boyd: That's right. But keep in mind when you're doing it, keep in mind of the situation, whether you have justification. Remember, you want in the end, to have that moral support all over so you can lever your adversary rather than him levering you. And that's particularly true in a guerrilla, or what we now call LIC, low intensity conflict.

Audience: You do that, you go from destructive to constructive, isn't that another way of saying you're reacting, you are on the reactive as opposed to being proactive—

Boyd: You're forced to go to the destructive, you're forced to go to the destructive, in a sense you're already reacting, that's exactly right. You've got it, you've got it. I mean you have no choice. But in any case, if you have to do it, try to get over to the constructive as fast as you can. You still may have to, but try to get it there as quickly as you can, do it.

Audience: But it's interesting in World War II, when we got into that conflict, I mean we hit them so hard and so fast, destructively, and then came on as the good guys at the end, it's interesting. The point is that, however this sounds, we won that one with no problem.

Boyd: We were justified. We were justified because of the way Hitler behaved. He was a badass from beginning to end. So, we

could be bad guys from beginning to end, and relative to him, *[45:00]* we looked like good guys. Remember it's a relative situation, that's what I'm trying to tell you. Remember we blew his—you know, we complain because he bombed London and he bombed Rotterdam and all those places, but then he set it up so we could do it to him, we said they deserved it. And we took apart Berlin, we took apart Dresden, we should never have bombed Dresden. And of course we've been—people are still mad at us today. But at the time it was, well, Hitler deserved it.

That's what I'm trying to tell you, so we could get away with that, because from a moral viewpoint, he still looked worse than we did. And what you want to do when you're playing this game, you want to set things up so the other guy, morally, is in the gutter and you're not. Or at least if you're in the gutter, he's in one even below you. Very important. And see, that's why he was making the point he made. We got away with some stuff that happened at different times, guys would have gotten fired, we would have been in deep trouble.

Audience: You shoot some arrows, blame it on the other guy—

Boyd: Be careful, because then if you do something like that and you play a game like that, and then it surfaces that you did that, then you're really deep [unintelligible].

Audience: I was suggesting that that may have happened.

Boyd: Oh, okay.

Audience: It's a dirty play, but it's the real world.

Boyd: I understand. Okay, so—

[46:31]

[End of tape 5, side 2]

[End of "Patterns of Conflict"]

[see appendix for Boyd's bibliographic references used to create the presentation "Patterns of Conflict."]

CHAPTER



The Strategic Game of ? and ?

Introduced by Frans P. B. Osinga

The presentation "The Strategic Game of ? and ?" is important because it highlights what John Boyd really considers the essence of strategy and strategic behavior, and it contains an original new perspective on what strategy is about. It differs significantly from "Patterns of Conflict" and "Organic Design for Command and Control," which are, in essence, about military dynamics at the tactical and operational levels of war. Although sometimes rather conceptual, the historical examples Boyd uses and the concepts he develops find their basis in well-known studies of operational art. In contrast, "The Strategic Game of ? and ?" pertains to the (grand) strategic level, and here Boyd develops an abstract general strategic theoretical principle, aiming to formulate in even more general terms what lies at the heart of a strategic encounter with an opponent. This briefing contains a search for what strategy is about—that is what the question marks in the title represent.

It covers familiar territory in the elaboration on the set of definitions—or rather the list of "to dos"—Boyd developed in "Patterns of Conflict" about tactics, grand tactics, strategy, and grand strategy. It also contains several themes and arguments from "Organic De-

sign for Command and Control" and revisits a theme from the essay "Destruction and Creation," highlighting again the importance of the combination of analysis and synthesis as a mode of thinking. But this presentation is not merely a restatement of earlier arguments. Building on them, Boyd carries these insights to their logical abstract and general conclusion and makes previous themes and arguments more explicit. He also approaches the question from different angles.

Indeed, instead of military history, we find in it references to brain research, complexity theory, neo-Darwinism, anthropology, and systems theory, fields that are, as Boyd argues in the first 10 pages, essential for understanding war and strategy. Understanding strategy (as in military strategy) necessitates a new look that ventures beyond familiar existing (military) categorizations, theories, and interpretations and instead examines strategic behavior in a more general and generic fashion.

In a 16-page, wide-ranging survey, Boyd shows how organisms and social organizations of various sorts survive. The insights from various sources and academic fields provide the answer and lead to a short "condensation to essential elements." A series of questions and illuminations throughout 30 pages reveals a reformulation of "the art of success," one with applicability that extends beyond the military domain. Echoing the theme of adaptability and indicating he regards war as a clash of two (or more) complex adaptive systems, it amounts to a highly abstract yet insightful and original redefinition of the essence of strategic encounters, and one that clearly harks back to the epistemological issues explored in the essay "Destruction and Creation."

Presentation: "The Strategic Game of ? and ?"
Place: Command and Staff College, Marine Corps University, Marine Corps Base Quantico, Virginia
Date: 2 May 1989
Transcriber's note:

Aside from Colonel Michael Wyly and Captain John Schmitt, the transcriber could not identify by name or branch of Service any of the audience members (no class roster is included in the archived material). Individual speakers are identified by the name "audience."

TITLE SLIDE

THE STRATEGIC GAME
OF
? AND ?

Based on audience interaction with Boyd during the course of the three days recorded, the transcriber estimates an audience size of approximately 10 members.

[start of tape 1, side 1]
[0:00]

Audience: [Speaking over Boyd as the recording begins.] This is Colonel Boyd, the session on strategy. May 2, 1989.

Boyd: —and the reason why I selected "Strategy" initially is because you people on the—when we were going into the "Patterns," discussing "Patterns," you were really probing me on the moral stuff; and if you recall, we had [unintelligible] and I said, "Well, I'd like to get into that deeper," and I really do get into it much deeper, plus my additional comments I provide on it, particularly at the end of the "Strategy." And I think maybe you people, having to deal with troops and other people in order to get them to have an organic whole, it turns out that it's the most important part of this whole thing, the moral dimension. And so, Napoléon, would you believe it, was 3:1 or 10:1, he was right, his idea that the moral is to the physical is three to one [unintelligible] more important than the physical. Some people might say it's 10:1 or 5:1, but he's just using numbers to illustrate one's much more important than the other.

Audience: That's totally accurate with PISRR.[1]

Boyd: PISRR? Yeah, wherever that comes from, you were, when we were dealing, we could find out—in fact, let me talk to that right now because I'll get into it later on. When you begin to look into all these operations, you recall, I put two things in a box, later on I said we'll start all the way back from Sun Tzu to the present. You look at things from a, in a destructive sense, you've got to be able to penetrate your adversary. I don't care if he's on offense or defense, dig into his flanks, his rear; if he's coming in, you want to dig into him. If you can't penetrate his system, why should he throw in the towel? He's not going to. So, you're talking about penetration, not just from a physical viewpoint, but from a moral and mental. And you get the strategists who are talking about moral and mental as well. Of course, the mental, we see that in maneuver warfare, but I want to get to the moral dimensions too.

And so then, you want to penetrate. What do you want to do? You want to generate what I call as many noncooperative centers of gravity or isolate the components one from the other. Take away their, those things that sustain, nourish, or support, because then he can't function. In other words, you [unintelligible] his ability to be able to observe and interrogate or be able to deal with the environment, the surrounding environment, he needs in order to cope. And then, so the blitzkrieg does that very nice. They penetrate the system, they isolate it, and they overload it, and collapse it or subdue it. Okay, but that's all this stuff. [Boyd appears to be referencing a slide from another presentation, but it is unclear which one.]

Now, if you look at the guerrillas, what they do, they do the same thing. They penetrate and they isolate too, but they're much more subtle, more in a moral sense. And not only that, they try to subvert

[1] In subsequent conversation, Boyd clearly states that PISRR is an acronym for penetrate, isolate, subvert, reorient, and reharmonize. While PISRR does not appear in the recordings of Boyd's other presentations, later commentaries by Boyd's friends indicate that they regularly heard Boyd use this term and thus it seems fair to conclude that Boyd originated it. See G. I. Wilson, Greg Wilcox, and Chet Richards, "Fourth Generation Warfare and OODA Loop Implications of the Iraq Insurgency," PowerPoint presentation, December 2004, Fourth Generation Warfare (Articles), Defense and the National Interest; and Chet Richards, "John Boyd, *Conceptual Spiral*, and the Meaning of Life," *Slightly East of New* (blog), 22 March 2013.

the system, which is even more subtle. And then as, during the subversion process, the village level and other levels they are working up, and then they try to reeducate those people; in other words, to bring them on their side and reorganize the whole thing in their framework. So, you got penetrate, isolate, subvert, reeducate, reorganize.

Okay, but now, if you begin to think about that, and you change it a little bit, the reeducation is the reorientation process. You're reorienting people, see? And they're going to harmonize those people within their system so you're reharmonizing. So, you know, P-I-S-R-R, PISRR, it just turns out that's the way it works, as everybody says, PISRR. But there's two components to it: there's not only a destructive component, but there's also a constructive component, a reorientation. Okay, so now store that in your mind.

Now, thinking about that, you say, "Okay, let's pretend we're researchers of one kind or another." Well, I'm going to have to penetrate into my subject, you understand what I'm saying? And focus or isolate on those components that are important. I mean I can't look at everything. I've got to isolate those components that are crucial or key. And then what I have to do is I'm going to find out there's something different than I already thought about, which means I'm subverting my own mind. So, I penetrate, isolate, and subvert my own position, which means I'm forced to reorient then, and if I don't reorient, I can't deal with this new phenomenon. And then if I'm going to converse with others, I've got to be able to do it in a larger scope, so I've got to reharmonize the system at a larger level. So, even in research you go penetrate, isolate, subvert, reorient, reharmonize.

Okay, now, let's talk about our so-called destructive operations, and essentially do the same thing. Let's say you're going to go out and let's say you're going to do a blitzkrieg, for lack of a better [unintelligible]. Okay, you're going to realize some initial objectives. Well, now you have to reorient your force and reharmonize them for a larger objective. So, it's a constant process: penetrate, isolate, subdue, reorient, reharmonize, penetrate, isolate. So, that's sort of the cycle you go through too.

You have to reorient to the new situation. You have to reorient, and you've got to reharmonize your forces. I'm talking about, you know, from a campaign viewpoint, not just from a local action, I'm

talking about the larger sense. So, those are not bad; if you want to talk about principles, they make more sense than this stuff, all the principles of war which we've talked about.[2] You have to penetrate the system. It makes no difference whether you're going forward, backwards, sidewards, I don't care which direction. Well, if you can't penetrate my moral-mental-physical being, hell, I'm not going to throw the towel in, I'm going to try to ram it up your ass. So will the other guy. And we didn't penetrate their—no matter how often we ran the search and destroy missions over there in Vietnam—we didn't penetrate them.

Michael Wyly: The Korean War is another example. We were just pushing the FEBA [forward edge of the battle area]—

Boyd: Yeah, we were just FEBA-pushing, just trying to push the FEBA back.

Audience: [Trying to interrupt] Weren't we limited, though?

Boyd: [Continuing as if unaware of the question.] —the first time you bring the guy he'll say "Yeah, but if you make these thrusts in here, you get a goddamn, you have a flank too." That's right. *[05:00]* The question is who's got the exposed flank? That's always the issue, it's not just the flank, it's the exposed flank.

Audience: You know you made a statement that we didn't do it in the Korean War, we didn't do it in the, over in Vietnam. Weren't we—

Boyd: Well, no, we hadn't. We said in the Korean War, the FEBAs. What I'm talking about, we were talking about physically. He mentioned the point we were pushing FEBAs in the Korean War. I didn't say Vietnam. Vietnam, we had a lot of local things. But the point is, it was a physical penetration we were looking for. We weren't looking at the moral and mental, I'm not even sure we realized we were talking about penetration when we were wandering all over the region.

Audience: Yeah, but weren't we limited politically then?

Boyd: Yeah, one thing we didn't penetrate, and we should have, I told you about the platoons in the villages.[3] See, we would operate

[2] Boyd has an extended critique of principles of war in "Patterns of Conflict"; see p. 392–99 .

[3] Boyd tells this anecdote during the presentation of "Patterns of Conflict"; see p. 283–84, 290–91, 348, 354–55.

inside the villages, we would have penetrated. The other guy would be on the outside. But I used that as an example, remember?

Audience: You might suggest that, with the [Combined Action Program] CAP, though, that there was a certain amount of moral penetration.

Boyd: Wait a minute. We agreed with that; you weren't here, but that's the whole point. We said they did it, but they were pulled off, they stopped that whole operation. When they had a CAP, the CAP guys were working it right in the beginning, and the early special forces were doing it right. But then he said, the commander says, "Bullshit, you guys aren't fighting hard enough; and I want to search and destroy and stop the whole goddamn thing." That was the issue.

See, I raised the question, the movie, I said "How many people saw the movie *Platoon*?" You weren't here, John. I said, "How many people saw the movie, *Platoon*?" and a whole bunch raised their hands. I said, "Okay, let's go to the central episode, which was the attack on the village." And, of course, every time you mention it, the Marines and Army all get pissed off, "Well, you're going to tell us about their blowing—" I said, "That's not the issue, you know, about how the kids get blown up, hand grenades and all that because we know sometimes they're enemy." And I said, "So, that's not the issue." So, I said, "I'm going to a different issue."

The point is we shouldn't have been attacking the village, we should have been *in* the village. We should have owned the village. We should have been living in the village. Then they would have been on our side and let the other guy attack it, let them get pissed off at the other guy. And Mike [Wyly] went through that, and other people went through that. And that's what the CAP teams were trying to do. You know, they weren't fighting. But if they would have read Sun Tzu, subdue enemy without fighting, they would have had it right. But some assholes didn't read that, they said, "You guys aren't fighting hard enough."

You don't always have to fight. The name of the game is: you have a purpose, you want to realize it, and what is the best way to realize it? That's the issue. And the CAP guys had it right in the beginning, and so did the early special forces. In fact, there's a good book out on it, the book that Mike and I like very much, and I'm not the only one, but it turns out the guy who looked at it was this guy

Krepinevich in his book, *The Army and Vietnam*.[4] He's—you probably read that. And he discusses that.

Go ahead.

Audience: What about as military people, when we're restrained to a certain degree—I know you don't like—well, put it this way, you've got different views from Harry Summers on the book that he wrote, *On Strategy*.[5]

Boyd: Well, yeah—

Audience member: But he makes—

Boyd: Yeah, but he fucked it up. He said we won all the battles. We didn't win. You know, goddamn it, he made a point we won all the battles. We didn't win all the battles.

Audience: My point is what happens when you are a military person, you have restraints placed on you, political restraints, and you can't carry through all the philosophy that you—

Boyd: Did you read Bruce Palmer's book?

Audience: No, sir.

Boyd: See, you should have read that.

Audience: Well, I will now [laughs].

Boyd: You will want to read it, *The 25 Year War*.[6] Now, remember, Bruce Palmer, he was assistant— He, first of all, he was a, a corps commander over in, I think III Corps or whatever it was. Was it III Corps? He [unintelligible]. Did you read *The 25 Year War*? Yeah, III Corps commander, and then later on became a deputy to [General William] Westmoreland, and eventually became vice chief of staff of the Army. So, he watched, he saw that thing being framed out and laid out at the upper level because he was part of it there, because he could see that. And his point was the military—he came down hard on the military—couldn't even give the administration the kind of information or set up the strategies to implement over there.

[4] Andrew F. Krepinevich Jr., *The Army and Vietnam* (Baltimore, MD: Johns Hopkins University Press, 1988).

[5] Boyd is referring to Harry G. Summers, who served in the U.S. Army during both the Korean and Vietnam Wars. Summers wrote an analysis of American operations in Vietnam through a Clausewitzian framework, titled *On Strategy: A Critical Analysis of the Vietnam War*, 2d ed. (New York: Presidio Press, 1995).

[6] Gen Bruce Palmer Jr., *The 25-Year War: America's Military Role in Vietnam*, 4th ed. (Lexington: University Press of Kentucky, 2002).

They didn't know how to do it. He criticized the upper level. You have to read the book. I mean he comes down hard.

Wyly: The answer to your question, though—

Boyd: I'm answering his question. He said, "Let the military do what they wanted to do." They couldn't figure out what they wanted to do! That's Palmer's whole point.

Wyly: And not only that, the military didn't have constraints on them—

Boyd: That's right.

Wyly: —the military constrained itself. I mean it was Westmoreland who put the end to the, or took the support away from the CAP.

Audience: I don't think that's all, in fact, true. When you got Tuesday afternoon luncheons that are figuring bombing targets; and you know, as an example, in Hanoi at one factory, they're pumping out war goods, but you can't drop a bomb on that because it's manned by civilians. Now, whether someone's shooting at you with a bullet or gun is going to kill you, or some guy is supplying the bullet, they're both as lethal—

Boyd: I recommend you read *The 25 Year War*.

Audience: I'll do that, sir.

Boyd: Read it carefully. And Palmer makes it very clear, the military couldn't even come up with a workable strategy. Here they were supposed to give the military strategy, they couldn't even come up with a workable strategy. Couldn't even cough one up! He's—

Wyly: Whereas Palmer wants it.

Boyd: He makes it very clear. He was up there.

Wyly: He was up there.

Boyd: You know what he states, you know he was so pissed off at that war, he really was [unintelligible] off. He spent 10 years to research and write that book; he spent 10 years and rewrote it again. He was so—because it came out so bad, it just so bothered him, you could see it, it's sort of an exorcism when he's writing. He's a gentleman. You could tell by the way he's very soft, he writes very, very nicely written. And of course, he must have written that draft God knows how many times in 10 years. But he really, really makes the point: the guys couldn't even lay out a decent strategy, the military.

Audience: Can I make one more comment? I think it'd be real good *[10:00]* if someone like yourself could get into our college sys-

tems and actually teach a course that, you call it whatever—combat philosophy. So, when you talk about the mental game of it, we don't have the mental aspect in this country. And we're getting this pitch as military people, we realize it, but all the people behind us that are out there watching TV have never been educated to this process. And you ought to approach someone like a university and say, "Hey, listen: How about a course in combat philosophy?" It's important.

Boyd: As a matter of fact, we did approach a university, George Mason University; a guy who knew the chancellor that I knew took me to see him. But then do you know what happened? I found out behind the scenes that he had to go out to his reviewers to see if they wanted—he was interested in the course that Mike and—we were laying out, [unintelligible] which is, in essence, the Green Book here, except I didn't have it.[7] That was about two years ago. I think it was March, two years ago—it was '80—this is '89—it was '87. But we wanted to do that because the guy said, "Let's go there," he knows the guy and he got kind of interested. But then it got killed. And I know who killed it. We found out behind the scenes because some other people—once you get in the Washington area, you know how to work the networks and find out. And guess who was, some of his advisors were putting money into the university didn't want to see it happen. Can you guess? BDM.[8]

Audience: BDM Corporation?

Boyd: BDM. The guy with the wheel at BDM went to him because they provided money. They didn't want to see this because it wouldn't build up their goddamn budget, don't you understand, in order to buy hardware. That was the whole point.

Wyly: And, in fact, I beg to differ with you and say that we should teach that to the military; the military isn't getting it.

[7] The "Green Book" was a limited printing effort led by Col Wyly using the Quantico base printer to create a compiled hard copy of Boyd's briefings as they then existed. The Green Book included the essay "Destruction and Creation," and the briefs "Patterns of Conflict," "Organic Design for Command and Control," "The Strategic Game of ? and ?," and "Revelation." The book's name comes from the distinctive green fabric used to cover its cardboard covers, which was a military publishing technique very common at the time.

[8] BDM is likely a reference to Braddock, Dunn, and McDonald, a technical services firm and defense contractor that was headquartered in Tysons Corner, VA, at the time Boyd presented this brief.

Audience 2: In addition to the military, I'm saying.

[Cross talking]

Boyd: Okay. We're going to have the vote here now: which one do you want to go with? We can go with either one, either/or. We can either go with the strategy pitch or the "Organic Design."[9] Now how many people here have seen the "Organic Design?" OK. How many people—

Wyly: I'm a nonvoter.

Boyd: Okay. They weren't here, so—Okay, and I promised you strategy–let's go through the strategy and get the "Organic Design" later, okay? Because we want to get to the moral issue. Okay.

[Sounds of Boyd shuffling slide transparencies]

Boyd: Okay, let's see what I'm doing here.

[pause]

Wyly: I've got another one in my office. [Apparently speaking to another audience member] Go open the top drawer of the shelves, you know, the ones that are right near the windows—

Boyd: In fact, this is the first time I did it this way, so I'm glad I did it this way. [Cross talking]

Audience: Here, Dave, I, I can find it.

[Cross talking]

Audience: How long do you think you're gonna take—

Boyd: Hmm?

Audience: How long do you think you're going to be taking? How long is this going to be going today [unintelligible]?

Boyd: Two hours. Couple of hours.

[Cross talking]

Boyd: Is that about right? [More slide shuffling.] We'll wait until those guys get back.

[Lengthy pause with more slide shuffling.]

Audience: What's Mr. Palmer's background? Bruce Palmer's background.

[9] *Strategy pitch* and "Organic Design" are shorthand for "The Strategic Game of ? and ?" and "Organic Design for Command and Control." From these and other comments across various presentations, it is clear that in this particular series of briefs at Marine Corps Command and Staff College, Boyd first presented "Patterns of Conflict," then "The Strategic Game of ? and ?," and finally "Organic Design for Command and Control," in that order.

SLIDE 1

?—RAISES QUESTION—?

What lies hidden under the question marks?

PUT SIMPLY
That is what the aim or purpose of this presentation is all about—to find and make evident what lies hidden under the question marks!

Boyd: Mister? General!

Audience: Oh. Never mind.

Audience 2: —four-star—

Boyd: Four-star general.

Audience: I know his background, it's okay. [Pause.] And one of the things is when a moral issue, it comes up in the administration, the point is that somebody, if they really know what's going on [unintelligible in cross talking] lay it on the line [unintelligible] the issue.

[slide 1]

Boyd: Okay, are we ready to roll? Note the title of this thing. Of course, the key thing is we really want to find out what lies hidden under those question marks, that's the title, and that's what we want to get into. And, of course, we're going to find out and see if we'll get it right. With that in mind, the point that I want to make here is, well, that's the question: What lies hidden under the question marks? That's what the aim of this whole presentation is about, really to get at that, not just in a one-dimensional sense but obviously in an all-dimensional sense. We want to really get at that. Okay?

[slide 2]

Okay, so, for openers, let me ask you a question. And you probably wonder why this slide is in here. This is one I always direct to the audience, don't worry, before you get into it. I'll let you look into the book. How do you regard strategy? I want your viewpoint; What do you think strategy is?

SLIDE 2

FOR OPENERS

What is Strategy?

Audience: I happened to write an [unintelligible] paper on that. It's the [chuckling by other audience members as the speaker searches for words] it's the plan by which a country furthers its interests and its goals.

Boyd: And anybody? —That's alright, you don't have to have—Anybody else? [Directing the question toward another audience member] What do you think strategy is? [unintelligible] Did you read ahead?

Audience: No sir.

Boyd: Then don't.

Audience: Are you talking about military strategy or—?

Boyd: I just said strategy; it just says "strategy." I didn't want to make it any tighter than that.

Audience: Well, you have certain objectives that you want to obtain, *[15:00]* and you apply resources and elements to obtain that objective.

Boyd: [Directing the question toward another audience member] What do you think strategy is?

Audience: Well, personally it's, it's—

Boyd: [Interrupting] I'm not embarrass—don't take this—there's no intent to embarrass anybody or make you look bad, I'm just trying to find out the different views. Go ahead.

Audience: It's the means to an end.

Boyd: Okay, I won't ask anymore of you all, we can go through this forever. But just keep these things in mind. We'll work our way through this thing, okay? Okay, with that in mind then, here's going to be the outline of the presentation that we're going to come to

SLIDE 3

OUTLINE

- What is Strategy?
- What is the aim or purpose of strategy?
- What is the central theme and what are the key ideas that underlie strategy?
- How do we play to this theme and activate these ideas?

grips with. What is strategy? What is the aim or purpose of strategy? What are the central themes and key ideas that underlie and define it, and how do we play to this theme and activate these ideas?

[slide 3]

Now, that doesn't mean I'm going to show you what to do: step one first, step two first, step three first, or step four. In other words, we're not going to compartmentalize this real nice. The fluidity, we'll reveal it, and you'll see it. Remember, we want to be very fluid. And I recommend, don't try to compartmentalize too much. Because when you do that, pretty soon, you don't know how to link across compartments, you get isolated, and you can't play the game. In fact, you people wrote in your new manual *Warfighting*—fluidity, fluidity of action.[10] Also fluidity of mental processes, too. Okay?

[slide 4]

So, with that in mind then, that's the outline; here's the approach we're going to take. And you'll see that this is an important idea here. It seems like that way it's [unintelligible] idiot Boyd who went through this [unintelligible]. Make a general survey; in other words, we've got to look across many different things, find out what's going on. And then what we want to do is squeegee it down, condense it down to those that are the key elements, or the essential elements,

[10] *Warfighting*, FMFM-1 (Washington, DC: Headquarters Marine Corps, 1989). The Marine Corps' development of FMFM-1 is described in Ian T. Brown, *A New Conception of War: John Boyd, the U.S. Marines, and Maneuver Warfare* (Quantico, VA: Marine Corps University Press, 2018), 163–72.

SLIDE 4

APPROACH

- Make a general Survey
- Condense to Essential Elements
- Place in Strategic Perspective
- Implementation

find out what they are.[11] Remember what I said in my—we talked about the "Patterns," or what I call the, on the second page of my abstract. Remember what I said, the second page of the abstract, the last paragraph: break it down, build it up, break it down, build it up.[12] Analysis, synthesis, analysis, synthesis. We're going to break, pull those things out of the analysis. Then we're going to place it in a strategic perspective, which means we're going to take those things, make a big picture. We're going to go to the synthesis, build a new picture with that information.

And then finally, we'll give you an example of implementation. And then I'm going to add one—I don't have it here—I'll give you something else at the end of the day that I've had for a while and I'll show you a little—It's going to sharpen it even more, give you a better *fingerspitzengefühl*. This is not in the briefing, but we'll talk about it at the end. So, that's the kind of thing we'll be going through. Okay?

[slide 5]

So, it raises a rather interesting question: you know, why do we want to use this approach? Why doesn't— Why do we want to break things down, build them up, break things down, build them up, and all that kind of stuff. Okay, let's give you an illustrative example or an illustration. Now, what I want you to do is imagine in your own mind: you're on a ski slope with other skiers. Lock this image in. Your

[11] Boyd often used the term *squeegee*, or sometimes *squeeze*, as a metaphor for distilling or filtering information down to an essential point.
[12] The abstract for "A Discourse on Winning and Losing"; see pp. 62–64.

SLIDE 5

?—RAISES QUESTION—?

Why do we want to use this approach?

SLIDE 6

ILLUSTRATION

- Imagine that you are on a ski slope with other skiers—retain this image.
- Imagine that you are in Florida riding in an outboard motorboat—maybe even towing waterskiers—retain this image.
- Imagine that you are riding a bicycle on a nice spring day—retain this image.
- Imagine that you are a parent taking your son to a department store and that you notice he is fascinated by the toy tractors or tanks with rubber caterpillar treads—retain this image.

image and my image, and all our images may be different. I couldn't care less. We all have different orientations, so I don't know what, how you see it in your mind or in my mind, but we probably see it different ways. It makes no difference.

[slide 6]

Next, imagine you're in Florida riding an outboard motorboat. You might even be towing water skiers, not necessarily. Lock this image; store these images.

Next, imagine you're riding on a bicycle on a nice spring day. Hang on to this image.

And finally, imagine it's Christmas time and you're taking your

SLIDE 7

NOW IMAGINE THAT YOU:

- Pull skis off ski slope; discard and forget rest of image.
- Pull outboard motor out of motorboat; discard and forget rest of image.
- Pull handlebars off bicycle; discard and forget rest of image.
- Pull rubber treads off toy tractors or tanks; discard and forget rest of image.

son to the department store, and you notice he's fascinated by all these toy tanks and tractors that have rubber treads. Hang onto this image. Now, when I say hang on to it, I just want you to sort of highlight that in your mind.

[slide 7]

Okay. Now, let's operate on that. Now, let's pull the skis off the ski slope, discard and forget the rest of the image—I don't mean just forget it, but I'm saying really highlight the skis, soft-pedal the rest. Got that?

Okay likewise, same thing, the outboard motor. Take that out of the outboard motorboat, discard and forget the rest; or better yet, highlight it, subdue the rest.

Pull the handlebars off of the bicycle; discard and forget the rest of the image, or highlight the handlebars, subdue, soft-light the rest.

Pull the rubber treads off the toy tractor. So, you see we've got [unintelligible].

[slide 8]

Now, knowing that, let's look at what we have. These things are stuck together [Boyd appears to have laid slides 8 and 9 on the projector at the same time, giving his readers a glance at the word "Snowmobile" on slide 9.] So, what do we have here? We got skis, outboard motor, handlebars, rubber treads, and what do we have? You already know the answer because we looked through to the next page. So, imagine in your own mind's eye—when I used to have

SLIDE 8

THIS LEAVES US WITH

Skis, outboard motor, handlebars, rubber treads

PUTTING ALL THIS TOGETHER
What do we have?

it on a different page, you could see it—What do you have there? You glue it all together, you got a snowmobile. But it wasn't there before; but now it's there. Isn't that strange? It wasn't there but it really was there because we had all the bits and pieces.

So, you come up with something different, or a new image beyond the previous four images; you created a new image out of the previous four images. And how did you do that? You broke it down, built it up, kept taking the bits and pieces; I'm just showing you one way to do it. And we call that, when you go from whole to parts, *[20:00]* what do you do? It's analysis or deduction. When you go from parts, take parts, glue them together to make a new whole, what do you call that? Induction, or synthesis, or integration. And that's why I told you that, the other night when I was in here, I said, "I'm insulted when a guy calls me an analyst, because then he suggests I'm a half-wit, and I don't know synthesis." And synthesis is the creative part; that's what you as a commander or a leader are going to have to be able to do, you're going to see different bits and things going on out there, and you're going to have to glue it together, come up with a new idea to move ahead. And if you can't, the whole thing's going to come unglued. So, what do we do up in that building?[13] Everybody wants to be an analyst and break things down. So we get all these bits and pieces, nothing glued together. Except that you squeak over to Congress, and say, "Isn't this great?" But Christ, it's a big pile of mess. Spaghetti.

[slide 9]

[13] By "that building," Boyd is probably referring to the Pentagon.

SLIDE 9

SNOWMOBILE

And that's my point. So, what do we have in the next chart? It's a snowmobile. It's a very good [unintelligible] to have. So, that's what we want to be able to do. The name of the game is to build snowmobiles—morally, mentally, and physically—in any dimension. In other words, I'm using the snowmobile as a metaphor for what we're going to do. All it is, a metaphor. So that's what this thing addresses. So, what I'm saying, in order to build those snowmobiles, you must interact in a variety of ways with your environment. If you have only a one-dimensional way to look at the environment, how can you, you can't take out many pieces, you can't glue them together, you can't play the game. So, if you only have one way to look at things, how can you find out what's going on? There's no way.

[slide 10]

As I say in my "Organic Design," you'll see later on [unintelligible], you've got to be able to make these many-sided implicit cross-references. You've got to be able to see this, see this, and see this; pull this out, and pull this out, pull this out of these many different dimensions. So we must be able to examine the world from a number of perspectives, not just one. Remember what I said: don't be able to see the pyramid from one side; be able to see it from the side, the bottom, the oblique, the inside, the top, and then you get a true image of the pyramid.[14] But if you only see it from the side and I see it from the top, and I never saw it in any other way, then we never could communicate; and yet, we'd be talking about the same thing.

[14] Boyd describes this analogy in detail at the beginning of "Patterns of Conflict"; see p. 82.

SLIDE 10

?—WHAT DOES THIS EXAMPLE SUGGEST—?

To discern what is going on we must interact in a variety of ways with our environment.

IN OTHER WORDS

We must be able to examine the world from a number of perspectives so that we can generate mental images or impressions that correspond to that world.

MORE TO THE POINT

We will use this scheme of pulling things apart (analysis) and putting them back together (synthesis) in new combinations to find how apparently unrelated ideas and actions can be related to one another.

Okay, more to the point then, here's what we're going to do: this will be the scheme of pulling things apart and putting them back together, in new combinations—see how that is related. So, it's an analysis-synthesis game, not just an analyst. When a guy calls me an analyst— a new guy likes to be called an analyst. I guess they like to be called halfwits, an insult. And an "expert"; I hate to be called an analysis expert, or an "analytical expert" is the worst thing. Because if you're an expert, that means you've got it all figured out. You know the experts, they got it all figured out, nothing new to learn, they've got the whole nine yards. So, that's a personal insult when they call me that.

[slide 11]

Okay. With that in mind, then, now I want to get into my general survey as I set it up [unintelligible]. And okay, in the general survey, here's the domains we're going to look at, areas we're going to criss-cross through, different perspectives: mathematical logic.

[slide 12]

Don't worry about it, I'm not going to have you run equations

SLIDE 11

GENERAL SURVEY

SLIDE 12

DISCIPLINES OR ACTIVITIES TO BE EXAMINED

- Mathematical Logic
- Physics
- Thermodynamics
- Biology
- Psychology
- Anthropology
- Conflict

or anything like that. Physics, thermo[dynamics], biology, psychology, anthropology, and probably even some others. In other words, we've got seven; instead of four images, we're going to look through seven images here at least. And, as you're going to see, we're going to play that game; we'll be taking bits and pieces from all these, we're going to glue it together, and then come up with an idea and strategy, in a very fundamental way. So, we're going to use these domains to build our strategic snowmobile. What we want to build is a strategic snowmobile. That's what we're going to do. Okay?

[slide 13]

So, but, you know, we sort of have a little problem: Where do we begin? We need to sort out someplace for the start. And let's go back to one chart I lifted out of one of my previous charts in the "Patterns."

SLIDE 13

VERY NICE
BUT

?—WHERE DO WE BEGIN—?

SLIDE 14

HUMAN NATURE

Goal

- Survive, survive on own terms, or improve our capacity for independent action.

The competition for limited resources
to satisfy these desires may force one to:

- Diminish adversary's capacity for independent action, or deny him the opportunity to survive on his terms, or make it impossible for him to survive at all.

[slide 14]

We're going back to human nature. Remember, while we're doing this, we're going to talk about strategy: in some sense, we want to survive, survive on our own terms or improve our capacity for independent action. You've seen this before. [unintelligible] We had that chart in my "Patterns," my briefing on "Patterns." I'll even give you a better one, which I'll give you later on, but I'll preempt myself here. There's a better way of thinking about it, what I call organic success,

or a goal you want to have: you want to be able to thrive and grow. That's what you really want to be able to do: thrive and grow by being able to comprehend, shape, and cope with an ever-changing and uncertain world we have to deal with. That's what you really want to talk about: an uncertain and ever-changing world.

[slide 15]

But you can think of it this way too. Okay, with that in mind, then, let's start. The reason why I bring that to you is to raise the question, and it's how do we realize this and we're making it difficult for others to realize this as well? Well, we're going to have to start marching through these various perspectives, obviously. *[25:00]* So, let's go through our general survey.

[slide 16]

Now I want you to read this chart, then when you read it, I'll comment. All I did here was lift these two things right out of the *Washington Post*. I took these passages. The first one is by Boyce Rensberger. The second one is by Richard Restak, he's got a book out on the brain [unintelligible].[15] Note these quotes, then I'll comment. Now, remember, you may say, "What's this goddamned Boyd bringing this stuff up for?" It's very germane to all—you may not think so right now, but it's very germane to the subject of the strategies you're going to see. Very germane.

[Long pause as audience reads the slide.]

Now why did I—anybody—just, let's start surveying [unintelligible]. Remember the topic is strategy. Why would I show a chart like this? What's the whole point behind this? When you think, in your mind's eye, what's the point behind these two passages? What am I bringing to your attention?

Audience: Different ways to view things.

Boyd: I'm showing you in a way what happens in order to come up with something, what they're showing is the brain— [Boyd apparently recognizes an audience member who wishes to speak] Go ahead.

Audience: Organically, we have within us the capacity to [ob-

[15] Boyce Rensberger, "Nerve Cells Redo Wiring, Report Says: Neurons Branch Out, Change Contacts," *Washington Post*, 10 June 1985; and Richard M. Restak, "The Soul of Our Machine," review of *Neuronal Man: The Biology of Mind* by Jean-Pierre Changeaux, *Washington Post Book World*, 24 March 1985, BW1.

SLIDE 15

?—RAISES QUESTION—?

In a most fundamental way how do we realize this goal or make it difficult for others to realize this goal?

SLIDE 16

SELECTIONS FROM NEWSPAPERS

The Washington Post
"Nerve Cells Redo Wiring . . .", by Boyce Rensberger

"Dale Purvis and Robert D. Hadley . . . have discovered that a neuron's fibers can change significantly in a few days or weeks, presumably in response to changing demands on the nervous system. . . . research has shown neurons continually rewire their own circuitry, sprouting new fibers that reach out to make contact with new groups of other neurons and withdrawing old fibers from previous contacts . . . This rewiring process may account for how the brain improves one's abilities such as becoming proficient in a sport or learning to play a musical instrument. Some scientists have suggested that the brain may use this method to store facts. . . . The research was on adult mice, but since all mammalian nervous systems appear to behave in similar ways, the researchers assume that the findings also apply to human beings."

The Washington Post Book World
"The Soul of the Machine", by Richard M. Restak
(Review of "Neuronal Man", by Jean-Pierre Changeux)

"Changeux suggests that the complexity of the human brain is dependent upon the vast number of synapses (connections) between brain cells. . . . these synaptic connections are established or fall by the wayside according to how frequent they're used. Those synapses which are in frequent use tend to endure ('are stabilized') while others are eliminated . . . In other words, . . . interactions with the environment ' . . . (exert) . . .' tremendous influence on the way the human brain works and how it has evolved."

scured by coughing] adapt dynamically to a change of environment.

Boyd: That's right. But note, in order to do it, it's got elements within your brain; if you don't make connections between those elements, the brain can't function. And so, the whole idea is you're going to build these connections, and the mere fact that when you learn something new; What is he saying? When you learn something new, you actually are changing the connections within your brain. You

build those connections, but without those connections you can't do those things. Remember, when you learn something new, how to do something, you were very clumsy when you learned something new; and after you learn it, you don't even have to think about it. And the reason why is you've now built up the connecting linkages. In fact, they had some images where you could look at the connecting network before somebody learned something and afterward, and you could see the richness of the connections. And so, stored in those connections, your ability to do whatever that was.

Now, on the other hand, note what else is he saying here. If you don't use it, what happens? It withers away. And I could think of it myself: I used to be a real good passer when I was a young guy; I could throw a ball real nice. Christ, even though I want to do it now, in a residual capacity, I'm a basket case. For some things I haven't done for a long period of time, you lose that touch. What's happened is some of that stuff's withered away because I no longer using it, so it tends to atrophy away.

And note this here, by the Frenchman.[16] So, the point is when you learn something new and you operate from this variety, you begin to get that *fingerspitzengefühl*, or get it inside you, in effect, what have you done to your brain? You've changed it. You've changed it. On the other hand, if you have a narrow repertoire and you don't use things, it's going to tend to atrophy away, and you lose those connections.

And that's why in my—which I'll bring out in "Organic Design"—you're going to see I say you want to make those many-sided implicit cross-references. By doing that, what are you doing? You're building up that what? Connectivity. Which allows you to get the *fingerspitzengefühl* so you can deal with the world out there. If you use a "checklist mentality" going by—you're not going to want to [unintelligible]. You're screwing yourself. And that's why when I told you that guy tried to—I didn't know, heck, done this stuff then—but he brought that checklist in that time, after I became a base commander and lost his airplane and he wanted to use that checklist, and I threw it

[16] Boyd is referring to Jean-Pierre Changeux's *Neuronal Man: The Biology of Mind*, trans. Laurence Garey (New York: Oxford University Press, 1987), the subject of Restak's quote on slide 16.

SLIDE 17

SELECTIONS FROM NEWSPAPERS (CONTINUED)

The Washington Post
"Brain Cells Try to Battle Alzheimer's . . .", by Jan Ziegler

"A post mortem study of brains of Alzheimer's victims", (reported on by Dr. Carl Cotman and colleagues) "showed that cells tried to repair connections destroyed by the disease by sprouting new branches. . . . A progressive, degenerative disease, it can cause memory loss, confusion, difficulty in speech and movement, inability to recognize even family members . . . A characteristic of the disease is the death of neurons, or nerve cells, that connect to each other by long fibers, which forces the brain to live with fewer and fewer connections. Analyzing cells from the hippocampus of six deceased Alzheimer's patients, Cotman and colleagues, found that axons—the output fibers of nerve cells, responsible for transmitting signals through the nervous system—start to sprout, reforming the connections between remaining cells. . . Ultimately however, the sprouting process cannot keep up with destruction. Either the sprouting stops, or too many nerve cells die . . ."

Erie Daily Times
"Rats Lost Muscle, Bone Strength in Space Flight", by Paul Recer

"Space rats that spent seven days in orbit suffered massive losses of muscle and bone strength, suggesting that astronauts on long voyages must be protected from debilitating effects of zero gravity . . . The young space rats experienced a bone strength loss of up to 45 percent and a muscle tissue loss of up to 40 percent . . . older rats . . . suffered bone and muscle strength losses of about 15 percent . . . Soviet space scientists reported a similar amount of muscle and bone loss in rats that were in space for more than 20 days . . ."

out the window two or three times; and finally, he got the message.[17]

Okay?

[slide 17]

Now, here's one more chart, which goes to the same thing in a different sense. In fact, we're getting deeper and deeper. In fact, there's just another recent article on Alzheimer's; we're seeing the same thing here. What happens is they start losing the cells and the connectivity begins to die away. Remember what I said: terrain doesn't wage wars, machines don't wage wars; people do, and they use their minds, and that's how the mind functions, because then you can play different games. All right?

Wyly: *[30:00]* You could actually take this analogy and take it up to the level of society.

Boyd: Oh, don't think I'm not thinking that's correct. Because

[17] Boyd tells this full story in "Patterns of Conflict"; see p. 150–52.

you're a social—you're a cell, I'm a cell, he's a cell, and we build connecting links between ourselves; in fact, I have that in part of my briefing, and instead of calling that *orientation*, I call that *harmony* where you're harmonizing various units so they can function as an organic whole.[18] In other words, you do it in individuals or you can do it in a social context too. Exactly right. That's exactly what. You got it exactly right.

And that's why we talked about the other night. Remember I said, "What do you want to build?" You want to build that organic whole, you know, in an organization like in the Marine Corps, your unit, whatever it might be. So, you're building those connections. They're invisible, but nevertheless, they're there.

But note what happens here with Alzheimer's. Pretty soon, they start getting—the cells die away; and even though that, they find out, they're sprouting new connections, they're—

[30:57]

[end of tape 1, side 1]

[start of tape 1, side 2]

[slide 18]

Boyd: This is a book, *Order Out of Chaos*, Ilya Prigogine, he won the Nobel Prize.[19] In fact, he was one of the leaders in this new theory they call "chaos." And his assistant, Isabelle Stengers. And here's some passages I captured out of his book.

All they mean by equilibrium thermodynamics is when there's no potential—it means they're in the same state. What happens when you got things in equilibrium? What happens? You have what? Max what? Anybody know? Entropy. When you lose your potential for doing work or when you have unavailable energy. When all your energy becomes unavailable, your energy's in equilibrium condition, there's no more capacity for doing work or taking action.

Note what he said: "Obviously the answer is no." Not only that, "without further interaction with their environment." Note when he talks about when they examine a biological cell or a city, they see something very different, which is the point you were making.

[18] "Patterns of Conflict."

[19] Ilya Prigogine and Isabelle Stengers, *Order Out of Chaos: Man's New Dialogue with Nature* (New York: Verso Books, 2018).

SLIDE 18

SELECTIONS FROM BOOKS

"Order Out of Chaos", by Ilya Prigogine and Isabelle Stengers

"Equilibrium thermodynamics provides a satisfactory explanation for a vast number of physicochemical phenomena. Yet it may be asked whether the concept of equilibrium structures encompasses the different structures we encounter in nature. Obviously the answer is no."

"Equilibrium structures can be seen as the results of statistical compensation for the activity of microscopic elements (molecules, atoms). By definition they are inert at the global level . . . Once they have been formed they may be isolated and maintained indefinitely without further interaction with their environment. When we examine a biological cell or a city, however, the situation is quite different: not only are these systems open, but also they exist only because they are open. They feed on the flux of matter and energy coming to them from the outside world. We can isolate a crystal, but cities and cells die when cut off from their environment. They form an integral part of the world from which they can draw sustenance, and they cannot be separated from the fluxes that they incessantly transform."

Now what I want you to sort of keep these things in mind, when you say, "Where is that guy taking me?" This is very important stuff we're doing here because it will help give you good insight into strategy.

Okay, everybody read it? Okay.

[slide 19]

Now in the next one here, we got, these are guys commenting—these are another physicist and an engineer in which they're commenting upon Prigogine's work.[20] Now, he's talking about "far-from-equilibrium." How many people read any stuff about this new science called "chaos" that they're talking about? And everybody likes to write about it, but if we're really talking about it, you want to put it down in a nutshell, what they call "far-from-equilibrium open nonlinear systems with feedback." The reason why they call them "dissipative structures" is because they're dissipating entropy to the

[20] John P. Briggs and F. David Peat, *Looking Glass Universe: The Emerging Science of Wholeness* (New York: Simon & Schuster, 1986).

SLIDE 19

SELECTIONS FROM BOOKS (CONTINUED)

"Looking Glass Universe", by John P. Briggs and F. David Peat

"Prigogine called far-from-equilibrium forms like the vortex, 'dissipative structures.' The name comes from the fact that to keep their shape these structures must constantly dissipate entropy so it won't build up inside the entity and 'kill' it with equilibrium . . . [These dissipative structures] can survive only by remaining open to a flowing matter and energy exchange with the environment . . . The structure is stabilized by its flowing. It is stable but only relatively stable—relative to the constant energy flow required to maintain its shape. Its very stability is also paradoxically an instability because of its total dependence on its environment. The dissipative structure is autonomous (separate) but only relatively separate. It is a flow within a flow."

outside world. There it says they're constantly dissipating entropy. Because if the entropy builds up, what does that mean?

Audience: It reaches equilibrium. It dies.

Boyd: It dies. It reaches equilibrium, it just dies. It's dead. So, it has to export entropy to the outside world. If it doesn't, it dies. And note what he said, "it can survive only by remaining open to a flowing matter and energy exchange with the environment." So, if you cut that off, what's going to happen? It can't function too well. It can't function too well. Note what he says, "it's stabilized but it's only relatively stable." Now think about what we've been talking about in "Patterns" and all that. This is all very related.

Okay?

[slide 20]

And now, let's look at another one. I lifted this out of a book. How many people ever read this *War of the Flea*, it's about guerrilla warfare?[21] It's got some striking passages in there. [unintelligible]

But you're going to see all these things I'm trying to show you, they're all related. We're going to show, they're all related to one

[21] Robert Taber, *War of the Flea: The Classic Study of Guerrilla Warfare* (Lincoln, NE: Potomac Books, 2002).

SLIDE 20

SELECTIONS FROM BOOKS
(CONTINUED)

"The War of the Flea", by Robert Taber

"Almost all modern governments are highly conscious of what journalism calls 'world opinion.' For sound reasons, mostly of an economic nature, they cannot afford to be condemned in the United Nations, they do not like to be visited by Human Rights Commissions or Freedom of the Press Committees, their need of foreign investment, foreign loans, foreign markets, satisfactory trade relationships, and so on, requires that they be members in more or less good standing of a larger community of interests. Often, too, they are members of military alliances. Consequently, they must maintain some appearance of stability, in order to assure the other members of the community or of the alliance that contracts will continue to be honored, that treaties will be upheld, that loans will be repaid with interest, that investments will continue to produce profits and be safe."

"Protracted internal war threatens all of this . . . no ally wishes to treat with a government that is on the point of eviction."

"It follows, that it must be the business of the guerrilla, and of his clandestine political organization in the cities, to destroy the stable image of the government, and so to deny its credits, to dry up its source of revenue, and to create dissension within the frightened owning classes, within the government bureaucracy (whose payrolls will be pinched), and within the military itself."

"Isolation, military and political, is the great enemy of guerrilla movements. It is the task of the urban organization to prevent this isolation, to provide diversions and provocations when needed, to maintain contact, to keep the world aware of a revolution in progress even when there is no progress to report."

another. Even though they seem like they're from separate fields, they're all related to one another. And obviously the "flea" being the guerrilla.

[Long pause as audience reads the slide]

Note all the things they need in order to function. Don't they—look at human rights, freedom of the press, et cetera. In other words, they still need to interact with the world. If you cut that off, it's kind of hard to build [unintelligible].

[Long pause]

Now, if you think about what we talked about: the brain has to have connectivity, the guerrillas have to have connectivity. Do you see the argument I'm beginning to build up? You begin to see these things keep creeping up in different dominions. Everybody read it all? Okay?

[slide 21]

SLIDE 21

SELECTIONS FROM BOOKS
(CONTINUED)

"Social Order and the General Theory of Strategy",
by Alexander Atkinson

Moral fibre is "the great dam that denies the flood of social relations their natural outlet of decline towards violence and anarchy" . . . In this sense, "moral order at the center of social life literally saves society from itself."

"Strategists must grasp this fact that social order is, at once, a moral order . . . If the moral order on which rests a fabric of social and power relations is compromised, then the fabric (of social order) it upholds goes with it."

In other words, "the one great hurdle in the strategic combination (moral and social order) is the moral order. If this remains untouched the formation of new social relations and social ranking in status and power either never gets off the ground or faces the perennial spectre of backsliding towards the moral attraction of established social and power relations."

The strategic imperative, then, becomes one of trying "to achieve relative security of social resources by subverting and reweaving those of the opponent into the fabric of one's own social order."

Now, let's look at—this is a book written by Alexander.[22] How many people read this? *[05:00]* He never should have—he wasn't ready to write it. He had some good ideas, but he had it all screwed up. In fact, I'm probably giving him more credit, I had to reorganize it in order to make sense out of the goddam stuff. So I'm probably giving him more credit than he deserves. But he's talking about—he's bringing in the moral dimension here. So let's read it. And it should be considered as strategy.

[Long pause as audience reads the slide]

Note that second passage there: "That social order is at once a moral order—If the moral order on which rests a fabric of social and power relations is compromised, then the fabric of social order it

[22] Alexander Atkinson, *Social Order and the General Theory of Strategy* (Oxfordshire, UK: Routledge, 2022).

SLIDE 22

SELECTIONS FROM BOOKS
(CONTINUED)

"Beyond Culture", by Edward T. Hall

"Everything man is and does is modified by learning and is therefore malleable. But once learned, these behavior patterns, these habitual responses, these ways of interacting gradually sink below the surface of the mind and, like the admiral of a submerged submarine fleet, control from the depths. The hidden controls are usually experienced as though they were innate simply because they are not only ubiquitous but habitual as well."

". . . The only time one is aware of the control system is when things don't follow the hidden program. This is most frequent in intercultural encounters. Therefore, the great gift that the members of the human race have for each other is not exotic experiences but an opportunity to achieve awareness of the structure of their own systems, which can be accomplished only by interacting with others who do not share that system . . ."

upholds goes with it." And you get into moral dimensions deep here, that I just—This is the first chart.

[Long pause]

Okay?

[slide 22]

Remember, we're looking at many different areas here. We're trying to, trying to mind, manage in your mind how we're going to pull this together, break it down [unintelligible]. Now this is a book written by—*Beyond Culture*, the guy that wrote this, Edward Hall, is a well-known cultural anthropologist.[23] He's looking at this as a cultural anthropologist. And I want you to pay particular attention to the last passage, the second passage. Both of them are important, particularly the second.

Now, what's the message in the first passage? There's an inter-

[23] Edward T. Hall, *Beyond Culture* (New York: Anchor Books, 1977). Hall was an American anthropologist noted for his development of *proxemics*, which studies the human use of physical space and the impacts of population density on human communication, interaction, and social behavior.

esting message there. This is how we get preconceptions formed and we can't get rid of them. In other words, you get a certain orientation, it gets hard in order to change that orientation. That's what he's telling you in that first passage there. In other words, they become habit, rigid habit patterns. It's hard to break those habits. You don't even realize they're controlling you.

Now, then he goes on to the second passage. What's he saying there? He says the only way you can understand your own culture is by doing what?

Audience: [unintelligible]

Boyd: Looking at another culture. I can't look at black and compare it with black and say it's black. I've got to have something different. In other words, we really understand things not by—we understand them by differences between them. We actually put them together in similar [unintelligible] both differences and similar things to work. Well, without differences, you can't even play the game. You can't say black is black because it's black. You can't compare something to itself. That's what he's saying. Okay?

[slide 23]

You got to reach out. And of course, that's what's in my "Destruction and Creation" in which I say according to Gödel's incompleteness theorem, Heisenberg's uncertainty principle, and the second law, one cannot determine the character or nature of a system within itself.[24] Moreover, attempts to do so lead to confusion and disorder. You can't determine the character or nature of a system within itself, not only did it come out in Gödel, Heisenberg, and the second law, but this guy didn't even read those things. The cultural anthropologist found out you have to interact with other cultures, otherwise you can't find out your own culture either.

[24] Boyd's "Destruction and Creation"; see pp. 70–75. Kurt Gödel (1906–78) was an Austrian logician, mathematician, and philosopher. His incompleteness theorem posited that the consistency of any system cannot be proved from within the system. Werner Heisenberg (1901–76) was a German physicist who influenced a number of modern scientific theories, including quantum theory, ferromagnetism, and subatomic particles. His uncertainty principle stated that the very presence of someone observing a system introduced an element of uncertainty into the system being observed. The second law of thermodynamics states that the entropy or disorder of a closed system will always increase over time.

SLIDE 23

SELECTIONS FROM AN UNPUBLISHED ESSAY

"Destruction and Creation", by Yours Truly

According to Godel's Incompleteness Theorems, Heisenberg's Uncertainty Principle, and the Second Law of Thermodynamics one cannot determine the character or nature of a system within itself. Moreover, attempts to do so lead to confusion and disorder.

SLIDE 24

SELECTIONS FROM A SPEECH

"A Model of Soviet Mentality", by Dmitry Mikheyev

"Interaction between the individual and his environment starts with his perception of himself as a separate entity and the environment as everything outside of self. He learns his physical limits and desires, and how to fulfill them through interaction with the physical and social environment. . . . I maintain that the way the individual perceives the environment is crucial for his orientation and interaction with it."

"Man's orientation will involve perceptions of self as both a physical and a psychological entity, as well as an understanding of the environment and of the possibilities for achieving his goals (FROMM, 1947). Society, meanwhile, has goals of its own—preservation of its physical integrity and spiritual identity. Pursuing these goals involves mobilizing and organizing its inner resources and interaction with the outside environment of other societies and nations. . . . An individual becomes a member of the society when he learns to act within its limits in a way that is beneficial to it."

Also, Tarski, Alfred Tarski, found out in terms of languages, the same thing.[25] You can't examine a language within itself to deter-

[25] Alfred Tarski (1901–83) was a Polish-American logician, mathematician, and contemporary of Kurt Gödel. Tarski's undefinability theorem states that arithmetical truth cannot be defined in arithmetic, a clear parallel to Gödel's incompleteness theorem.

SLIDE 25

SOME FAVORITE SELECTIONS

Old Fable
- But sir, the emperor is naked, he has no clothes

Sun Tzu
- "Know your enemy and know yourself; in one hundred battles you will never be in peril."
- Seize that which your adversary holds dear or values most highly; then he will conform to your desires.

Jomini
- "The great art, then, of properly directing lines of operations, is so to establish them in reference to the bases and to the marches of the army as to seize the communications of the enemy without imperiling one's own, and is the most important and most difficult problem in strategy."

Leadership
- The art of inspiring people to cooperate and enthusiastically take action toward the achievement of uncommon goals.

mine the structure of the language. You have to reach out and compare it to other things. Okay?

[slide 24]

Here's one from a Soviet dissident. In fact, he's [unintelligible], I met the guy, pretty interesting guy.

[Long pause as audience reads the slide]

Note the words he used there: man's orientation, [unintelligible].

[Long pause as audience reads the slide]

Okay? Now, some of my favorite selections here.

[10:00]

[slide 25]

Why is the emperor naked? Why does he have no clothes? Anybody? You know, it's an old fable. Why do people use that as a fable? What are they saying?

Audience: Well, the emperor has to believe that he has something on everyone else, and so his subjects, lacking any other means to provide him talk him into his own [unintelligible].

Boyd: Go ahead.

Audience: [unintelligible]

Boyd: No. Don't take it literally. This is a very important fable.

Audience: One of the issues that I think was being able, the inability of people to tell the emperor, who was—

Another audience member: Oh yeah.

Boyd: Go ahead. Go ahead. You're onto it.

Audience: The problems.

Boyd: What happens is his ministers are not telling the truth, so he doesn't know what the hell's going on. So, the young kid in the old fable says, "Well, sir, the emperor is naked." He has no clothes." He doesn't know what the hell is going on. In other words, they've cut him off from his environment.

Audience: And so, the whole thing about him getting these [unintelligible] clothes was that no one wanted to tell the emperor—

Boyd: Look at Sun Tzu. Know your enemy, know yourself.

Jomini. Leadership. I'll come back to that chart later on. I'm going to put it aside. In fact, you're probably wondering, "Why do I have all these very different kinds of things?" We'll come back to that later on after we've gone through some stuff.

[slide 26]

Okay. So, it raises a question. Remember, we're trying to see how they're related to one another. That was the whole thing, we gave all these diverse things from these different domains or realms. Now, can we break them down and put them together? Now, remember when I did this—I'm just showing you a sample—I went through a whole bunch of stuff. I'm just showing you a very tailored sample here but it's very germane to what we're talking about. In other words, I focused it very hard so we could get right to it.

[slide 27]

So then, our next thing is to, we want to condense things down. Remember, I said the second part, we want to condense all this thing down. Now, let's get down to the nitty gritty. That's why I call it compression, let's compress everything down.

[slide 28]

And note that first bullet. The point is physical as well as electrical and chemical connections in the brain are shaped by interacting with the environment. Without them, you don't have the mental

SLIDE 26

?—RAISES QUESTION—?

Remembering that we are trying to see how the preceding selections are related to one another, where do we go next?

SLIDE 27

CONDENSATION
TO
ESSENTIAL ELEMENTS

wherewithal to deal with the environment. In other words, we build up that activity in your brain, and that's built up by what? As a result of interaction with the environment. If you don't interact, you don't build up the connectivity. Therefore, you can't deal with the environment.

Okay. Gödel's Theorem, Heisenberg, et cetera, we cannot determine the character or nature of the system. Moreover, attempts to do so will lead to confusion and disorder, mental as well as physical. In other words, once again, we need an external environment or outside world to define ourselves. We need to maintain organic integrity, otherwise we experience dissolution and disintegration and we come unglued.

Okay, moral fiber is the glue that holds society together. Those are those things. Remember what I said? That's the control mechanism, permits us to interact with one another. If you don't, you have a problem. They're very simple.

The last one. Living systems are open systems, closed systems are nonliving systems. So, if we don't communicate with the outside

SLIDE 28

COMPRESSION

- Physical as well as electrical and chemical connections in the brain are shaped by interacting with the environment. Point: Without these interactions we do not have the mental wherewithal to deal or cope with that environment.
- Godel's Incompleteness Theorems, Heisenberg's Uncertainty Principle, and the Second Law of Thermodynamics, all taken together, show that we cannot determine the character or nature of a system within itself. Moreover, attempts to do so lead to confusion and disorder—mental as well as physical. Point: We need an external environment, or outside world, to define ourselves and maintain organic integrity, otherwise we experience dissolution/disintegration—i.e., we come unglued.
- Moral fibre or moral order is the glue that holds society together and makes social direction and interaction possible. Point: Without this glue social order pulls apart towards anarchy and chaos leaving no possibility for social direction and interaction.
- Living systems are open systems; closed systems are non-living systems. Point: If we don't communicate with outside world—to gain information for knowledge and understanding as well as matter and energy for sustenance—we die out to become a non-discerning and uninteresting part of that world.

world to gain information for knowledge and understanding as well as matter and energy for sustenance, we die out and become what I call an uninteresting part of that world. Debris. Okay?

[slide 29]

Now, let's super-compress it. Take it down in other words, what I'm saying here. In other words, what I'm saying, simply stated, as human beings, we cannot exist without an external or surrounding environment from which we can draw sustenance, nourishment, or support. You gotta to have it. Period. It's crucial. And we're not just talking about physical, we're talking about what? We're talking about moral and mental pieces if you look at those other statements. So, in other words, interaction permits vitality and growth while isolation leads to decay and disintegration. Exactly right. That's what the previous chart was all about. Interaction and isolation.

SLIDE 29

!—SIMPLY STATED—!

As human beings, we cannot exist without an external or surrounding environment from which we can draw sustenance, nourishment, or support.

IN OTHER WORDS
Interaction permits vitality and growth while isolation leads to decay and disintegration.

SLIDE 30

SUCH A SIMPLE STATEMENT REVEALS THAT:

The theme associated
with
D & C, P O C, C & C
is one of
Interaction and Isolation

- "Organic Design for Command and Control" (C&C) emphasizes interaction.
- "Patterns of Conflict" (POC) emphasize isolation.
- "Destruction and Creation" (D&C) is balanced between interaction and isolation.

[slide 30]

Okay. So those people who've seen my presentation, it occurred to me after I did this, something very interesting. "Destruction and Creation," "Patterns of Conflict," and "Command and Control"—is one of interaction and isolation. "Organic Design for Command and Control," which you're gonna see, tends to emphasize the interaction aspect. It highlights interaction. "Patterns of Conflict," you recall, is

SLIDE 31

KEEPING TRACK OF ALL THESE IDEAS

Let's move on and place them in a—

SLIDE 32

STRATEGIC PERSPECTIVE

all the things we're doing to 'em, we tend to emphasize the isolation side of the picture. And "Destruction and Creation" is balanced between the two. That's the essay you see in the back here.[26] Okay? *[15:00]*

[slide 31]

So, let's move on then, now let's place them in a strategic perspective. So now, we'll go to the second part. Strategic perspective. Now, we can fill in that first chart.

[slide 32]

[slide 33]

Now, if we go back to that first chart, we'll see, it's one of interaction and isolation. That's the name of the game. Remember the first chart, I had "Strategic Game of ? and ?" The question marks are now filled in. It's a game of interaction and isolation, that's the game. To be able to diminish an adversary's ability to communicate or interact with his environment while sustaining or improving ours.

[slide 34]

In fact, if you don't penetrate them, how can you isolate them?

[26] Boyd may be referring to the back pages of the "Green Book."

SLIDE 33

NOW WE CAN SEE BY
GOING BACK TO THE BEGINNING

The Strategic Game
is one of
Interaction and Isolation

A game in which we must be able to diminish adversary's ability to communicate or interact with his environment while sustaining or improving ours.

SLIDE 34

?—RAISES QUESTION—?

How do we do this?

THREE WAYS COME TO MIND

- Moral
- Mental
- Physical

[unintelligible] And without reorienting, what's happening? In other words, you're getting out of touch with your environment. Without reharmonizing, the overall organism can't get in touch with the environment. Remember I used the word PISRR, P-I-S-R-R? Penetrate, isolate, subvert, reorient, reharmonize: all those are related to interaction and isolation.

SLIDE 35

?—WHY SHOULD WE USE THESE—?

- Physical represents the world of matter-energy-information all of us are a part of, live in, and feed upon.
- Mental represents the emotional/intellectual activity we generate to adjust to, or cope with, that physical world.
- Moral represents the cultural codes of conduct or standards of behavior that constrain, as well as sustain and focus, our emotional/intellectual responses.

Okay, so it raises an interesting question. How do we do this? I say three ways come to mind: moral, mental and physical. Three ways.

[slide 35]

Okay? Why should we use these? Here's why. Because the physical represents the world of matter, energy, information that all of us are a part of, live in, and feed upon. Part of the world we come from.

Mental represents the emotional—not just intellectual—emotional/intellectual activity we generate to adjust to or cope with this world, to actually deal with the world.

And moral represents the cultural codes of conduct or standards of behavior that constrain, as well as sustain and focus, our emotional/intellectual responses.

Now in a minute here, I'm going to go a bit deeper than we are. Before that, though, I want to go to two more charts on, where that moral is a little bit deeper [unintelligible].

[slide 36]

Okay, with that in mind then, let's look at the isolation side within that framework. Upon folding these ideas into our interaction/isola-

SLIDE 36

UPON FOLDING THESE IDEAS INTO OUR INTERACTION/ISOLATION THEME WE CAN SAY:

- Physical Isolation occurs when we fail to gain support in the form of matter-energy-information from others outside ourselves.
- Mental Isolation occurs when we fail to discern, perceive, or make sense out of what's going on around ourselves.
- Moral Isolation occurs when we fail to abide by codes of conduct or standards of behavior in a manner deemed acceptable or essential by others outside ourselves.

tion theme, we see that physical isolation occurs when? Mental isolation occurs when? Moral isolation occurs when? Note what I've got on mental: when we fail to discern, perceive, or make sense out of what's going on around ourselves. Now, remember when we talked about OODA loops earlier, what did I say? You get inside your adversary's OODA loop, what do you do? You're generating mismatches between the way he sees the world and the way the actual world's unfolding. In other words, he can't discern what's going on. Moral isolation.

[pause as audience reads the slide.] Okay?

[slide 37]

Now, let's turn the argument around with the interaction side of the house. Now what are we saying here? When we generate mental images or when we generate images or impressions that match up with the events or happenings that unfold around ourselves. Note this: when we live by codes of conduct or standards of behavior. Now I want to draw a distinction between moral and morale. So, I'll draw a distinction between that now. Moral, you're referring to codes of conduct or standards of behavior, whether you abide by

SLIDE 37

WHILE IN OPPOSITE FASHION WE CAN SAY:

- Physical Interaction occurs when we freely exchange matter-energy-information with others outside ourselves.
- Mental Interaction occurs when we generate images or impressions that match-up with the events or happenings that unfold around ourselves.
- Moral Interaction occurs when we live by the codes of conduct or standards of behavior that we profess, and others expect us, to uphold.

them or whether you don't. Morale is a state of mind or a mental attitude that relates to whether you're encouraged, you've got confidence, enthusiasm, or whether you're discouraged, in despair, et cetera. So, one's a state of mind; the other refers to mental attitude.

Now, let's look into the moral. Let's go into that a little bit deeper before we go on. Apart from what I said about the moral here, apart from what I said about the moral, why do we have these moral values or these ethics? Why do we have them? What's the purpose of them? You know, just to look pretty, nice to have? There's a fundamental purpose, all societies have them. They might be different. But why do we even have those things? Go ahead [unintelligible].

Audience: Well, in order to move about and have an organism do those things that we want to do, our independent actions, these rules develop and then they approve of individuals trying to exhibit independent action. Then those codes are the codes that allow each of us to maximize independent action while minimizing conflict with others' independent actions.

Boyd: You're sort of onto it. Turn the argument around. Let's say we didn't have them, what would happen? Let's say we didn't have

moral, let's say we didn't have these codes of conduct or standards of behavior. There were none. What would we have?

Audience: Anarchy.

Boyd: He said anarchy. Everybody's got really independent action. You give everybody freedom of action *[20:00]* independently, and they've got all kinds of freedom of action. Of course, it's a real jungle out there. So, in some sense, the reason why we define these things is so we don't have anarchy. So, we can have social interaction without having that anarchy. And so, what are they? [Unintelligible] ask yourself, what are codes of conduct? They're constraints upon our individual behavior or upon our freedom of action. They're constraints—thou shalt or thou shalt not—that constrain you to operate in a way so you can interact in a positive way with the other people there. Social interaction. They're really a constraint on your activity.

And so, in one sense, you lose freedom of action. Note what I say: in one sense. In another sense, I'm going to show you that you increase it. Because if you live in a jungle, in a sense you also constrain your—thing is, you have to operate in a very physical environment. By having these codes of conduct or standards of behavior so by being able to operate together, you build new dimensions. You operate on an artistic level and you get a freedom of action and new dimensions.

See what I'm getting at? That's why we have those codes of conduct. They're very important. So that's why when people violate those codes like Jim Wright seems to be doing right now, there are all kinds of people, people get horned off, they say, they're trying to get well at our expense.[27] There was one area where Jim Wright is not getting hosed, and that's down in his district, because even though he's doing some of these things, his people down there are assuming that those allegations are true. But they say, "Well, what

[27] Boyd is likely referring to Congressman James Wright (D-TX), who at the time was speaker of the House of Representatives. At the time, Wright was at the center of several scandals: his aide, John Mack, was the focus of a *Washington Post* interview with a woman named Pamela Small, whom Mack had brutally attacked 16 years earlier and then served a brief sentence before being paroled; the House Ethics Committee was investigating both Wright and his wife for receiving excessive speaking fees and gifts; and Wright allegedly received campaign contributions from "control frauds" involved with the savings and loan crisis.

SLIDE 38

!—FINE—!

But how do we play to this theme
and exploit these ideas?

HINTS

- Recall how we mentally constructed a snowmobile.
- Remember how we looked at ideas in a mathematical logic, physics, thermodynamics, biology, psychology, anthropology, and conflict to surface a central theme.
- Remember our whole approach has been one of pulling things apart and putting them back together until something new and different is created.

the hell, he's bringing in all this money." They're also doing well too.

So, when your politicians don't deliver the goods, they're going to start looking more and more at the ethics. When do you worry about food? When you don't have it. When do you worry about honesty? When it's not there. When do you worry about your health? When it's not there. When do you worry about money? When you don't have it. When do you worry about ethics, then? When it's not there. Also, when you don't have the other benefits. [Unintelligible.] These are very important ideas. Okay? Okay, let's move on then.

[slide 38]

So, in a sense, moral codes are constraints upon your actions. And the reason why there are constraints there is so people can interact in a positive way. If you don't, you're going to have anarchy with chaos. Jungle, real jungle. So, how do we play? Remember how we mentally constructed a snowmobile. Remember how we looked at all these ideas and all these various things. Now what we want to

SLIDE 39

ILLUMINATING EXAMPLE

?—What does the Second Law of Thermodynamics say—?
All natural processes generate entropy.

?—What did Heisenberg say—?
One cannot simultaneously fix or determine precisely the momentum and position of a particle.

?—What did Godel say—?
One cannot determine the consistency of a system within itself.

do, we're talking about pulling things apart and putting them back together until something new is created. So, let's do that right now. In other words, we're going to build some strategic snowmobiles. Do it again.

[slide 39]

Okay. Now we've talked about it. I said, "What does the second law of thermodynamics say?" All natural processes generate entropy, which you can regard as confusion, disorder, losing your potential for doing work or capacity for taking action. In other words, at max entropy you have no potential for doing work, unavailable energy, incapacity for taking action. No more differences you can use, or potentials you can use in order to generate, to do things. And you also call it—entropy is what? A measure of what? They use it as a measure of confusion and disorder. So, when you have max entropy, you have max what? Disorder, which is that, it's called what? Chaos. Exactly right.

What did Heisenberg say? Note what he says here. Why did he

say that? Anybody know? Because if you look at it, it's very similar to the second law. Remember, he's using electrons and photons to look at electrons and photons. In fact, they make this statement: they couldn't distinguish between the means of observation and the phenomenon they're observing. Well, if you can't distinguish between the means of observation and the phenomenon you're observing, isn't that a system examining itself?

In a sense. In a sense. In fact, [unintelligible] Bohr's statement very well. Neils Bohr. See, you [unintelligible] to use electrons and photons to look at planets but that's something different than a planet. When you got photons and electrons looking at one another, the stuff you're using to look at things is no different than the things you're looking at. In other words, if you can't distinguish between the means of observation and the phenomenon being observed, that's a system examining itself. [Unintelligible] he lays out a nice equation.

What did Gödel say? Well, he already said that. You can't determine the consistency of a system within itself. Or more appropriately, you can tie it all together: consistency being the character or nature, you can't determine the character or nature of a system within itself or discern the character or nature of a system within itself.

[slide 40]

These seem unrelated to one another. If these statements can be related, if so, how? And I've already told you. Taken together, what do Gödel, Heisenberg, and the second law say? I've preempted myself. *[25:00]*

[slide 41]

We cannot determine the character or nature of a system within itself, and according to the second law, moreover, attempts to do so lead to confusion and disorder. You understand what I'm getting at, everybody?

Okay, now, keeping this statement in mind, now we're going to store that. We're going to make another snowmobile on top of that one. We're going to build snowmobiles on top of one another. Let's keep this one in mind. Now, keeping this statement in mind, what do the tests of the YF-16 and YF-17 say? I'm going to use this as another good example.

[slide 42]

What we found out: the ability to shift or transition from one

SLIDE 40

ILLUMINATING EXAMPLE
(CONTINUED)

Point
As they appear, these statements and the ideas they embody seem unrelated to one another.

?—Raises Question—?
Can these statements be related to one another; and, if so, how?

in other words

Taken together, what do Godel, Heisenberg, and the Second Law of Thermodynamics say?

SLIDE 41

ILLUMINATING EXAMPLE
(CONTINUED)

Message
One cannot determine the character or nature of a system within itself. Moreover, attempts to do so lead to confusion and disorder.

Keeping this statement in mind,

?—Let's ask another question—?

What do the tests of the YF-16 and YF-17 say?

SLIDE 42

ILLUMINATING EXAMPLE
(CONTINUED)

Message
The ability to shift or transition from one maneuver to another more rapidly than an adversary enables one to win in air-to-air combat.

Now
?—What do we have—?
A statement drawn from the ideas of Godel, Heisenberg, and the Second Law of Thermodynamics (First Message)

as well as

A statement drawn from the tests of the YF-16 and YF-17 (Second Message).

maneuver to another more rapidly than an adversary enables one to win in air-to-air combat. We found that out. We talked about that when we talked about "Patterns of Conflict." Okay, so now, what do we have? We have a statement drawn from the ideas of Gödel, Heisenberg, and the second law, and we've got a statement drawn from the YF-16 and YF-17. Two statements.

[slide 43]

So once again, we're facing that it appears that these two messages seem unrelated to one another. Can they be related and if so, in other words, taken all together, what can we say? In other words, we can synthesize this all together and it's consistent with any one of these things. Build our synthesis, taking disparate information, many-sided cross-referencing process.

[slide 44]

What we'll see here, the overall message then, the ability to operate at a faster tempo or rhythm than an adversary enables one to fold adversary back inside himself. In other words, he can't keep up.

SLIDE 43

ILLUMINATING EXAMPLE
(CONTINUED)

Point
Once again, it appears that these two messages seem unrelated to one another.

?—Raises Question—?
Can these statements be related to one another; and, if so, how?

in other words

Taken altogether, what do Godel, Heisenberg, the Second Law of Thermodynamics, and the tests of the YF-16/YF-17 say?

So, for every incident of time, he's out of touch with the world. And when he tries to get back in touch, you change the world on him. He tries to get back in touch with that, you change the world on him again. So, he's out of touch. What's going to happen? He starts coming unglued. He will become disoriented.

How did we define disoriented, or disorientation? A mismatch between that which he perceives and that which he must react or adapt to. And if you keep changing the world and he can't keep up, I think he becomes disoriented. And if you're a threat what's that gonna, pretty soon, what happens? It would suggest unless that menacing pressure can be relieved, these things begin to crop up: doubt, uncertainty, confusion, et cetera. Panic. Despair. Under different people, different combinations come up. Which will further disorient or twist his mental image of what's happening, thereby disrupt his mental, thereby overload or cascading now, thereby collapse his ability to carry on. It's a cascade.

Remember when [Confederate States Army general] Nathan

SLIDE 44

ILLUMINATING EXAMPLE
(CONTINUED)

Overall Message

- The ability to operate at a faster tempo or rhythm than an adversary enables one to fold adversary back inside himself so that he can neither appreciate nor keep-up with what's going on. He will become disoriented or confused;

which suggests that

- Unless such menacing pressure is relieved, adversary will experience various combinations of uncertainty, doubt, confusion, self-deception, indecision, fear, panic, discouragement, despair, etc., which will further:

Disorient or twist his mental images/impressions of what's happening;
thereby
Disrupt his mental/physical maneuvers for dealing with such a menace;
thereby
Overload his mental/physical capacity to adapt or endure;
thereby
Collapse his ability to carry on.

Bedford Forrest—I'm bringing it out when I give my "Organic Design,"—he made the point, "Git thar the fastest with the mostest."[28] No, no, that's not, that's nineteenth-century thinking. What you want to do is you want to lay a situation on somebody, he tries to adjust, you lay a new situation on him, he tries to adjust, you lay a new one, so he's falling further and further back. He's not getting there. What

[28] A prewar slave trader and plantation owner, Nathan Bedford Forrest enlisted as a private in the Confederate Army at the start of the American Civil War. Later commissioned to raise a battalion of mounted rangers, throughout the war Forrest conducted successful cavalry raids behind Union lines, disrupting Union operations and capturing large quantities of supplies. He also gained a reputation for refusing to offer quarter to Union forces that would not immediately surrender to him; the Fort Pillow Massacre in April, 1864, saw troops commanded by Forrest murder Union soldiers who attempted to surrender after Forrest's troops stormed the fort, with black soldiers specifically singled out for execution. Following the Civil War, he helped found the Ku Klux Klan and was elected its first Grand Wizard.

SLIDE 45

?—WHAT'S THE POINT OF ALL THIS—?

- We can't just look at our own personal experiences or use the same mental recipes over and over again; we've got to look at other disciplines and activities and relate or connect them to what we know from our experiences and the strategic world we live in.

if we can do this

- We will be able to surface new repertoires and (hopefully) develop a fingerspitzengefuhl for folding our adversaries back inside themselves, morally-mentally-physically—so that they can neither appreciate nor cope with what's happening—without suffering the same fate ourselves.

you're trying to do is force him to adjust to different situations, so finally he can't keep up and he just comes unglued. French 1940, et cetera.

Got it? Okay.

[slide 45]

Now what's the point of all this? I'm trying to get at something. The point is we can't just look at our personal experiences and see the same mental recipe over and over again. In other words, [unintelligible]. We've got to look at other disciplines and connect them to what we know from our experiences because by doing that, what are we going to do in our brain? We're going to build up those connections, right? As a result of that, we're going to get that *fingerspitzengefühl* so we can deal with that variety and hose the other guy rather than him hosing us when you're talking about conflicts. We're hoping to surface new repertoires, there's the word—and I use the word *hopefully* because I don't think they do that—there's the word,

SLIDE 46

WHICH CARRIES US TO THE ?—QUESTION—?

- How do we fold adversaries back inside themselves, morally-mentally-physically . . . . without suffering the same fate ourselves?

or put another way

- How do we physically isolate our adversaries yet interact with others outside ourselves?
- How do we mentally isolate our adversaries yet keep in touch hence interact with unfolding events?
- How do we morally isolate our adversaries yet maintain the trust/confidence of others thereby interact with them?

you know, I've been using: *fingerspitzengefühl.* So, you fold the adversary back inside himself morally, mentally, and physically. See, that's the whole name of the game, you want to fold a guy back inside himself. When you fold him back inside himself, he's not coping and he starts [Boyd makes sound effect of drawing one's finger across their throat] coming unglued. Obviously, we don't want to have the same thing happen to us. Okay?

[slide 46]

Knowing that then, how do we do it, how do we fold back—or put another way, how do we physically—when you fold a guy back inside himself, you're isolating him. Yet we want to interact with others outside ourselves. We want to mentally isolate our adversary yet keep in touch hence interact with unfolding events. And morally isolate our adversaries yet maintain the trust/confidence of others thereby interact with them.

What's the quickest way to destroy an organization? Anybody?

Audience: Mistrust. *[30:00]*

Boyd: Say it. You said it. Don't be afraid to say it. Build up mistrust or distrust. Then the whole thing comes unglued. It can't function.

Why do people, when you see organizations, they're always writing memos back and forth? Why do they communicate that way? Anybody?

Audience: CYA.[29]

Boyd: Well, isn't that mistrust? That's exactly right, CYA. That means people mistrust one another. Therefore, they have to go through written memos. That's the first thing I look for when I go to an organization. If I see them doing that, I say, "Boy, these guys are out to lunch." I believe in verbal orders only. Only written memos when you need them, for money and that kind of stuff. Otherwise, verbal. Not only can you react more rapidly, if you have to write memos back and forth, Christ, you've got it slow as molasses in January. Because the guy, when he's writing a memo, he's writing a memo to protect himself. He's got to be sure it's stated just a certain way. All you're saying is your organization is founded on mistrust when you do it that way. Exactly right. So, if I can generate mistrust and discord in an outfit, they'll have a hell of a time. Do you ever see what happens in organizations that operate that way for a long period of time? You put the squeeze on them and then the finger pointing begins. They all start blaming everybody else. That's the many noncooperative centers of gravity. That's the result of all that mistrust. *[31:27]*

[end of tape 1, side 2]

[start of tape 2, side 1]

[slide 47]

Boyd: [Long pause as audience reads the slide] What's the significant difference between the bottom one and the upper two?

Audience: Well, the bottom one they do it themselves. The upper two—

Boyd: Say that out loud. That's exactly right. You can't do this [referring to the third bullet] to them. They are the ones that have to break that moral code. They're the ones that have to break that. Now, you can set circumstances up such that they may do it, but

[29] CYA refers to "cover your ass."

SLIDE 47

ILLUMINATION

- Physically we can isolate our adversaries by severing their communications with outside world as well as by severing their internal communications to one another. We can accomplish this by cutting them off from their allies and the uncommitted via diplomatic, psychological, and other efforts.
- Mentally we can isolate our adversaries by presenting them with ambiguous, deceptive, or novel situations, as well as by operating at a tempo or rhythm they can neither make out nor keep up with. Operating inside their O-O-D-A loops will accomplish just this by disorienting or twisting their mental images so that they can neither appreciate nor cope with what's really going on.
- Morally our adversaries isolate themselves when they visibly improve their well-being to the detriment of others (i.e. their allies, the uncommitted, etc.) by violating codes of conduct or behavior patterns that they profess to uphold or others expect them to uphold.

in the end they have to make that decision. See, physically we can isolate ourselves, we also can isolate others. Mentally we can isolate ourselves, but we also can isolate others. But morally they have to do it for themselves. That's exactly right.

Audience: We can help that along.

Boyd: I said that's correct, particularly if they're weak. You know, you put them on the fence and pretty soon they start finger pointing and all that kind of stuff. They start doing things that violate their moral codes and that. But in the end, they have to make that decision. And that's why it's very important to get a good moral code and live by it, because when the squeeze comes on, what happens then? You hang in there. And if you don't have it, the whole goddamn thing comes apart. Remember what I said the other day: therefore, your control is exercised through what? Your moral values. [Unintelligible] people have obsession for control. That's where you really exercise control. And the reason why it's important is because it bears

upon everybody, the leader as well as the lowest guy, the private to the Commandant. And that's why it's important, I said, the only way leaders can do it is by example. If they start violating that stuff, the guys down below are gonna say, "fuck it." They're going to violate it, and I'd do it too. The next thing you know, the whole thing comes apart. And that's why when people violate it, they should have their ass kicked right out. But they're not doing it. I mean, we may make mistakes. We're not perfect. But they should fess up to it and try to correct it. If you do that, you admire people who do that. But when they deliberately try to hide something or paper over it, that's the problem, because that's a lousy example.

And so the junior people can respect the leader that abides by that code. You say, "Well, he's no different than I am." Beautiful. Therefore, you have control without going for it. The other way you try to set your control and make people behave like automatons, they all try to leap away from it any way they can.

So, the only discipline that really counts is what then? Self-discipline. And so, your job as officers or NCOs is to build up that self-discipline. If you always have to impose it externally, it tells you something. Christ, you're not getting through.

And that comes out of a moral code. And I think that's why it's so important I can't overemphasize it. Okay?

[slide 48]

And so, then here's the expected payoff if you can do it: isolation. [Long pause as audience reads slide]

Okay?

[slide 49]

Let's turn the argument around now.

[Long pause]

Note what I'm saying: making many channels of communication with the outside world, in other words, interact with many different channels. Then you stay in touch with the world. Remember what I told you: you can think of people being a narrow band or wide band filter. A narrow band filter can't read a wide band filter, but a wide band filter can read a narrow band filter. So, you want to put your adversary in a narrow band mode, you want to be in the wide band mode. I think we got a communications guy. You know what I mean, you know exactly what I'm talking about, right?

SLIDE 48

EXPECTED PAYOFF

Disintegration and collapse, unless adversaries change their behavior patterns to conform to what is deemed acceptable by others outside themselves.

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ILLUMINATION
(CONTINUED)

- Physically we interact by opening-up and maintaining many channels of communication with the outside world, hence with others out there, that we depend upon for sustenance, nourishment, or support.
- Mentally we interact by selecting information from a variety of sources or channels in order to generate mental images or impressions that match-up with the world of events or happenings that we are trying to understand and cope with.
- Morally we interact with others by avoiding mismatches between what we say we are, what we are, and the world we have to deal with, as well as by abiding by those other cultural codes or standards that we are expected to uphold.

Audience: Yes, sir.

Boyd: So, you think of that. Physicists say you want to operate a wide frequency spectrum, put your adversary in a narrow frequency spectrum. You can read him; he can't read you. Or really, he can't read much of you. He can, of course he can read a little bit of you, but I mean overall is what I'm saying. Of course, he might be leaving

the most important part outside his bandwidth. You want a wide bandwidth, give him a narrow bandwidth.

Note what I'm saying, once again: select information from a variety of sources. And when I made that point about many-sided implicit cross-referencing processes, which we're going to bring up again and again. Because that will help you to generate these mental images or impressions that match up with what's going on out there. So, if you can cut that off from your adversary—we talked about that, ambiguity, *[05:00]* deception, indistinctness, et cetera—what you're trying to do is narrow down his view of the world so he can't play with it.

And morally we interact by avoiding mismatches between what we say we are and what we are to the world we have to deal with. In fact, I'm going to bring this up in a much better way after we're done with this presentation, dig into that.

In fact, the key idea is mismatches and match-ups. That's the key idea. Or what I call mismatches and motherhood. M&M. In fact, we used to call—the Pentagon guys, used to work on it, somebody else would say, "Well, we'll use the candy strategy." M&M is the candy strategy, instead of mismatches and motherhood. [Unintelligible] two or three at a time. In fact, Tower, we got him to admit it one time, when we were getting something done over on the Hill and he said, "Christ, how can I fight this? This is goddamn motherhood." And he didn't realize he was coming on to our strategy. He said, "I can't fight this. This is motherhood." And I'll explain what that is in a minute.[30]

Go ahead.

Audience: But the second half of your sentence—

Boyd: Which one?

Audience: Uh, the last one, about "morally." Are you trying to say that we have to adapt our codes to others?

Boyd: No, I didn't say that. [Pause.] But you better be sure your code is inclusive enough. Like the Nazis had a nice code and took care of themselves, but they alienated everybody else, and they went down the goddamn tubes. So, if you take an exclusive moral

[30] Senator John Tower (R-TX) served in the U.S. Senate (1961–85) and was considered an opponent of the military reformers with whom Boyd was affiliated. He chaired the Tower Commission, which investigated the Iran-Contra scandal, which Boyd discusses further below.

code that fits a small group, but it actually makes everybody else its enemy, you're not in good shape, are you?

Audience: As long as that code is not diametrically opposed to your own, you can—

Boyd: We're going to get to that. Just hang onto that. Hang onto that. Hang onto that. We're going to get into that in just a minute. You're exactly right, as long as it's not diametrically opposed.

Another audience member: You're using the word *adversary*. And in a strategy in peacetime, there's no clear-cut adversary, it creates problems. Remember, Henry Kissinger said that countries don't have friends, countries have interests.[31] And those interests don't coincide with friendships.

Boyd: That's right. Okay.

Audience: So, the term adversary—

Boyd: I've got, all I've got here, I've got it here in terms of a two-way street. I agree with that. I'm going to show you in a different way. We are going to broaden that view.

Audience: I mean, Great Britain, Argentina was a friend, and yet we provided Great Britain—[32]

Boyd: I can't put it all on the first chart. You've gotta let me lay it out sequentially. I'm going to get there. Right now, I'm focused on sort of a two-sided game. Do you see what I'm saying? You're right. But if our interests are opposed to theirs, you become adversaries. Kissinger's problem is he regards himself as being a *realpolitician*. *Realpolitik*, he goes by *realpolitik.*[33] And they get mad when you bring

[31] Henry A. Kissinger (1923–2023) served as secretary of state and later as national security advisor under presidents Richard Nixon and Gerald Ford.
[32] The Falklands War was a conflict fought between Argentina and the United Kingdom from 2 April–14 June 1982. Argentina had long claimed sovereignty over British territories in the Falkland Islands, South Georgia, and South Sandwich Islands, and in April 1982 invaded and occupied those territories. The United Kingdom deployed naval and amphibious forces and successfully retook the islands. Although the American government initially attempted to mediate a peaceful resolution, it ultimately provided munitions, fuel, and satellite communications and imagery in support of Britain's military operations.
[33] First introduced in the nineteenth century by German author and politician Ludwig von Rochau, the term *realpolitik* came to refer to policy approaches based on particular circumstances rather than strict adherence to preexisting ideological or political frameworks.

EXPECTED PAYOFF

Vitality and growth, with the opportunity to shape and adapt to unfolding events thereby influence the ideas and actions of others.

up the moral issues. They say, "Well, we don't want to deal with the moral crap." That's the most important part. We'll get to this later on, Kissinger and [unintelligible]. I'll bring it out. Do you see what I'm saying here? Then, okay, let's broaden the issue.

Okay.

[slide 50]

Okay. So expected payoff. [brief pause as audience reads slide] Okay?

[slide 51]

Now if we pull it all together. This is partially getting to what you're saying here. [Pause.] Note what I say: "potential adversaries." You might have different interests. See what I'm saying there? And current adversaries as well as the uncommitted so they are drawn toward our philosophy and empathetic to our way of life.

Now this is what I call a positive side, and there's a negative side: yet be able to. Now, can anybody detect the subtlety in that chart? What have I done differently as opposed to what I've laid out previously? I did this, I played the same game with you when I did the "Patterns." Remember, I started from the negative side of the house and went to the positive. Here I'm going from the positive to the negative. You always want to emphasize the positive. In order to understand the positive, you can't, you know, in order to have a Christ you've got to have an anti-Christ. In other words, you gotta come in from the backside. In mathematics, in order to prove something, you have to do it from the falsehood side. But in the end, you want to turn it around and emphasize the positive. Note that I didn't say "do this." You have to be *able* to do it, so you don't get hosed later on. So always come in from the positive side. Don't come down, you

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PULLING ALL THIS TOGETHER
WE HAVE IN A NUTSHELL

The Art of Success

- Shape or influence the moral-mental-physical atmosphere that we are a part of, live in, and feed upon so that we not only magnify our inner spirit and strength, but also influence potential adversaries and current adversaries as well as the uncommitted so that they are drawn toward our philosophy and are empathetic toward our success;

yet able to

- Morally-mentally-physically isolate our adversaries from their allies and outside support as well as isolate them from one another, in order to: magnify their internal friction, produce paralysis, bring about their collapse, and/or bring about a change in their political/economic/social philosophy so that they can no longer inhibit our vitality and growth.

know, what do they say, it's better to use honey.[34] Now if they don't take the honey, then you're justified. Remember, we talked about that the other day.

[slide 52]

Okay.

Now let's look at implementation. And we're going to answer, start answering that point you made up, or somebody made up here in a minute. And then we can start getting into it here, implementation, now, a way of thinking about it.

[slide 53]

So, what I call a moral design for grand strategy. Remember, I said grand strategy should be more *[10:00]* constructive and not destructive.

[slide 54]

[34] A paraphrase of the proverb "one catches more flies with honey than with vinegar."

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IMPLEMENTATION

AN EXAMPLE

SLIDE 53

A MORAL DESIGN FOR GRAND STRATEGY

SLIDE 54

NAME-OF-THE-GAME

- Use moral leverage to amplify our spirit and strength as well as expose the flaws of competing or adversary systems, all the while influencing the uncommitted, potential adversaries and current adversaries so that they are drawn toward our philosophy and empathetic toward our success;

or put another way

- Preserve or build-up our moral authority while compromising that of our adversaries' in order to pump-up our resolve, drain-away adversaries' resolve, and attract them as well as others to our cause and way of life.

?—RAISES QUESTION—?

- How do we evolve this moral leverage to realize the benefits cited above?

So, here's the name of the game.

Remember, you've got to look at it from three sides. Sun Tzu said, "Know your enemy and know yourself." Well, know your enemy, know yourself, and know those third parties out there, [inaudible] turn to. In his world you didn't have to worry too much about that because they don't have the communications, so they could knock somebody off before anybody else knew about it. Nowadays, Christ, you move and do anything, and it's around the world in seconds. And you know the guerrillas and the terrorists, and those people take full advantage of that modern communications.

[slide 55]

Okay, and with respect to ourselves, it's better once again to set the example. You got to look at it two ways: don't try to paper this stuff over, face up to it and start correcting it. We often take the second part and try to paper this over, and it causes problems. In fact, the politicians like to take this part and paper this over to get in deep trouble.

How many people here have ever read Machiavelli, *The Prince*?[35] What's the key message there? John?

John Schmitt: I don't know, sir.

Boyd: Well, if you read it, what it is, it's the way I look at politics. Remember, *The Prince*, it looked at four basic groups, the prince and the people he dealt with: his ministers, the nobles with their constituents, and the people. And when you look at the game he was playing, it was a very dirty game in order to get control them. And so really that's the way I define politics—the art of manipulating others for advantage—that's what the prince was doing all the way through, to gain leverage. And interestingly enough though, Machiavelli, remember he wrote that in the sixteenth century. He understood something. Item one: he said it's easy to control the ministers because you can fire and hire those who are good. With nobles it's tougher because they have constituents, and you act against them, they might line up against you, and you have a big problem. You got to play one off the other and all that. He said in the end you can't trust them, nor can you trust your ministers. He said if the squeeze comes on, what you really want is you want the people on your side.

[35] Niccolò Machiavelli, *The Prince* (London, UK: Reader's Library, 2021).

SLIDE 55

MORAL LEVERAGE

With respect to ourselves we must:

- Surface as well as find ways to overcome or eliminate those blemishes, flaws, and contradictions that generate mistrust and discord so that these negative qualities neither alienate us from one another nor set us against one another, thereby destroy our internal harmony, paralyze us, and make it difficult to cope with an uncertain, everchanging world at large.

In opposite fashion we must:

- Emphasize those cultural traditions, previous experiences, and unfolding events that build-up harmony and trust, thereby create those implicit bonds that permit us as individuals and as a society, or as an organic whole, to shape as well as adapt to the course of events in the world.

Because if you have the people on your side, then you can control the ministers and the nobles. So, when the squeeze comes on you can make it. Well, isn't that interesting, because that's the same thing in guerrilla warfare. It's people-focused. And he wrote this in the sixteenth century, except he was doing it from a negative viewpoint. Okay?

[slide 56]

Now let's look with respect to our adversary. Don't let him get away with stuff. [Long pause as audience reads slide] And if you're going to play that game, the side that reveals mismatches, you know, don't live in a glass house because he can smash you, too. You want to have a better example, then you have an enormous leverage. Okay? The last one.

[slide 57]

Now, this is the third party. This is what somebody mentioned that before, when you have to work with another party or culture. And we are going to get very clear on that second statement there.

SLIDE 56

MORAL LEVERAGE
(CONTINUED)

With respect to our adversaries we should:

- Reveal those harsh statements that adversaries make about us—particularly those that denigrate our culture, our achievements, our fitness to exist, etc.,—as basis to show that our survival and place in the scheme of things is not necessarily a birthright, but is always at risk.

Likewise we should:

- Reveal those mismatches in terms of what adversaries profess to be, what they are, and the world they have to deal with in order to surface to the world, to their citizens, and to ourselves the ineptness and corruption as well as the sub-rosa designs that they have upon their citizens, ourselves, and the world at large.

Moreover we should:

- Acquaint adversaries with our philosophy and way of life to show them that such destructive behavior works against, and is not in accord with, our (or any) social values based upon the dignity and needs of the individual as well as the security and well-being of society as a whole.

[Directing to a particular audience member] I think you were the one who raised that, right? And, just because they have a different culture, you don't want to say, "Well, they're bastards, and we're gonna take them out." So long as they don't try to undermine yours, then you can realize that they can go along with you. Because we all don't have the same cultures now. But too often because they don't have an American culture, we want to go and Americanize the globe and cause enormous problems. I think that's what you were alluding to. On the other hand, they start trying to unwind us, we give a little push-back too. In other words, it's a delicate act you have to play.

Okay?

[slide 58]

So therefore, here's what we've been talking about all the way through, and then I want to give you something else. Here's the way I like to look at strategy. What is strategy? A mental scheme or design for harmonizing and focusing our efforts. *[15:00]* In other words, a

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MORAL LEVERAGE
(CONTINUED)

With respect to others (i.e., the uncommitted or potential adversaries) we should:

- Respect their culture and achievements, show them we bear them no harm, and help them adjust to an unfolding world, as well as provide additional benefits and more favorable treatment for those who support our philosophy and way of doing things;

yet

- Demonstrate that we neither tolerate nor support those ideas and interactions that undermine or work against our culture and our philosophy hence our interests and fitness to cope with a changing world.

tapestry of changing intentions for realizing some aim or purpose in an unfolding and often unforeseen world of many bewildering events and many contending interests. Somebody used the word "interests" back there. In other words, you have to be able to look at it from many different what? Viewpoints or perspectives. Exactly right.

And what is the aim or purpose of strategy? Whether it was the individuals, as groups, or nation-states, so we can survive on our own terms. In other words, we don't want to be hammered in the ground by somebody else. We want to have some control over our own survival, so we can thrive. And what is the central theme? You're always working this interaction/isolation. I'm going to come out and make it more vivid in a moment.

Audience: This seems very theoretically not a good deal.

Boyd: I didn't say it was hard, I didn't say it was easy to do.

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NOW
GOING BACK TO THE BEGINNING

?—What is Strategy—?
A mental tapestry of changing intentions for harmonizing and focusing our efforts as a basis for realizing some aim or purpose in an unfolding and often unforeseen world of many bewildering events and many contending interests.

?—What Is the Aim or Purpose of Strategy—?
To improve our ability to shape and adapt to unfolding circumstances, so that we (as individuals or as groups or as a culture or as a nation-state) can survive on our own terms.

?—What Is the Central Theme and What Are the Key Ideas that Underlie Strategy—?
The central theme is one of interaction/isolation while the key ideas are the moral-mental-physical means toward realizing this interaction/isolation.

?—How Do We Play to this Theme and Activate these Ideas—?
By an instinctive see-saw of analysis and synthesis across a variety of domains, or across competing/independent channels of information, in order to spontaneously generate new mental images or impressions that match-up with an unfolding world of uncertainty and change.

Audience: But there seems to be competing interests all the time.

Boyd: There always is.

Audience: State, Department of Defense, [unintelligible]. But we're fighting among ourselves trying to figure out what our angle is.

Boyd: Every society has competing interests. What you have to do is you want to get yours more in harmony than somebody else, so you can cope with the outside. And of course, the way of doing that is if you get something like this Ayatollah.[36] If you get somebody with an evil source out there, then maybe you can harmonize your

[36] Ayatollah Ruhollah Khomeini (1900/1902–89) was the founder of the Islamic Republic of Iran after playing a leading role inspiring the Iranian Revolution against U.S.-backed Shah Mohammad Reza Pahlavi in 1979. Khomeini served as supreme leader of Iran from 1979 until his death in 1989.

people more together in order to get at the more menacing external source like we had during World War II with Hitler. You know, our country was all divided and really unified when we had to go to war. We have a hard time unifying when we don't have an outside threat. In fact, this is the Russian senior here, remember, what is his name, the advisor to [Mikhail] Gorbachev.[37] He said, "You know, you're going to have a hard time against us because we're going to take ourselves away from being your enemy."

Wyly: That's right. I mean—

Boyd: He said that.

Wyly: —well, why do we keep—

Boyd: Now, how are you going to organize? The only way you can deal with us is because you think of us as enemies. We're not going to be your enemy anymore. Then we want to see you deal with us.

Wyly: Okay, you know, we could never be tolerated in Europe—

Boyd: You heard that? That statement's been made. Who is Gorbachev's guy? That guy that's head of their American In— . . . Arbatov. What's his name?

Audience: [unintelligible]

Boyd: No, no, no—he's dead. The guy that—Georgy Arbatov or whatever his name is. He's the one that said it. He told our secretary of state, he said, "You're going to have a hard time of it. What happens when we take ourselves away as being your enemy? What're you going to do then? Because that, everything you've laid out is because we're an enemy."

Wyly: Well, we would never be welcomed with military forces in Europe if there weren't the Warsaw Pact.

Boyd: Well, look at already what's happened.

Wyly: —we wouldn't be welcomed in Poland—

Boyd: Well, look at already what's happened. Kohl has got all the Europeans to go against their idea of the nuclear weapons over there.[38] The only one who's hanging in there is Thatcher on our side.

[37] Georgy Arbatov (1923–2010) was a Russian political scientist who led a think tank known as the Institute for U.S. and Canadian Studies, making him the chief "Amerikanist" policy advisor to Soviet and Russian leaders from 1965 to 1995.

[38] Helmut Kohl (1930–2017) served as chancellor of West Germany from 1982 to 1990 then as chancellor of the newly unified Germany from 1990 to 1998.

Remember? He's got everybody else turned around. So, they're having some success at that strategy going [unintelligible].

Now, the bottom one here. The point if you can't do this—the bottom one's the most important one—if you can't do this, you'll never realize the above. If you can't realize or do what I say at the bottom in the last statement here, you'll never be able to realize what's above that. That's important. Because the world's always changing, what I'm really suggesting here is you gotta be able to build snowmobiles all the time, and be able to employ them appropriately. So, if you can't do this, you're not going to be able to realize the above. That's the most important.

Now having said that, let's go through a little exercise. What did we talk about in the strategy? We talked about, one: interaction and isolation. We talked about it across the moral, the mental, and physical dimensions, right? And we looked at it in various ways. Now let's look at the world. We have a situation, right? We have to take actions in order to deal with the situation, right? We have to have ideas in order to concoct the actions to deal with the situation, right? Then we have to have some ideals or values, whatever you want to call them—in which to embed our ideas, actions, or situations. So, I'm going to have four things: ideals, which is related primarily to the moral; ideas, which are primarily related to the mental; actions which are primarily related to the physical, and a situation you have to deal with, whether it's enemy or otherwise. Right?

Okay, let's take the physical dimension first. If we look at the physical dimension, we have actions versus situation. We want to get a matchup between our actions and our situation so we can deal with it. If we have a mismatch, we can't cope, right? So, M&M. Matchup/mismatch. I call it matchup, that's motherhood. You got it right. You got the matchup. You got harmony. You got the connections. And so, armies in some sense realize part of that, or the military. What they try to do is cut the other guy's lines of communication. What are you doing? You're trying to generate that, take away his source, that part of him. Do you see what I'm saying?

Now, let's go to the mental. Now the idea is related to the mental. And the ideas have to be related to the actions and the situation.

So, you get a mismatch between ideas and actions, and a mismatch between ideas and situation. Likewise, there's a matchup between the two. So now you have two M&Ms. You have one M&M between actions and situation. Two M&Ms, mismatch or matchups between ideas—one between ideas and actions, and one between ideas and situation.

Okay, now let's go up to the moral dimension or ideals. *[20:00]* Ideals are related to the moral. So, you can get a mismatch between your ideals and your ideas, between your ideals and actions, and between ideals and situations. Likewise, there's a matchup. So, there's three M&Ms there. You got one M&M in the physical dimension, two in the mental dimension, and three in the moral dimension. If you add them up, you have a total of six M&Ms. Now the ones most people tend to operate on in the military are only one, the physical. So, they go out, they only got one-sixth of it at best. If you don't do it perfectly, you don't even get one-sixth of it. If you bring in the mental dimension you can get half of it, the mental and physical, two plus one is three. If you bring in the moral you got all six, even if you don't operate perfectly, at least you're considering all six.

Well, Kissinger throws out the moral. He said, "I don't want to hear about that moral crap." So, he's giving away half the farm. And that's the nature of *realpolitik*, they don't want to deal with it, so they say. And they, if they really had *realpolitik*, you would deal with it very directly. Do you understand what I just told you? Do you all see what I'm getting at here?

Now, let me tell you something. The physical is the easiest one to understand. The mental is the quickest if you get leverage on somebody, but the moral is the strongest. You gain moral leverage, you got all kinds of leverage. Not only that, isn't it curious, you get three in the moral and one in the physical which also agrees with Napoléon's statement: the moral is to the physical as three is to one. I mean, I didn't make it come out that way. It just turns out when I look at it in that sense. So, you can generate more mismatches and matchups in the moral. In other words, not only can you have more matchups, but it's also easier to screw up in terms of mismatches. But also if you learn how to pay attention to that you can gain more leverage over your adversary.

So, the whole, what's my point winding it up then? The whole interaction/isolation game is based upon, then, mismatches and matchups, or matchups and mismatches. And that's what you're trying to do. And when you got, if you do your maneuver warfare or any kind of warfare correctly, what you're trying to generate are those mismatches in your adversary so he can't function, so you get those isolation schemes. On the other hand, you want to be able to read the environment better than he can, so you get more matchups than he has. You're not mismatched, therefore you get the interaction, and he has the isolation.

Audience: Deharmonize them, if you will.

Boyd: Deharmonize them or disharmonize them, that's right. So, the more mismatches I can get into a system, doesn't that magnify his friction or pump up his entropy? Absolutely. It's all related. [Long pause] John, you look perplexed. Does something bother you?

Audience: I'm just following it, sir.

Boyd: This John here.

Schmitt: I'm trying to follow it, sir. I don't know how successful I've been.

[slide 59]

Boyd: Here are some definitions I have there. Evil. People like to talk about good and evil. Evil occurs when this happens: when individuals or groups embrace codes of conduct or standards of behavior for their own personal well-being and social approval, yet violate those in order to undermine the well-being and social approval of others. That's evil. How many people here have read the—what's that one written by Allan Bloom, *The Closing of the American Mind.*[39] How many of you? Did you read that? Remember, he defined "good." He went back to Aristotle to define good. How did he define it? I'll paraphrase, it's not exactly what he was trying to say, but he didn't get it quite right. The way he laid it out is those ideas and actions that permit us to thrive and grow, or to flourish and grow. That's what Aristotle said. It's partly right, but not quite all right. If you really want to have the ultimate good, it's

[39] Allan Bloom, *The Closing of the American Mind: How Higher Education Has Failed Democracy and Impoverished the Souls of Today's Students* (New York: Simon & Schuster, 2012).

SLIDE 59

DEFINITIONS

- Evil occurs when individuals or groups embrace codes of conduct or standards of behavior for their own personal well-being and social approval, yet violate those very same codes or standards to undermine the personal well-being and social approval of others.
- Corruption occurs when individuals or groups, for their own benefit, violate codes of conduct or standards of behavior that they profess, or are expected, to uphold.

those ideas and actions that permit us to flourish and grow without denying others that same opportunity.

[Unintelligible] it's strange. You can thrive and grow. The Nazis tried to grow themselves, but they were holding it from everybody else, and I don't think you can call them good. And here you're depriving those others to thrive and grow. That's what I'm trying to say. That's evil, when you thrive and grow at the expense of others, it's not too good. It's not too good.

And so that's the problem when people at the higher level try to present themselves being one way when they're another way, and they're using that as a basis for gaining leverage over others. *[25:00]* They're starting to violate the moral codes. That's why it's important for a leader to set the example. If he doesn't set the example, when the squeeze comes on, when you need your people to be there, they're not going to be there. Instead, the finger pointing and all that begins.

Go ahead.

Audience: I got—I hope you can explain it to me—I got heartburn when you say that all orders should be verbal. I hate paper-

work, but nevertheless I remember playing the games when you were a kid and making—[40]

Boyd: But I'm saying I just tend to like verbal orders because I know things can be done faster, and I ran two goddamn fighter programs that way. You should see all the paperwork they have now. Hell, I laid out the design tradeoffs for the F-15. The FX became the F-15 and also the lightweight fighter, we did it all by telephone and personal thing. Only very few times—nobody wants it. Get that goddamn shit out of here. I know what has to be done. I tell them, "You got it? Fine." And if they didn't have it or did it wrong, if they made a mistake and I knew they were withholding—out the window!

Wyly: But what you're going to talk about is how things get lost in communication—

Audience: [Talking over Wyly] —first guy down the [unintelligible], it's not even close—

Wyly: Yeah, but that's because there are reasons for that.

Boyd: There are reasons for that. That's right.

Wyly: I, if you have—

Audience: [Talking over Wyly] Aren't you reading human nature and getting at, and trying to, let's say, head problems off before they occur? If you get, maybe you get even a smaller, or just something as a reminder to an individual. It's such a more complex situation.

Wyly: —there's another dimension which will come out in "Organic Design."

Boyd: Yeah.

Wyly: If this group here played that game now, and you started a message, it would be quite different when it got here. If we played that game for a week, I bet we could get the message all the way around.

Audience: Not, if—yeah, if it was the same message. But when you go out in the field—

[40] The audience member is referring to the game of "telephone," in which the first player thinks of a simple message or phrase and repeats it solely to the person next in the game sequence. Once the message has been passed from player to player, the last player reveals the message and compares it to the original created by the first player. Although the goal is to attempt to pass the message around all players as accurately as possible, much of the game's enjoyment comes from seeing just how much the final message has diverged from the original.

Boyd: No, no, no.

Audience: —I don't know—

Boyd: That's why you want to have multiple interactions. Because then when you interact with multiple other people, pretty soon you start building up similar orientations. And not only that, each one acts as a check and balance on the other. That's how you do it. But if you have a single chain of command, and you only operate through one pipeline all the time, then you have exactly what you're talking about.

Audience: I know, but let me take—

Boyd: In fact, it's like Balck.[41] Do you know what Balck used to say when he sent a message out—General Balck? He said, then he would go down to the other end and see what arrived. He said, "Boy it was very different." He said, "God damn it." Then he would try to find out and gradually begin to get that thing sorted out.

Wyly: [Talking over the other audience member] Right there, you've made a case for unit cohesion.

Audience: Oh yeah, but what I'm saying is you bring it down to a physical level, and let's say when we go to the field and in the fog of war, you're tired, you're being shot at, and you're doing this. And even though you've been working together for three years and your guy over here gets shot, and he's one man out of the link. All I'm saying is that when it goes around there, the more tired people become, the more confused and frustrated physically they get, things are going to, let's say, dis-translate as they go along. And a piece of paper may help. I don't like paperwork. I'm not saying a five-paragraph order is it. But to just—I'm trying to head things off, the problems, before they occur. I don't distrust people. Let's say I'm trying to understand human nature and accept human nature. And that's not distrust, that's—

Boyd: But Balck said it was the best way to give an order, and he did it. And you heard of—I'm sure the Army guys heard of him,

[41] Gen Hermann Balck was a highly decorated German officer who commanded multiple *panzer* forces on both the western and eastern fronts during World War II. He was one of several former German officers with whom Boyd talked while Boyd was assigned to the Pentagon during the late 1970s and early 1980s.

so-called Professor Wood—John Wood.[42] Considered probably the best armored commander in the U.S. Army. Considered the best. Remember what he did after they made the breakout. He had the division spread out on a 500-mile front. He had Combat Command A, Combat Command B, they had Combat Command C. Do you know how he operated? He was in a goddamn Piper Cub. He was going out there to talk to this guy and moved over to that guy. And that's all they did all the way through. And they went like, they [sound as Boyd slams hand on table]. They might have been confused, but I'll tell you one goddamn thing, the other guy was more confused. Remember what I told you: as long as the other guy is more confused.

It's the same old thing with Terry Allen, what he wanted to do.[43] He tried to train at night. They said, "We can't train at night. It's confusing." He said, "That's right. But if our guys are used to it more than the other guy, he's going to be more confused. We're going to leverage the hell out of them." So, he used night attacks. Night attacks are pretty goddamn good if you know what you're doing. Isn't that what the guerrillas did to us many times? Mike [Wyly], you were over there. Who was over there? Right? [Replies from the audience are inaudible.] Huh?

Audience: Rommel.[44]

Boyd: Rommel? Yeah, but the point is, see, night's confusing. See

[42] MajGen John Wood commanded the U.S. Army's 4th Armored Division under Gen George Patton's Third Army, as the Third Army pushed across France in mid–late 1944 following the landings at Normandy. Boyd discusses Wood's command methods at more length while presenting "Patterns of Conflict"; see pp. 261–62.

[43] In World War II, Gen Terry Allen commanded the 1st Infantry Division during the North Africa and Sicily campaigns and later commanded the 104th Infantry Division during operations in France, the Netherlands, and Germany. While Boyd states that Gen Dwight D. Eisenhower relieved Allen of command of the 1st Infantry Division, this occurred at the recommendation of Gen Omar Bradley, whose personality often clashed with Allen's, and who believed Allen did not instill sufficient military discipline in his soldiers.

[44] Erwin Rommel is one of the most famous German generals from World War II. Although he commanded a panzer force during the invasion of France in 1940 and was later placed in charge of the defense of the French coast in anticipation of the Allied invasion of 1944, he is best known for his exploits in North Africa from 1941 to 1943. His ability to move rapidly and appear in unexpected places earned him the nickname "Desert Fox."

what happened is goddamn Clausewitz, you know, he put in there—he didn't like night attacks. He didn't like this because all he was doing was, he was focused inward. He was looking at his own confusion and disorder, and his own uncertainty, his own friction. So, I raise my friction. If I can raise the other guy's higher than mine, I've got leverage. I can pull his pants down. And so, if the other guy is laying out this five-paragraph order and he's got to transmit all this way, in the meantime we're cycling through faster. He's out of date. He's got this nice order that's always out of date. And that's what the French were. They were out of date from the goddamn beginning to the end.

Audience: How about adapt to the situation and just give them a—

Boyd: In fact, Rommel said—I mean not Rommel, Balck. When they talked to him, he said one of his best guys he had in fact was an Austrian. He said, Christ, he told him what to do. And he said, "Get back to me." He didn't have to talk to him but once a week. He'd just check in every once in a while. "Okay, I'm still doing it. I'm on my way." He said on the other hand, other guys didn't know what they're doing. He monitored them very carefully.

Were you here the other night when I said about, you want to have, that's one thing about a command-and-control system. It implies only one way to operate. And really, the command-and-control system, if you know your people, is multidimensional. *[30:00]* You're going to give some guys a longer leash than others. And see that's what our so-called hardware doesn't come near to terms with or even accommodate. And that's why Balck says it's very important you know your people. Because once you know your people, then you can just decide how you can apportion your time to them to realize what you want to realize.

Wyly: Didn't Hindenburg have a guy on his staff, who—[45]

Boyd: Yeah.

Wyly: —whatever he said, they did the opposite of it. Whatever his recommendation—

Boyd: Yeah, it's a good story. Go ahead and say it. Tell 'em.

[45] Paul Ludwig von Hindenburg (1847–1934) was a German officer and later politician who served as chief of the Great General Staff of the Imperial Germany Army during World War I.

Wyly: Well, that's all I can really remember about it. I—

Boyd: Right.

Wyly: I know he had a guy. He knew that whatever his plan was, was the worst thing, the last thing they ever wanted to do, so—

Boyd: [Talking over Wyly and laughter from the audience.] Yeah, well, in fact subordinates were trying to get Hindenburg to fire him. The subordinates came to Hindenburg, "What do you keep this guy on for? He's a loser, he's always wrong." He said, "Let me explain it to you very carefully." And Hindenburg said, "What I do is I give it to him. And when he says it's okay," he said, "I know it has to be redone." Because he knew it was wrong. "When he says it's screwed up," he said, "I know it's ready to roll." [Wyly talking in the background.] He said, "When a guy is always wrong, you know, that's information too."

[31:06]

[end of tape 2, side 1]

[start of tape 2, side 2]

Boyd: —also I brought out indirectly, also really emphasize, though I didn't incorporate it in my briefings, except I talk about *fingerspitzengefühl*. But you can really characterize the German system, what I call their climate in which they operated in, with four components. Their *einheit* principle, you know, *einheit* means oneness, or organic or mutual understanding, mutual trust. *Einheit* which stands for mutual trust or understanding or organic harmony. Their *fingerspitzengefühl*, which is that instinctive feel we talked about. And then the—

[tape stops recording, then starts again]

Audience: It's easy with the German law—

Boyd: [Talking over an audience member at first] In fact, you see in the German system, they talk about when they work their signals—and they kept saying that—that meant when they're working together for a period of time, they didn't have to say much. They had the *fingerspitzengefühl* and they were all working together very well.

Audience: It would be hard to throw a basketball in defilade when you don't have a guy to catch it.

Boyd: I understand. But, you know, but the point is people have

done this. Fighter pilots have done it. And that's a fast-paced environment. Real fast-paced.

Audience: Well, I've flown Red Flags, and there's no way you can do a Red Flag without an ATO coming out.[46] Or a frag.[47] I'm playing the devil's advocate a little bit, but—

Boyd: Well, go ahead.

Audience: But I'm saying you've flown Red Flags. You're an Air Force pilot.

Boyd: No, I haven't flown Red Flags. That happened after I got out, after I left—

Audience: Oh, yeah. Similar exercises, right?

Boyd: I know about Red Flag. I was out there, and I observed it. In fact, I encouraged it and got it going. Got it honored at the higher headquarters. They didn't want to do it, and I went out there doing an investigation. And what they wanted to do, they almost ruined Red Flag. In fact, they may have done it by now. They wanted to put a goddamned—what do you call those teams in there that—I can't remember—not an ORI team, a—anyway, they wanted to have some guys there put standards on the goddamned Red Flag.[48] I forget what they call those teams since I've been out of the Air Force. I went through the roof. I said, well, Christ, you're going to ruin the whole thing. Everybody's going to do it a certain one way then, you know, the approved solution, is what I'm trying to tell you. So, I got them thrown out. I went to the chief, and he said, "That's bullshit," and he threw them out.[49] They still wanted to, they turned to him and said, "You don't understand, chief." He said, "No, I understand. *You* don't understand, you're no longer involved in those exercises. I don't want any standards out there."

[46] Red Flag is an annual Air Force large force exercise in which aviation units of other Services often participate. Daily mission assignments are made through that Air Tasking Order (ATO).

[47] A "frag," short for fragmentary order, is a short-notice tasking of a mission inside the normal orders development cycle, including an ATO cycle.

[48] The U.S. Air Force uses the Operational Readiness Inspection (ORI) system to assess the practical ability of units to perform their operational missions. The ORI is similar to the Marine Corps' Combat Readiness Evaluation (MCCRE).

[49] Boyd is likely referring to the chief of staff, U.S. Air Force.

Audience: You must not like the MCCRESs, then, and things like that.[50]

Boyd: Well, I don't know what a MCCRES is, but what I'm trying to tell you is, what they recognized, they wanted these guys to start learning how to deal with different situations instead of having to go over some standard procedure so they could adapt to changing circumstances.

Audience: Correct me if I'm wrong, but—

Boyd: What is a MCCRES? Anybody?

Audience 1: Well, you see, it's nothing but a test and—

Audience 2: Like an ARTEP—[51]

Audience 1: Well, it's like an ARTEP. You know what an ARTEP is, sir? The same thing as an ARTEP. You have a number of events to check, and you have to meet these standards based on whatever the event is. But, I mean, when you go to the National Training Center and do the exercise out there, if you don't meet those objectives, its, they ding you, right?

Audience 2: Well, we don't ARTEP there, traditionally.

Boyd: Okay. Now I don't want to take it too far, but I'm trying to—I want to emphasize verbal orders. You may have to put some things out there because they're of a very critical nature, but I don't want to get where at any time you communicate with the lower people, it's always through a written order. That's the key point I'm trying to make.

Audience 1: I agree with that a hundred percent.

Boyd: So, you know, you can't take it too far. Because the reason why they were saying that they wanted primarily personal contact between the superiors and subordinates to be sure that they understood them. And so that's why Guderian put out that thing: verbal

[50] Marines often referred to a MCCRE assessment by the acronym of the parent system, MCCRES, the Marine Corps Combat Readiness Evaluation System.

[51] ARTEP refers to Army Training and Evaluation Program. Just as Marines often referred to a MCCRE assessment as a MCCRES, soldiers would refer to an ARTEP combat readiness evaluation as an ARTEP.

orders only.[52] It's not that they did that only, they wanted a very high emphasis there, because then they could turn their operations over very rapidly.

Audience: Sir, one of the things that I have seen with the high end of maneuver warfare—

Boyd: Incidentally, I mean—oh, hang on just a second. Your point is quite good, though. Let's say you haven't trained these people to work together, then yeah, you're going to have to be damn sure they're going to be given very strict orders. Do you understand what I'm saying?

Audience: Yes, sir.

Boyd: And therefore, it's sort of a self-fulfilling prophecy. Now, you have to put the verbal orders out, and now you slow yourself down, more often—I meant, not verbal orders, written orders. I'm sorry, I said it the wrong way.

Audience: But that falls back to what you said, centralization—

Boyd: Yeah, so what I'm saying is—centralization. So, if you don't train these people and they don't think the same way and they don't have, you know, similar orientations, then you have no other choice. You're going to have to do what you want. But then of course you have to pay the price. You know, you're going to have a slow tempo or slow-paced operation. I mean, I don't know how else to deal with it. But if you're going to get these people so they can work together as an organic whole, then you can turn the operation over and over more rapidly then. You can adapt to circumstances as they shift and change. You can shift gears and change with it.

Audience: The only thing I was going to say was that in garrison—there's a garrison mentality and there's a field mentality.

Boyd: Yeah.

Audience: And we have a tendency—I saw the 2d Marine Di-

[52] Heinz Guderian developed many of the tactics used successfully by Germany's mechanized forces at the outset of World War II. He directly commanded panzer forces during both the invasions of Poland and France. In 1941, following the *Wehrmacht*'s failed attempt to capture Moscow, Guderian was relieved of command for pulling his forces back in direct contradiction to Hitler's orders. Thereafter, he held largely ceremonial positions in the German military until the end of the war.

vision go through all the gyrations when General Gray was the CG trying to get maneuver warfare off the ground.[53] And we went out in the field, and we tried to do all those kind of things. We go back in garrison, and next thing we know, we're telling exactly people how to do things and we're going—not mission-type orders—we're doing exactly the same thing over and over again. Then we go out to the field, and people don't make the transitions. And, ah, it's very hard to do that in garrison unless you train yourself that way too.

Boyd: Right.

Audience: It seems to me there's a—I mean, if we were at war and we were constantly out on the battlefield, then I think we would probably gravitate to that and we would win. But when you go to the field for two weeks and come out of the field and now you're back where *[05:00]*—I remember an incident where the regimental four called me up, and they wanted five men a day—or 10 men a day—to move wall lockers in the middle of the regimental area.[54] So, I called him back up and said, "What's the mission of these people?" He said, "Well, we're going to move all these wall lockers." "Well, I'll just march my whole company over there and I'll get it done in two hours and you won't screw with me the rest of the week." He said, "No, you don't understand." That's what [obscured by laughing] that's how, but that's the myth, you see, they couldn't make the transition.

Boyd: Couldn't make the transition.

Audience: Well, now I'm gonna have five people, and—

Boyd: Well, let me give you an example. When I used to design—

Audience: And that's just one incident—

Boyd: So, let me tell you what else I did by having verbal orders over the telephone. See, I knew how the goddamned bureaucracy worked. What they want to do is go through all the chains and then everybody starts modifying it along the way, you understand what I'm saying, instead of going down direct, when I was designing airplanes. Remember, I'm dealing with contractors, I'm dealing with other agencies in the Air Force—Christ, I had to talk to Congress and everything else when I'm laying that damn thing out, because you know, every once in a while, they like to hear whether we're making

[53] Brown, *A New Conception of War*, 161–64.

[54] Regimental four refers to the regiment's S-4, logistics officer.

any progress. And so, I did the whole fucking thing where I just got tired of bullshit and started doing it, and it worked. And Christ, these other guys had started on programs way ahead of me, and I was done before they even knew what hit them, and I had this design laid out.

In fact, when I was calling the guy on the phone, we had a big meeting. I remember one day it was a two-hour goddamn meeting between the generals, all the staff people. I'm making notes and all that, you know, and we finally came up and they agreed something good to be done. We had to do a new one. I said, "You really want to do that?" And I said, I finally sold him, and he said, "Yeah." He said, "How soon is it going to take you to get that implemented?" They thought I was going to send out some long message. I said, "Well," I said, "soon as I leave the meeting here," ah, I said, "I'm going to be on the telephone, and when I'm off the telephone, it's on its way." The guy said, "I don't believe that." I said, "Well, you, you sit and listen." So, I got on the phone, I had the notes. I said "Okay, get your pad out," and I went down through the thing. I said "Okay, here's the way you set your programs up," And I'm laying the whole thing out, and I said "Now play it back to me. What did I just say?" He told me. I said "Fine, good. Get back to me in a week and let me know how the hell you're doing this." I said it's on its way now. He said, "I can't believe it." I said, "We'll see. If it bombs out, you can crucify me. It's not going to bomb out. I trust these guys."

Audience: [Unintelligible question.]

Boyd: I checked with them there. You know, I checked with them every couple days, "How's it going? Did you have any problems show up?" He said, "Yeah, a couple things." "Do you know what to do? Fine." They tell me, "Yeah, it sounds good." "Press." I didn't bother him. And something they thought was going to take months, hell, we had it done in a couple weeks. I said, "There it's. Done. On your desk." He couldn't believe it. He said, "Where did you get these ideas?" Well, I've always had them. Did it when I was at Nellis and I ran the fighter weapons, and did the same thing. You know, this stuff of goddamn writing all this paperwork, pretty soon, you're buried in shit, and not only that, you're worried about whether you say something just so. If I talk to the guy over the phone, we can play it—we're getting instant feedback. Remember, a message only has one thing that goes out.

There's no feedback. This way when I'm talking to him, he can, I can tell—oh-oh, he didn't quite get that. And then, [Boyd makes a repetitive mechanical noise followed by an explosive noise, as if loading and firing a weapon]. Done. Press. Next guy.

And that's exactly what Wood was doing with his combat commands. He was doing the same goddamn thing. Get down there and they'd talk it out: "Fine. We both understand it, fine. See you, tiger, I got somewhere else to go." He had a division spread out in a 500-mile front, and he was kicking ass and taking names. He just had a tempo and pace going [Boyd snaps his fingers in a rhythm], just like that. He's not the only one. Other people thought he was very good. Balck did it, and some of the German commanders. Of course, that part of the war, they weren't doing it too well. Wood was doing it very well. And he was Patton's best guy. In fact, he's the one that told Patton to go to hell. And Patton wanted to loop back to the Channel ports, he said, "Hey, that's not, we don't want to face," he said, "we don't want to face England. We're trying to get into Germany." And he violated it, and Patton got pissed off, and he finally sold it to him. He said, "Well, you're right. Press." Patton wasn't an easy guy to go up against that way. He eventually got fired. You know how he got rewarded, they canned him. You knew that, didn't you? That always happens. So did Patton. [Laughing].

No, but I'm—

Audience: He was fired?

Boyd: What?

Audience: He was fired?

Boyd: What? Oh, yeah. He was canned. Because they had an operation around Metz, and he was pissed off the way they were doing it, so he wanted to do it his own way, so they canned him. Because he didn't want—see, they had this frontal attack. He said, "This is bullshit." There's a better way of conducting this," and he wanted to set it up differently, so he tried to violate their intent. [Boyd makes a raspberry noise] Out. In spite of the fact that he had been the most successful armored commander they ever had. It was bullshit. You're out. But he's regarded in the Army, they hold him at a very high level. He was a guy who was, when he was in there for a short, he was only in the operation about six months. A very short time. Very short

period. But for the period he was in there, Holy Christ, what he did! Highly regarded.

Go ahead.

Audience: Sir, before we get into the "Organic"—

Boyd: We're not going to do that tonight unless you want to.

Wyly: But that wasn't the answer. Are we going to do it?

Boyd: We can do it if you want to. It wouldn't take that long. We could do it if you want to.

Audience: I'd love to have a fast fly-through if there's time.

Wyly: Oh, I didn't mean tonight, I mean, can you do it tonight?

Boyd: We could. We'd need to take five. I mean, this went fast.

Audience: And I'd like the opportunities for mismatch and matchups in the physical, mental, and moral levels. One is the physical, two is the mental, and three is the moral. Could you identify this for me again so I could— *[10:00]*

Boyd: Okay. The way to look at it, you have under this—there's really—you're worried about the situation you're dealing with, right? In other words, you have to deal with the world out there.

Audience: That's the physical.

Boyd: You have to take—no, wait a minute—that's part of the physical. It also can be moral and mental and not just a physical situation. You also have the actions you have to take in order to deal with that situation, right? Then you have to have ideas behind your actions. And then you have to have a moral code or ideals that you're appealing to. In other words, your ideas are framed inside your moral code or your ideals. And then your actions are framed within both your ideals and your ideas. And of course, then you're using all three of those—hopefully you should be using all three to deal with the situation. And so I'm saying in a sense, you can get six mismatches. One, between your actions and your situations. Two, between your ideas—between your ideas and actions is one. Between your ideas and situations, two. So, you get two from your ideas on down. And then you take the other one, your ideas are related to mental and your ideals are related to moral. So, then you can get a mismatch between your ideals and your ideas, between your ideals and your ideas, excuse me; between your ideals and your ideas, between your ideas and your actions, and your ideals and your situations. So that's

three. Likewise matchup. You just take the opposite. M&Ms, both three ways. So, you got six possibilities there. One within your physical, two within your mental, and three within your moral. Does everybody see that now? Normally, I write it out. And I'm going to make a chart on that. I didn't have any paper, and I would have handed it out and have you do it by yourself so you could see it.

But the name of the game is you're trying—what you're trying to do is generate mismatches in your adversary's system, and the mismatches signifying that he's not coping with the world. And you can do it through those three dimensions, the moral, mental, and physical.

Audience: And maintain the match-ups in your [unintelligible].

Boyd: Huh?

Audience: And maintain the match-ups in yours.

Boyd: And you want to maintain as many matchups as you can. In other words, you want to get more matchups than he's got; therefore, he's got more mismatches; therefore, you're leveraging him, he's not leveraging you. And that's the name of the game. [An audience member begins to speak, but Boyd talks over him] It's not a perfect, you see it's not a perfect world. That's what I'm trying to say.

Wyly: —it's irrelevant.

Boyd: Yeah.

Audience: [Inaudible discussion among audience members] — three, four, five.

Boyd: Here, let me write it up. Give me a yellow pad and I'll write it out for you so you can all easily see it.

Audience: You've just got to work on your mental connectivity if you're [unintelligible]. That's where you've got to concentrate. You have to have a harmonious effort.

Audience 2: [Unintelligible].

Audience: You continually work on the physical fibers— [Lengthy indiscernible discussion with multiple voices]

Audience: Put the demand on the brain housing unit—

[tape pauses and then starts again]

Boyd: Okay, now let's reexamine these. [Boyd puts slide 25 up again] They begin to make—well, the emperor's naked. Why is he naked? Because he's got no matchup with the world that's going on out there. In other words, his ministers are walling him off from what's

going on. They're feeding him bullshit, you know. You heard the old statement we used to say in the military: treat them like a mushroom, keep them in the dark and feed them bullshit.

Audience: Mismatch [unintelligible]

Boyd: Look at Jomini. He's straight physical. "Properly directing." Well, he made this very important book, and I'm quoting him directly: "The great art, then, of properly directing lines of operations, is so to establish them in reference to the bases and to the marches of the army as to seize the communications of the enemy without imperiling, again, one's own, and is the most important and most difficult problem." In other words, he wanted to, what? Cut him off physically from the world that sustains and nurtures him.

And look at leadership: "the art of inspiring people to enthusiastically take action toward the achievement of uncommon goals." If you don't interact with them, how the hell can you inspire them? You can't. And the key thing is "uncommon goals." You know, in a common goal, everybody agrees, and boy, you don't need any leadership. All you need is a manager. Instead, a goal that they otherwise wouldn't go for, the extraordinary uncommon goal—that takes a leader. And what's needed is constant interaction. And if you don't set a very good example, well, you're going to have a hard time doing that. Okay.

Wyly: What are we going to do with "Organic Design?" Who wants "Organic Design?" John, do you see [unintelligible]. Okay, you are going to come? Okay.

Boyd: Okay. When do you want to set that up? When you set it up, there's no problem.

Wyly: What would work out best for your people, John, with the Command and Staff folks?

[Background conversations. Tape stops then starts again]

Boyd: —standard of living is going up— [break in recording].

Audience: [speaking very close to the recorder as the recording resumes with Boyd talking in the background] Immoral fiber.

Boyd: You know, we got some very serious problems in the world, yet at the same time, we got people that are making these—that we have in these leadership positions—whether it's the Congress, whether it's the executive branch, or even the military or other branches—*[15:00]* all they're interested in, Christ, they want to get

high salaries and everybody take care of them. And not only that, the common person out here in the world feels like he's getting crapped on, and these people want more for themselves and less for the others. They see a big divergence.

See, outside the beltway, it's very different. I see it down in Florida. Boy, they're really horned off. Like that 51-percent pay raise. A good example is the 51-percent pay raise. They came totally unglued. Totally unglued. And if you recall, David Broder and all these assholes in the *Post* were saying, "Well, hell, the goddamn guys deserve it."[55] That was an inside the beltway thing. They didn't even look outside. In the meantime, these people outside are saying, "Why should we give them a 51-percent pay raise? What have they done for us recently?" They want a big raise in pay, and in the meantime, the country's going down the tubes. In other words, the worse we get, the more we give to the leadership.

And of course, their view is, well, if they show us some results, they start cutting the foreign debt and start doing some of these other things, then we might give them that pay raise. Maybe we ought to take 51-percent away from them because they haven't been delivering the goods. And then the other argument that came out, they said if their goddamn pay is so low, how come they fight to retain their seat? It can't be too bad, because they're fighting like hell to retain, and 99 percent of them, you know, went back for reelection, so it can't be too goddamn bad. You know, so if it's such a bad deal—and not only that, the thing that really frosts them was the way they installed it. They had it set up such that they didn't even have to vote, which was a huge deception campaign, and they said, "They didn't even have enough guts to step up for it." So, they became very greedy. They wanted to get a 51-percent pay raise all in one fell swoop.

Now, if they would have done it maybe 10 or 15 percent, my feeling is they probably would have got away with it, you know, because

[55] David S. Broder covered politics as a columnist for the *Washington Post* from 1966 to 2008. Boyd is probably referring to Broder's column of 12 February 1989, "The Pay Raise Fiasco: Everybody Lost." The figure who took the most blame for mishandling the legislation was speaker of the House James Wright, who Boyd had mentioned earlier in this presentation and who would resign from that post under a cloud of ethics violations just a week later.

they, people say, "Well, yeah, okay. We don't like it but they need it." So, they got greedy, and they lost the whole nine yards. Now, if they even get 15 percent, everybody's watching them. I mean, everybody's out there alerted now. They're going to watch these assholes. And they told me—I know guys down there. They got people, you know—they're just observing like hell, and so Congress is afraid to go forward with it right now. Very nervous. And they did it to themselves.

And then this Wright stuff, you know, hasn't gone down good. The kinds of games he's playing. And now we see in the Ollie North trial, was the thing that they tried to make it look like under the Tower Commission that [Ronald] Reagan and [George] Bush were hardly involved.[56] Now we find out these documents are coming out. They definitely were involved. And now the Senate and Congress are all horned off at that. And in a sense, North is the fall guy.

Now, you know, we'll never know the real truth, I don't think, but my suspicion is, you know, knowing the bureaucracy—and I operated up in that environment, and I operated pretty fast and loose because I was designing airplanes—you have to do that kind of stuff. You know, you can get away with playing a pretty—without having people know things maybe for a few months, but North was doing it for two years. And there's no way that that White House didn't know what he was doing and that they hadn't sanctioned it from the top down. They sanctioned it. And as far as I'm concerned, there's blame. You know, they're as much to blame as he is.

Now, the thing that he did bad, what I think is bad, and some people seem to justify it, I don't think he should have lied to the Congress. What they should say is "I can't answer that question. I cannot answer it. I've been ordered not to. If you want to get an answer, you go talk to the president or the vice president or my boss. I can't answer it." That's all he had to say. So, that's where he gets, the thing

[56] LtCol Oliver North was a Marine officer who worked on the National Security Council staff as deputy director for political-military affairs from 1983 to 1986. North was a key agent in the Iran-Contra Affair in which profits from covert arms sales to Iran were illegally channeled to anticommunist Contra rebels in Nicaragua. North was indicted for conspiring to defraud the United States and stood trial in the spring of 1989. In May 1989, the same month Boyd made this presentation, North was convicted on three felony charges, although the trial and convictions were later overturned on appeal.

he made where he made his mistake: he didn't do that alone. He was directed. But where I think he made his mistake was he shouldn't have pumped out that phony information to Congress.

They tried to get me to do some of that stuff one time, I'm telling you. I told the guys I want that in a written order, and I'm going to put it out. They wanted to do some phony stuff. In fact, that was before a general, because I didn't want to do it. It was the secretary of the Air Force, his executive officer, a general, and he had another guy in there as a witness. He chewed my ass out, and he said, "You understand what I want, Boyd?" I said, "I've understood it from the beginning." He said, "Here it is." And I said, "Fine." I said, "To be sure that everybody else understands that this order is issued by this office and make goddamned sure I want it in writing." I said, "Now, General, you listen to me. I'm going to take that goddamn order, and I'm going to put my little note on it, and I'm going to spread it throughout the whole goddamn AFSC command so it'll never get lost.[57] So, there are always going to be copies, and then when the thing bombs out, you're going to eat it." I said, "I'm ready for your written order." He said, "Let's sit down and talk."

He got very interested. I knew fucking-A he wasn't going to sign that order. [Laughter from audience.] Because he's trying to tell me that if I didn't obey that order, possible court martial. There's no way he could explain that before a court martial. I knew that. I said, "Why would he put that in writing?" Because when they see the orders. And he said, "Well, I," he said, "I think we're going to have to do it differently." "I think so, sir." Then he asked me my recommendation. I said, "Well, here's the way it'll work, and goddamn, not only that, it'll be legitimate and we won't look like a bunch of assholes at the end of it." And he said "Well, can I take that?" and I laid something out, and I said you might want to modify it as long as it's within that theme. If you try to do it another way, I said, I'm not on board unless it's in writing. And then I will put my little amendment to that damn

[57] AFSC refers to Air Force Systems Command. AFSC was responsible for the research and development of new weapons systems for the Air Force, to include aircraft, and Boyd is likely referring to an episode from his time developing either the McDonnel Douglas F-15 Eagle or the General Dynamics F-16 Fighting Falcon fighter jets. In 1992, the Air Force was reorganized and the functions of AFSC were assumed by Air Force Materiel Command.

thing to be sure everybody at every level has a copy, so when this thing bombs out, we know who's responsible. See, you have that out. People are afraid to take it. It intimidates—he had a witness there, and so that witness was on my side then, too, see, because they know what I'm doing. See that witness can go either way.

Audience: That's one time when you need the written order. *[20:00]*

Boyd: Hmm? That's when you need written orders. But that's based upon what?

Wyly: Mistrust.

Boyd: Mistrust, exactly. That's why I needed a written order, because it was based upon mistrust. I didn't trust the son of a bitch.

[brief discussion on scheduling the next presentation]

[20:31]

[end of tape 2 side 2]

CHAPTER



Organic Design for Command and Control

Introduced by Frans P. B. Osinga

"Organic Design for Command and Control" extrapolates parameters for an adequate command and control concept from, in particular, the sections in "Patterns of Conflict" on blitzkrieg and maneuver conflict. The bibliography of "Patterns of Conflict" of December 1986 lists studies on generals Bonaparte, Grant, Lee, Patton, Genghis Kahn, Guderian, the Prussian general staff system, German generalship during World War II, tactical genius, morale, several case studies on command and control, and autobiographical works of generals Erwin Rommel and Heinz Guderian.[1] He combines these with

[1] Various sources have been footnoted in the previous chapter. It is worthwhile to note the following works in Boyd's bibliography: David Downing, *The Devil's Virtuosos: German Generals at War 1940–1945* (1977); T. N. Dupuy, *The Military Life of Genghis, Khan of Khans* (1969) and *A Genius for War* (1977); J. F. C. Fuller, *Grant and Lee* (1932); Richard Gabriel and Paul Savage, *Crisis in Command* (1978); Richard Gabriel and Reuven Gal, "The IDF Officer: Linchpin in Unit Cohesion," *Army* (January 1984); John Gardner, *Morale* (1978); Simon Goodenough and Len Deighton, *Tactical Genius in Battle* (1979); Heinz Guderian, *Panzer Leader* (1952); Richard Humble, *Hitler's Generals* (1974); Albert Kesselring et al., *Manual for Command and Combat Employment of Smaller Units* (1952); Harold Lamb, *Genghis Khan* (1927); Kenneth Macksey, *Guderian: Creator of the Blitzkrieg* (1976); S. L. A. Marshall, *Men Against Fire* (1947); Erwin Rommel, *Infantry Attacks* (1937); Charles Whiting, *Patton* (1970); and importantly, Martin van Creveld, *Command in War* (1982).

several studies on leadership, command and small unit cohesion.

Whereas Boyd previously had highlighted the importance of isolating the opponent from his environment (across all levels of organization), in this exploration of the essence of effective command interaction becomes the key theme. As Boyd had already alluded to, an organism needs to maintain interaction with its environment if it is to survive. Only open systems can adapt adequately to change. In military organizations this is the responsibility of the command-and-control system.

In his introduction, Boyd states that normal institutional responses to failures is more and better sensors, more communications, more and better display devices, more satellites, more and better fusion centers, etc.—all tied into one giant fully informed, fully capable Command and Control system. This way of thinking emphasizes hardware as the solution.[2] Boyd's approach is process oriented, or in his words, "I think there is a different way, a way that emphasizes the implicit nature of human beings. In this sense, the following discussion will uncover what we mean by both implicit nature and organic design."[3]

Traditional features of military command and control structures—hierarchy, explicit communication, control—inhibit adaptability, initiative and responsiveness. Instead in his argument for a more agile adaptive command set-up, Boyd leans heavily on the German philosophy of *auftragstaktik, fingerspitzengefühl,* decentralization, multiple informal communication channels, mutual trust, shared values and experiences, but also multispectrality, ideas not accidentally bearing strong resemblance to Martin van Creveld's excellent 1988 study Command in War. Boyd, therefore discards the term *command and control* altogether, replacing those with *appreciation and leadership*. Boyd's vision on command follows as the logical solution to the challenges and imperatives he highlighted in "Patterns of Conflict" concerning the rapidly unfolding and uncertainty-filled operational environment.

[2] John Boyd, "Organic Design for Command and Control"; see pp. 498, 552.
[3] Boyd, "Organic Design for Command and Control;" p. 498. It is not difficult to see the influence of Michael Polanyi's *The Tacit Dimension* in this.

Presentation: "Organic Design for Command and Control"
Place: Command and Staff College, Marine Corps University, Marine Corps Base Quantico, Virginia
Date: 25 April / 2 May / 3 May, 1989
Transcriber's note:

The transcriber could not identify by name or branch of Service any of the audience members (no class roster is included in the archived material). Individual speakers are identified by the name "audience." Based on audience interaction with Boyd during the course of the three days recorded, the transcriber estimates an audience size of approximately 10 members. Unlike Boyd's presentations of "Patterns of Conflict" and the "Strategic Game of ? and ?" to this Command and Staff audience, neither Colonel Michael Wyly nor Captain John Schmitt appear to be in attendance.

[start of tape 1, side 1]
[slide 1]

John Boyd: [unintelligible] "Organic Design for Command and Control." Okay? We're going to raise a couple of questions. Why the focus on command and control, and what do we mean by organic design? Now, one thing I'll preempt myself right away: in my command-and-control presentation, there are no wiring diagrams. I happen to believe that human beings make command and control, not machines, so therefore you see no wiring diagrams in my presentation, by intent, it's not by accident.

The reason why I developed this presentation is a reaction to the presentations I used to hear in the Pentagon, I heard an hour and a half presentation, all they ever showed me were all these fusions centers, and these interconnects and all that stuff. And after one colonel got done, I was standing there about an hour and half, I said, "when are we going to talk about command and control?" Well, he was insulted, he said, "Well, I just talked about it."

"You didn't talk about command and control, let's go over every goddamn one of your charts, all you're showing me is a bunch of goddamn hardware and how you fit it together. And so, you're really, the title of your presentation should be instead of 'Seeking [unintelligible]' what the Army would call it, 'CME'."

SLIDE 1

THE TITLE CHART PROVOKES A COUPLE QUESTIONS:

- Why the focus on C&C?
- What do we mean by organic design?

"What the hell's 'CME'?"

[unintelligible] "Communications and monitoring equipment, that's what your presentation's about. You didn't talk about command and control, just the equipment you used. [unintelligible] stand in the back while the equipment does command and control? The guy said 'no,' well, then you don't have a command-and-control presentation."

He was highly insulted, of course. And of course, that's what galvanized me into coming up with one [unintelligible]. So first, that's "why the focus?" Now what do we mean by organic design? Of course, that's the whole idea behind this thing.

[slide 2]

Here's what we have for past few years [unintelligible] command and control. The past years, look at all these fiascoes, Nifty Nugget, Proud Spirit.[4] Anybody heard of the Nifty Nugget or Proud Spirit exercises? Yeah, they were worldwide command and control exercises.

[4] Nifty Nugget was a large-scale simulated mobilization exercise conducted for 21 days in October 1978. Intended to demonstrate the ability to reinforce U.S. units stationed in Europe with troops, ammunition, and equipment from the continental United States, the exercise instead highlighted severe shortfalls in strategic airlift, shortfalls in maritime sealift and port onloading/offloading procedures, poor coordination among the Defense Department's major mobility agencies, and lack of understanding and execution of civil and military emergency authorities. Proud Spirit was a mobilization command post exercise conducted 6–26 November 1980. While the exercise scenario was a global crisis and not global conflict as in Nifty Nugget, and thus put somewhat less strain on American mobilization resources and processes, Proud Spirit was nevertheless plagued by its own unique shortcomings. Exercise participants discovered severe ammunition shortfalls in European stores, insufficient available trained soldiers, a weak U.S. defense industrial base, poor civilian agency preparation, and the catastrophic failure of a worldwide computer system designed to track unit readiness.

SLIDE 2

FAILURES

The past few years have seen the fiascos associated with Nifty-Nugget and Proud Spirit C&C exercises together with the real world fiascos epitomized by the evacuation of Saigon, Desert I and others.

RESPONSE

The institutional response for overcoming these fiascos is: more and better sensors, more communications, more and better computers, more and better display devices, more satellites, more and better fusion centers, etc.—all tied into one giant fully informed, fully capable C&C system. This way of thinking emphasizes hardware as the solution.

ANOTHER WAY

I think there is a different way—a way that emphasizes the implicit nature of human beings. In this sense, the following discussion will uncover what we mean by both implicit nature and organic design.

Anybody who's familiar with them, we'll talk about them later on, but they were worldwide command, in '78–'80 and the other in '80–'82, I think. [unintelligible] They bombed out rather severely. And of course [unintelligible]

And of course, technically what happened, when you have this kind of a problem, here's the typical response [unintelligible]. It's another reason why we have the focus on command. In other words, it's a hardware mentality. See, all we've got to do is just pile in more hardware, make it more sophisticated, more channels, spend more money, and we're home free. But the results show that that hasn't worked out too well. All we've got is a big bill, and a lot of confusion.

So maybe there's another way of looking at it, to emphasize what I call the implicit nature of the human being. So now, in this chart I'm showing why the focus on command and control, and now what do we mean by organic design, that's going to be the rest of the presentation. [unintelligible]

[slide 3]

SLIDE 3

IMPLICATIONS

- Need insight and vision, to unveil adversary plans and actions as well as "foresee" own goals and appropriate plans and actions.
- Need focus and direction, to achieve some goal or aim.
- Need adaptability, to cope with uncertain and everchanging circumstances.
- Need security, to remain unpredictable.

Okay, first of all, what I want to do. Normally, what we—when people start talking about command and control, right away they start listing the requirements for command and control before they think about. Well, if you don't think about it, then those requirements have no meaning. So, if you're talking about command and control, let's get into a little—not so hard, get into and sort of sneak our way into it, and let's look at the implications behind command and control.

You begin to see in command and control, in some sense you want to be able to have insight and vision, you want to unveil your adversary's plan, as well as foresee own goal and appropriate plan.

Also, to give you a basis for both focus and direction, so you can realize some goal, some aim, or some goals or aims or objectives. [unintelligible]

And next, obviously it has to be adaptable. You're going to have to cope with both uncertainty and ever-changing circumstances. The goddamn world changes and moves along, so your system has to be adaptable or flexible so it can be able to cope.

And finally, of course, better have some security to remain unpredictable. If the guy is reading your system [unintelligible] got read into the Enigma system during World War II, it caused a wee bit of a problem, you lose the benefit of all the stuff if it doesn't have security.

SLIDE 4

ELABORATION

- Why Insight and vision? Without insight and vision there can be no orientation, to deal with both present and future.
- Why focus and direction? Without focus and direction, implied or explicit, there can be neither harmony of effort nor initiative for vigorous effort.
- Why adaptability? Adaptability implies variety and rapidity. Without variety and rapidity one can neither be unpredictable nor cope with changing and unforeseen circumstances.
- Why security? Without security one becomes predictable, hence one loses the benefits of the above.

So, those are sort of the implications in a very general sense, so that we can keep track of them. And then, of course, I want to make elaborations upon that by turning everything around.

[slide 4]

And what I mean here, why insight and vision? Because without it, you have no orientation, no ability to deal with both present and the future. You're going to find out that this is a very critical idea, if you're not oriented, I don't care how much hardware you have, you're out to lunch, you're going to get taken to the cleaners. And I'm going to make that evident in the presentation, what I mean by that. It's very important, very important.

And why focus and direction? Because without it, whether implied or explicit, there can neither be harmony of effort nor initiative for vigorous effort. In other words, I'm just coming in the back door of the argument.

And why adaptability? Well, firstly, being adaptable implies variety and rapidity. And if you don't have variety and rapidity, guess what, you become what—nonadaptable and predictable. So, that's why you have to have variety and rapidity.

[05:00] [unintelligible] Without variety and rapidity, one can neither be unpredictable nor cope with changing and unforeseen circumstances.

And of course, why security? Well, without it, you're going to become predictable, in other words the guy can read into your system, which is the very nature of being predictable.

Now remember, the whole idea of a command and control system, you not only want to be able to have some command and control—of course, I'm going to surprise you later on by what I mean by command and control—but at this point, you not only want to have command and control, but also, at the same time, you got to be adaptable and unpredictable. Always want to keep that in mind, you want to be adaptable and unpredictable. Because if you're not, you weren't going to do very well. You're going to get taken to the cleaners. [unintelligible]

[slide 5]

Okay, with that in mind, I want to make this comment. So, with these thoughts in mind, let's take a look at some samples, let's just look a little back in military history at some things that we'll make use of as we proceed in our command and control, or our organic design is probably a better way to say it.

[slide 6]

So, here's some samples. And I just reach into the bag, you can probably think of some of your own. Sun Tzu from 400 BC. And if you look at Sun Tzu, you can see a number of things in there. You want to go strength against weakness, you know, you want to be quick, et cetera, and *cheng/ch'i*. You want to pull the other guy apart.

And then a direct quote from Bourcet. So, Sun Tzu brings in the idea of deception, so then Bourcet brings in the idea of ambiguity [unintelligible].

And look at Napoléon's comments. This quote, it's the emphasis on time, ambiguity, and a very rapid pace, in order to unwind your adversary. And I'm actually quoting here [unintelligible]

And then look at Clausewitz. Now Clausewitz says something very interesting, in a sense what he does, he just takes all these different things and wraps it under the notion of what he calls friction. The key idea being friction is the only concept that really distinguishes real war from war on paper. The point is, if you leave out the idea

SLIDE 5

COMMENT

With these thoughts in mind let's take a look at some appropriate samples from the historical environment that will, as we shall see, prove useful before trying to evolve any operational philosophy or command and control concept.

SLIDE 6

SAMPLES FROM HISTORICAL ENVIRONMENT

- Sun Tzu (around 400 BC)
  Probe enemy to unmask his strengths, weaknesses, patterns of movement and intentions. Shape enemy's perception of world to manipulate/undermine his plans and actions. Employ Cheng/Ch'i maneuvers to quickly and unexpectedly hurl strength against weaknesses.
- Bourcet (1764–71)
  "A plan ought to have several branches. . . . One should . . . mislead the enemy and make him imagine that the main effort is coming at some other part. And . . . one must be ready to profit by a second or third branch of the plan without giving one's enemy time to consider it."
- Napoleon (early 1800s)
  "Strategy is the art of making use of time and space, I am less chary of the latter than the former. Space we can recover, time never. . . . I may lose a battle, but I shall never lose a minute. The whole art of war consists in a well reasoned and circumspect defensive, followed by rapid and audacious attack."
- Clausewitz (1832)
  Friction (which includes the interaction of many factors, such as uncertainty, psychological/moral forces and effects, etc.) impedes activity. "Friction is the only concept that more or less corresponds to the factors that distinguish real war from war on paper." In this sense, friction represents the climate or atmosphere of war.
- Jomini (1836)
  By free and rapid movements carry bulk of the forces (successively) against fractions of the enemy.

of friction, you've probably got something other than war. So, there it's. And it's an interesting concept, because remember he formulated it in early part of the century, and since then of course we have the concept of [unintelligible] second law of thermodynamics, which

is the concept of entropy, all-natural process to generate [unintelligible]

So, in a sense, the way he uses friction, not in a physics sense or a scientific sense, but the way he uses it's very much in accord with the idea of the modern concept of what we call entropy. First of all, to describe that unavailable energy, inability to do work, capacity for, you know, you can't take actions [unintelligible] more confusion and disorder. So, he's talking about it. And in this sense, he's saying that friction represents the climate or atmosphere of war.

Jomini, his comments aren't too surprising, because if you remember, he's a Napoleonic general. So, you look at his comments, you can compare them to Napoléon, you can see they're pretty much in the same ballpark. He says it a little bit differently [unintelligible].

Audience: [unintelligible] you think the relationship between friction and—

Boyd: —entropy.

Audience: —entropy, where's this thing complacency come in? Is that, you're already within yourself, or you're not—

[cross talking]

Boyd: It means you're not—complacency, what is it, anybody, what does that mean for the [unintelligible] my presentation? Very simple. When you become complacent, you're not really observing what's going on out there, which means now you're being cut off from your environment, so the very thing you need to know about, you don't know about, so now you're going to get taken.

And that's what happened to our [unintelligible]. We won World II [unintelligible].

[cross talking]

But then we haven't won a war since World War II. You know, Korea we tied, and Vietnam we lost.

[cross talking]

So, we might want to get rid of those World War II methods because they don't seem to be working too good right now. In fact, they say, the only people who learn from wars are the losing side, because they recognize what they had didn't work, and they better learn something new. The winning side becomes arrogant, he's got it all figured out. I mean, it's not, it hasn't only happened to the U.S., you can look back through history, and it's happened again and again.

And that's why you always got to guard against it. You got to assume I don't know the answer, I always got to go for the answer. And that's why I told you people that just finished, here you're now, you're very proud, and it's a very nice manual we've talked about in [unintelligible] FMFM-1, some very new ideas, it's the best one out right now.[5]

But as far as I'm concerned, it's fucked up. Because if I don't say it's fucked up, then I'm going to keep it for 40 years like we kept the 1791 *Drill Regulations*, and you're going to be out of date. You understand my philosophy?

So right now, you guys should be sitting down, looking through that thing, "Where can we improve that," so the next two years from now, when you go to write it, you've got a new write-up, and you build upon it. If not, you're going to have that thing for—you'll be out of date, and you'll be back to a World War II mentality, except in a different time.

Audience: Can you share just a couple of quick examples, you know, right now we're all getting ready to discuss this with the students, some of those, when we reobserve the FMFM-1?

Boyd: Yeah, I'll give you a couple of examples of it, where they're incorrect. Now when I say that, I'm not knocking the manual. It's damn good, it's the best one around, but you got to learn, you got to move forward. We used to do the same thing when we did our tactics manuals out at Nellis. We'd get it done, I said, "Everybody happy, men?", and they say "Yeah," and I said, "Well, you better throw the towel in. I think it's all screwed up." "We just got done, how can you say that?" "You mean we're all perfect? That's bullshit. So, we should be working on the next manual."

Because that way you keep it alive, your spirit, vitality, your, you know, you're growing, thriving and growing. The French, they kept that goddamn 1791 *Drill Regulations*—I've never forgotten it, for 40 years, from 1791 to 1831 when they were all out of date. They paid for that. And so, you always want to think ahead.

[5] *Warfighting*, FMFM-1 (Washington, DC: Headquarters Marine Corps, 1989). Capt John Schmitt, USMC, was *Warfighting*'s primary author. The Marine Corps' development of FMFM-1 is described in Ian T. Brown, *A New Conception of War: John Boyd, the U.S. Marines, and Maneuver Warfare* (Quantico, VA: Marine Corps University Press, 2018), 163–72.

[10:00] Now, having said that, what you said to me, item one: too much Clausewitzian emphasis. Clausewitz didn't have it right. Concentration and speed, I'll give you an example, for the people who weren't here the other day when I talked about it. He says there's no higher principle than acting with the utmost concentration. Then you read very carefully, and he goes back to chapter, uh, book eight, chapter nine, in which he has a long discussion on the idea of concentration, on speed, or rapidity, or time. And he lays out four exceptions to the idea of concentration. Four exceptions!

And within the four exceptions, one reason, the underlying reason, you read it very carefully, is the idea of speed. You can't violate his second principle, act with the utmost speed. But he has no exceptions to speed. So, if he has no exceptions for speed, he uses it as the basis for concentration, then the highest principle isn't concentration but speed. So, he contradicted himself.

And so, what do you got in your manual? Concentration and speed. So, if you're going to use that, it should be speed and concentration, just the reverse. Not only that, I don't even like the word "concentration," because it's the wrong word. Now, if you're going to use multiple thrusts like we talked about today, and I can show all the different ways that's done, that's not concentration, that's a focus. So, it should be speed and focus. Now you're back in the twentieth century, instead of back in the—

[the tape switches at this point]

Don't let yourself get too dazzled by Clausewitz because he said something. Okay, so we see that. Okay? Now let's go onto this second, this is the last chart in this sample.

[slide 7]

Now let me talk to this one. Note this one up here. This is one of my favorites. "Git thar the fustest with the mostest." Old Nathan Bedford Forrest. Now what's wrong with that in the context of your new FMFM-1? FMFM-1, even though it has got some, has got in a sense, has got that right. Not this. This isn't quite the correct way to proceed. It's all right for the nineteenth century, but not for the twentieth century.

People who have heard my "Patterns"—tell me what's wrong with that. Close, but no cigar. [unintelligible] What, are you just going to rush somewhere, so you can get there, and get some place

SLIDE 7

SAMPLES FROM HISTORICAL ENVIRONMENT
(CONTINUED)

- N. B. Forrest (1860s)
  "Git thar the fustest with the mostest."
- Blumentritt (1947)
  "The entire operational and tactical leadership method hinged upon . . . rapid, concise assessment of situations, . . . quick decisions and quick execution, on the principle: 'each minute ahead of the enemy is an advantage.' "
- Balck (1980)
  Emphasis upon creation of implicit connections or bonds based upon trust, not mistrust, that permit wide freedom for subordinates to exercise imagination and initiative—yet, harmonize within intent of superior commanders. Benefit: internal simplicity that permits rapid adaptability.
- Yours Truly
  Operate inside adversary's observation-orientation-decision-action loops to enmesh adversary in a world of uncertainty, doubt, mistrust, confusion, disorder, fear, panic chaos, . . . and/or fold adversary back inside himself so that he cannot cope with events/efforts as they unfold.

the fastest? What you want to do is you want to lay a situation on somebody. As they're trying to adjust to that situation, then you lay another one on to it, so he has to just keep adjusting the situation, he falls behind, you pull his pants down. So, what he's doing here, he's using time to serve space. I use space in order to serve time. Pull the guy around, just invert the whole process. I'm moving to use space in order to lay situations on a guy, he can't keep up, end result, he falls back in time. When he's not adapting he starts coming unglued. He can't cope with the situation.

Okay, Blumentritt.[6] 1947. Note his comment. Incidentally, these are his underlines, not mine. He underscored that. The reason why I bring it out, I just find that very interesting. People don't like my

[6] Gen Gunther Blumentritt served on the eastern front in World War I, became a tactics instructor in the interwar years, and served in the *Wehrmacht* during World War II, largely as a staff officer. He was the sole author of the plan for the invasion of Poland and collaborated with Manstein and others on developing the plan for the invasion of France. Blumentritt later oversaw planning for the defense of the French coast against Allied invasion and was implicated but cleared in the assassination plot against Hitler in 1944.

OODA loop, but the Germans already in a sense had it. They just didn't have the first little quick assessment. They took the observation and orientation and put them together. Quick decisions. Quick executions. I mean rapid assessment, excuse me. Same idea. Note what he said: "Each minute ahead of the enemy is an advantage." Not to go somewhere. He just said he wants to take advantage. He saw it, in 1947. Now that's when it was written. Now how much, how long, how much before that were they doing it? That's a good question, that's one for sure. You surmise they were thinking that way far before then. Very interesting.

Okay, Balck, 1960, 1980, excuse me.[7] Recognize the importance of the implicit connections or bonds. In other words, so you can have an organic whole so you can function as an organism.

Note what he says, based upon trust and not mistrust. The quickest way to destroy an organization is generate mistrust and discord within the organization, so it's no damn good. So, when the squeeze comes on, they all fly apart and panic, pointing fingers and all that. So, you build up these real strong bonds of trust in that, and harmony, then when the squeeze comes on [unintelligible]. It's going to come. It always does, some time or later.

Then this is mine. You can see mine. [unintelligible] And note this, and this is a very important idea. Fold adversary back inside himself. Why do I say that? For the people who've heard my presentation so far, it's an important idea. So, why do you want to fold a guy back inside himself? You cut him off from the very thing he needs in order to cope.

Audience: Orientation.

Boyd: That's right. You destroy his orientation. If his orientation is destroyed, you destroy what then? His decision—his ability to observe, to decide, and to act, which means now he can't play. In other words, it's the isolation side of the interaction/isolation union.

Audience: You follow that with what we're doing with our system and the [unintelligible] will draw upon—

[7] Gen Hermann Balck was a highly decorated German officer who commanded multiple *panzer* forces on both the western and eastern fronts during World War II. He was one of several former German officers with whom Boyd talked while Boyd was assigned to the Pentagon during the late 1970s and early 1980s.

Boyd: And see, what you, what you, the way if you get inside a guy's OODA loop, *[15:00]* or you destroy his orientation, so he's disoriented, now he's unfolding that loop with a corrupt orientation.[8] Then if you can keep it going, it gets more and more—it amplifies itself. So, what happens is, you begin to see these things. First: uncertainty, doubt, mistrust, confusion, panic, and the whole thing [unintelligible]. You just can't cope.

In fact, Colonel Hobbs pointed out, or it was Barnes who pointed out in one of the exercises he ran with some of your students here, where they ran an exercise and they fell behind.[9] They just, all the guys were sitting there looking at the goddamn table. They were paralyzed. They couldn't do a frigging thing because the other guys got totally inside their loop. You're laughing. Is that true?

Audience: [laughing] It was interesting to watch.

Boyd: Did you see that? Yeah. Everybody was telling me about it. And incidentally, this isn't the first time I've seen it happen. When I was out at Leavenworth they talked about, they ran some exercises with a similar kind of thing. The guys, they just got to the point they didn't know what the hell—was paralyzed. Done. Out of the game. In the real world, of course the guys come in and sweep them up [unintelligible]. Can't cope.

Audience 1: I don't want to distract from you, but some of the conversation I shared with you coming down here is that we may have a system that self-induces us to continue to look within. We lose the focus outside.

Audience 2: Some of the things you were talking about is the

[8] Boyd's shorthand for the observation-orientation-decision-action loop he developed as an output of his life-long exploration of conflict and competition. See Brown, *A New Conception of War*, 116–19, 140–45.

[9] This may be Col Thomas A. Hobbs, who appears to have been a contemporary of Boyd and other Marine Corps reformers active at this time. Terry Terriff interviewed Hobbs, along with these other reformist Marines, in his article "Warriors and Innovators: Military Change and Organizational Culture in the US Marine Corps," *Defence Studies* 6, no. 2 (June 2006): 215–47, https://doi.org/10.1080/14702430601056139. Hobbs was listed as commanding officer of Regimental Landing Team 2 in the 4th Marine Expeditionary Brigade in Operation Desert Shield/Desert Storm. With Boyd presenting this brief in the late 1980s, it is possible that Hobbs was on the staff of one of the Marine Corps schools in Quantico prior to Desert Storm. The author was unable to determine who the Barnes referred to by Boyd might be.

focus. We made too much of our plan, and we focus on how we can make our plan work as opposed to orienting us to what happens—

Boyd: What I'll bring to you later on when I talk about Nifty Nugget, I'll give you a little hint. We'll get into it later on, I'll just give you a hint since we're onto this thing right now. Nifty Nugget and Proud Spirit. What happened was, they got internally focused, and they couldn't cope. [unintelligible] people familiar with it. Christ, they were working so goddamn hard to make the thing work they couldn't make it work, they couldn't figure out what was going on in the outside. So, they were focused inside too, and the whole thing just drained away into goddamn bullshit. They couldn't do it.

So, these are, you know, so we're getting on—so I'm just laying out some snapshots here, some ideas. I don't want you—don't get attached to anyone. The most important thing—don't even get attached to that goddamn green book. I call it the green book. Always you want to widen your horizons. That's just another input, gather inputs. You want to get what I call a wide repertoire for dealing with the world. You have to have a wide repertoire, you're going to have that variety, you're going to have that rapidity in new situations, you're going to be able to make the adjustments. If you have a narrow repertoire, if something goes wrong you say, "now what?" You're done. It's like the fighter pilot that has his favorite maneuver. If that doesn't take, he's done. Hosed. Same thing.

[slide 8]

Okay, so those are the key points that I'm trying to get to you after looking at these two things. One, I'll use the Clausewitzian thing. The atmosphere of war is friction, or if you want to call it entropy, okay. I'll use entropy later on. But I'm giving Clausewitz a little credit here. And what you have to understand is, Clausewitz made a mistake. He just called it the atmosphere of war like it's out there. Not only that, remember he was worried about his own internal friction. He didn't look at it like, why not try to pump up the adversary's friction. He just said it's sort of out there, and it's kind of hard to control. But he was always focused inward trying to reduce his own friction. He never came up with, "How do I pump up the adversary's friction?"

And that was the difference between he and Sun Tzu, even though Sun Tzu didn't have the word friction, he's trying to really literally pump up his adversary's friction so the guy can't focus, can't

SLIDE 8

KEY POINTS

- The atmosphere of war is friction.
- Friction is generated and magnified by menace, ambiguity, deception, rapidity, uncertainty, mistrust, et.
- Friction is diminished by implicit understanding, trust, cooperation, simplicity, focus, etc.
- In this sense, variety and rapidity tend to magnify friction, while harmony and initiative tend to diminish friction.

play the game. So, in that sense, Sun Tzu has a better philosophy of war than Clausewitz, regardless of how long Clausewitz's volumes are. So, friction is generated by a number of things or pumped up—menace, ambiguity, deception, rapidity, uncertainty, mistrust, confusion, et cetera. [unintelligible] That tends to [whistling sound] push it up. On the other hand, you can diminish it. You can't get rid of it. By implicit understanding, trust, cooperation, simplicity, focus, et cetera. Those kinds of things.

Okay, so in this sense variety and rapidity, you can look at this, tend to magnify friction, while harmony and initiative tend to diminish it. In other words, we're sort of gluing things together now. That's what I'm trying to bring out.

[slide 9]

Okay, that being the case, let's summarize here. In other words, what I'm really saying relative to that is, variety and rapidity without harmony and initiative lead to confusion, disorder, and ultimately to chaos.

Okay, but turn the argument around. You got to be careful. You say, all we need is harmony and initiative. No, not quite. Harmony and initiative without variety and rapidity lead to uniformity, rigid uniformity, predictability, and ultimately to nonadaptability, which is when you go down the tube. So, you can't have just one or the other. You got to have what? Both. You got to have variety and rapidity

SLIDE 9

IN OTHER WORDS

- Variety/rapidity without harmony/initiative lead to confusion, disorder and ultimately to chaos.

On the other hand

- Harmony/initiative without variety/rapidity lead to (rigid) uniformity, predictability and ultimately to non-adaptability.

?—RAISES THE QUESTION—?

- How do we generate harmony/initiative so that we can exploit variety/rapidity?

COMMENT

- We must uncover those interactions that foster harmony and initiative—yet do not destroy variety and rapidity.

along with harmony and initiative, if you're going to play the game of cooperation and conflict.

Which raises an interesting question: how do we generate harmony and initiative so that they can exploit variety and rapidity? That's the way to think about it [unintelligible]. Or we must uncover those, what I call those interactions that foster harmony and initiative, yet don't destroy variety and rapidity. And so that's going to be our goal in this presentation. That's what we're going for. So again, that's why I call it organic design. Okay?

[slide 10]

Now this chart, I'll let you just look at it. I got to brief this chart. Now, what you don't realize, when you look at that, you say, "My God, there's all different kinds of things in there." But they're really connected, I'm going to show you here in a minute as I talk to them. I'm going to show you how they're all related, very much related to one another. *[20:00]*

SLIDE 10

INTERACTIONS

Positive

Activities	Linkages
• Radio transmission/reception	• Common frequencies
• Conversation/writing	• Common language
• Operational Intelligence Center	• Correlation among multiple sources
• Teamwork	• Harmony of different efforts
• Tradeoffs	• Inversely related characteristics
• Hans Rudel	• Image of activities and changes thereto

Negative

• Compartmentation	• Disconnected bits and pieces
• Non-cooperative centers of gravity	• Islands of disconnected effort
• Alienation	• Disconnected from other humans
• Non-adaptation	• Disconnected from environment
• Fixed recipe	• Disconnected from environment, but connected to some formality

Okay, for example, and they're one-to-one corresponding, I got "activities" here and I got corresponding "linkages" over here. For example, note what I've done, I've labeled them "positive" and "negative." Let's talk about the positive first. Radio transmission and reception. You can't talk or receive unless you're on common frequencies, right? That's trivial, yeah. So, you have to be on a common frequency. Okay?

Now, let's talk about conversation and writing. You both have to use the same language. In other words, if you speak German and I speak English we don't really know, we can't even communicate. Okay?

Now you have an Operational Intelligence Center. You have to correlate them with multiple sources. You get information. You have to get some kind of correlation. You just can't have the data, otherwise you're going to be totally confused. There has to be some correlation. You got to pull it together. What fits, what doesn't fit?

That's not necessarily easy either, because stuff is coming at you. In fact, you use that, when you know other intelligence agencies have to feed that, you try to feed that so you can screw them up, so they get the wrong picture of what's going on.

Teamwork. Harmony of different efforts, getting into even more stuff. In other words, we're on a team, and we're all different. Well, we all can't go off individually on what we're doing, so somehow we have to get our efforts, so they have some certain harmony, so we realize in a social sense a larger purpose or a larger goal. So, in other words, you have to observe your buddy and he has to observe you. You have to constraint your activities to fit in with his and vice versa. Yet, at the same time you want to maintain that variety and rapidity we were talking about.

Okay, what about tradeoffs? Inversely related characteristics, in other words if I tend to highlight something that means I subdued something else. It's automatic. So, you made a tradeoff today right now, you're in this presentation whether you wanted to be here or not. So, we're highlighting that. Sometimes we do it informally. We sometimes highlight certain kinds of things because of orientation. Other times we do them in a very formal sense like designing airplanes. We highlight certain things instead of doing others. We all do. That's very normal. There's nothing wrong with it.

Then Hans Rudel [unintelligible] of course he's a human being.[10] Many of you probably heard about him, Stuka pilot during World War II. He flew over 2,000-something combat missions and destroyed over 500 Russian tanks, sunk a battleship, and was shot down 29 times. When he was flying at the end of the war, the last phase of the war, part of his leg was gone. He was all shot up. He was considered the greatest combat pilot of all time. He really was. And note what he, note this comment that I got here, image

[10] Hans-Ulrich Rudel was a preeminent Luftwaffe pilot on the eastern front in World War II. Flying close air support missions in both the Junkers Ju 87 Stuka dive bomber and Focke-Wulf Fw 190 fighter, Rudel was credited with the destruction of over 500 tanks and hundreds more vehicles, artillery pieces, and other ground targets. When Boyd collaborated on the development of the Fairchild Republic A-10 ground attack aircraft, he spoke with several *Luftwaffe* pilots about their close-air support experiences during World War II, including Rudel.

of activities and changes thereto. The reason why is we had him over in this country three different times, he's dead and passed away, we were interested in his experience, so we brought him over.

And one of the things he pointed out is, he said one time after he got shot down and lost his leg one time, a couple of times he left the front illegally and came back, is everything felt strange. He had to be able to get back into it so he could see what was going on. In fact, he developed that *fingerspitzengefühl*, the feel for the front, so you not only know where to go, but also so you can survive.[11] And he said, when you first come back you have problems, you're gonna go do things you shouldn't do, you're going to get hosed down, or you're going to make a mistake. He said the only way you can do it is that you have to keep up on it. It's all those interactions that are taking place, we call them interactions that take place.

And you're thinking, "What the hell's this damn Boyd doing?" I'm going to take you through it. What we're saying is, common frequencies here.

What are we talking about as we work our way down? First of all, what we find out as we work our way down here is we have to cross-reference from one thing to another. We have to relate from one thing that I call it cross-referencing. You have to cross-reference. Not only that, as you go down here, you're finding out, is it gets more and more subtle. You have what I call many-sided cross-references. And that's not so obvious as you go down here. It's called many-sided, I call it implicit, sort of hidden. Many-sided implicit cross-references.

And there's four components to it. You tend to project yourself into the situation. In other words, you tend to see it from your viewpoint. On the other hand, you want to be able to see it from the other viewpoint, which I call empathy. And next you want to find those things that correlate, remember what I said here, and reject that if it doesn't.

So, what we're really saying here, what this represents all these interactions here, is nothing more than a many-sided implicit cross-referencing process of projection, empathy, correlation, and

[11] See pp. 101–2 of "Patterns of Conflict" for Boyd's explanation of *fingerspitzengefühl*.

rejection. And to show you how powerful this is, let's take the negative. You have compartmentation, which intelligence people do, people who have rigid discipline to do that. You have disconnected bits and pieces. In other words, people aren't communicating across broad boundaries. And that's why you hear me talking about always be fluid, be able to go through that. Otherwise, you have an organization that can't function as an organic whole. That's why intelligence agencies [unintelligible] compartmentalization. By doing that, they tend to protect the overall picture even though the intelligence agency working them over only, they only got bits and pieces and they can't put together the overall picture. It's just natural. It's a security device.

Okay, noncooperative centers of gravity. Islands of disconnected effort. In other words, people aren't cooperating, and you have all this stuff going off in every direction. No interaction. That's why I call it negative.

Alienation, disconnected from other humans. If a person is alienated [unintelligible] now you can't function as a whole. The guerrillas play heavily upon that. What they're trying to do is they're trying to alienate the government from the people. *[25:00]* Once they've done that, the government has nothing to run, and they take over everything. We talked about it.

Non-adaptation, disconnected from the environment. In other words, now you're disconnected, you're not even tuned into the environment. You have to adapt to it, and you're no longer adapting. And fixed recipe. Now I'm talking about the 1791 *Drill Regulations*. Initially they were connected, but eventually they had this formal thing, they've been doing it for years, the environment's changed, now it's totally disconnected from the environment. They're going through some kind of formality that's not even related to what they should be doing. Okay?

[slide 11]

So, then here's the insight from the previous chart on what we were talking about: interactions shown represent a many-sided implicit cross-referencing process of projection, empathy, correlation, and rejection. That's what we're talking about. That's the common idea I'm trying to bring out of that previous chart. The common theme.

SLIDE 11

INSIGHT

Interactions, as shown, represent a many-sided implicit cross-referencing process of projection, empathy, correlation, and rejection.

SLIDE 12

SUSPICION

Seems as though this insight is related in some way to orientation, hence it . . .

?—RAISES THE QUESTION—?
What do we mean by orientation?

Now let's build upon it. But you say, "okay, Boyd, this is a bunch of crap." Okay, let's go into it and see what we can build.

[slide 12]

So, we have a little suspicion, we say when we're thinking about this, we say wait a minute, in some sense it seems just related to orientation. Hence, it raises the question: what do we mean by orientation? Let's see if we can link these things together and pull some things together here.

[slide 13]

And if you look at orientation, for a person or a team, we look at it as a result here, in terms of the images, views, and impressions in your head. And it's shaped by a number of things here: your genetic heritage, your genes. Your cultural traditions, your previous experiences, and it can be modified depending upon how adaptive we are by unfolding circumstances. By unfolding circumstances.

SLIDE 13

MESSAGE

Orientation, seen as a result, represents images, views, or impressions of the world shaped by genetic heritage, cultural traditions, previous experiences, and unfolding circumstances.

But there's another point here. The geneticist says we're hard-wired. We can't change that. Of course, we have guys working on it today where you'd be able to do that, in molecular biology and microbiology. You're hard-wired. In other words, there are certain ways we're shaped. Our personality exists because of our genetic structure. You can't change that.

Your cultural traditions—you can change that; but change it over a long period of time. That's not easy to change. Those are the preconceptions we have that are associated with our cultures, our world, and our family, our friends, and everything in it. Or in any institution like the Marine Corps or wherever you are. You're shaped by it, they're in your head. You make decisions on that basis. And your previous experiences, the things you learned at work; you say fine. Those things. Well, those things tend to do it. And the only way you can change is by unfolding circumstances. And what I'm trying to say is maybe we're not quite as adaptive as we think we're being adaptive.

And that's why when you set up a plan of operations, when you're going to want to use a deception plan, what you do is you try to understand your adversary and those preconceptions he has. You feed those preconceptions. In other words, you feed his biases. Because if you can feed his biases, you get enormous deception. It's why you do it. But we're not quite as adaptive as we think we are when you start gluing these things together and see it in a more whole sense. Okay?

Now, this raises another question. You know? How are these images, views, or impressions created?

SLIDE 14

?—RAISES ANOTHER QUESTION—?

How are these images, views, or impressions created?

SLIDE 15

MESSAGE

Referring back to our previous discussion, we can say: orientation is an interactive process of many-sided implicit cross-referencing projections, empathies, correlations, and rejections that is shaped by and shapes the interplay of genetic heritage, cultural tradition, previous experiences, and unfolding circumstances.

[slide 14]
[slide 15]

Now, we're going to line some things up. Now, instead of looking at it as a result, we look at the orientation as what I call an ongoing process or an interactive process. So really, orientation is an interactive process of many-sided implicit cross-referencing that is shaped by and shapes the interplay of genetic heritage, cultural tradition, previous experiences, and unfolding circumstances. That's what your orientation really is. You can look at it as a result, but it's really an ongoing process that's being tweaked and tuned. For some people who don't look at the outside world, then it becomes a result. They're hard-thinking in every way, they can't change. We call that kind of a person, what? Rigid. It's a rigid person. We use that word. Or dinosaurs. In other words, words that they don't like to hear. Okay?

SLIDE 16

ILLUMINATION

- Orientation is the schwerpunkt. It shapes the way we interact with the environment—hence orientation shapes the way we observe, the way we decide, the way we act.

In this sense

- Orientation shapes the character of present observation-orientation-decision-action loops—while these present loops shape the character of future orientation.

IMPLICATION

- We need to create mental images, views, or impressions, hence patterns that match with activity of world.
- We need to deny adversary the possibility of uncovering or discerning patterns that match our activity, or other aspects of reality in the world.

Now that being the case, so we want to make some [unintelligible] here's an illumination I want to bring out.

[slide 16]

And this is a very important chart. So, orientation is the *schwerpunkt*, or the driver or the main focus.[12] And the reason why is it shapes the way we interact with the world. It shapes the way we observe, the way we decide, and the way we act. In other words, you have a certain preconception. You don't look at the world any old way. You look at it a certain way. In other words, your orientation, your genes, your culture, and your previous experiences—it's the lens through which you look at the world. And each of us have their

[12] *Schwerpunkt* is a German term roughly translated for military use as main effort or focus of effort. Introduced to the military lexicon by Prussian officer and military theorist Carl von Clausewitz in *On War*, *schwerpunkt* has evolved in meaning but generally refers to an aspect of an operation that is considered to be decisive and thus weighted heavily in terms of troops and supporting resources required to ensure its success.

lens. And that lens captures some things, tends to highlight some things and subdue others. And for different people, they have different highlights and different things that are subdued. So, it really shapes the way of what you see from that world.

Let me give you an example. Some of you people have gone through and you read a book sometime in your life. You're very fascinated by this, "Goddamn, it's a hot book, I really liked that." Then four or five years later you go back and read it, and you get a totally different interpretation. It's the same book. What's happened? In the meantime, your orientation has changed. Now, you're highlighting and subduing different kinds of things. Same book!

That's why I hate approved solutions. You know, the instructor, he would say, "Okay, tell me what's in the book." He's got this cute little thing in his orientation he assumes, right? And everybody else has got a different one. So, they're wrong and he's right by the mere fact that he's an instructor. *[30:00]* It's totally a terrible way to do it. The point is people are going to highlight and subdue differently according to what they find out in orientation. The important thing is can they explain it, and does it make sense?

And a good example of that where you see people have different orientations, you heard of this old parlor game. You put 20 guys in a row, and you give a guy on the left a message. And you say pass that same message onto everybody else. And they're not even trying to distort. By the time it comes back, you say, "Christ. I didn't say that. That's not even close." At every level people have different orientations. They tend to highlight and subdue different things. So, after that accumulates for about 20 people, it's a different message.[13]

That should tell you something about chains of command in that too. It's the same thing. It's nothing malicious. Of course, if it's malicious, people can make it even worse. That's why you want to have

[13] Boyd is referring to the game of "telephone," in which the first player thinks of a simple message or phrase and repeats it solely to the person next in the game sequence. Once the message has been passed from player to player, the last player reveals the message and compares it to the original created by the first player. Although the goal is to attempt to pass the message around all players as accurately as possible, much of the game's enjoyment comes from seeing just how much the final message has diverged from the original.

as *few* intervening layers between what you're trying to do when you give an order to someone and somebody else, or you want to have it go down parallel paths so you can be sure that it's structured in the way that you intended. Okay.

So that's the key point of it. That's what I'm trying to say. The orientation then, is *you* as an individual. It's a repository of your genes, your culture, and your experience. It's *you* as an individual, it's a repository. So, orientation, so what I'm really saying is the second "O" in the OODA loop is the most important part. "Observe, orient"—the second O, because it shapes the way you observe, the way you decide, and the way you act. On the other hand, you can modify it by the mere fact that when you go through that OODA loop, you get some new experiences, which you can change your orientation. Of course, some people go through it, and they never change.

Audience: So really, your orientation will change what you observe.

Boyd: That's right. When you go through the loop, you see some other things there you hadn't seen before. You pick up a few things and you can get a new reorientation. So now what kind of—let me give you an example. So now, let's say we throw some events at a guy, and he's out of date in his orientation. Then in the next loop, he's disoriented. He gets disoriented further and further. We just grind the guy down, and he comes totally unglued. It's like a chain reaction. So, if we can go at a faster tempo, his orientation—the first one—he's going to be disoriented. Then he goes through again, and he's going to be further behind, further behind, further behind. Pretty soon, Christ, his observations, decisions, and actions are totally out of touch with what's going on out there. It's like a chain reaction.

So, the implication is very simple. What we want to do is, is we need to create mental images and views and impressions, hence patterns that match with the activity of the world. On the other hand, we want to deny our adversary that same opportunity. And a good example is during World War II. There's the so-called—. The British when they suborned all the German agents, it was called the double cross system. They were feeding back all this phony information to the Germans. And then coupled with that, they were able to fix in the German mind that we were going to come in the Pas de Calais area rather than the Normandy area. So, they put all their armies at the

Pas de Calais, and they held onto that image for over 30 days after we landed at Normandy. Incorrect impression of what was going on. That was a very, that was an outstanding strategic deception. Go ahead.[14]

Audience: That last bullet there, the implications. What you're talking about then is—were you trying—

Boyd: This bullet here?

Audience: —The one that's up from that—

Boyd: This one?

Audience: Yeah. Are you saying that what you're trying in terms of command and control, and what you're trying to design, is a way of looking at things that corresponds as closely as possible to reality?

Boyd: How can you guard against that? In other words, you want to get reality. How are you going to get reality? I already told you: make the many-sided implicit cross-referencing. If you don't look at things from many different viewpoints, and only look at the pyramid from one side, you're gonna have one view of it but you're not going to really know what a pyramid looks like. You have to look at things from several points of view. Do you see what I'm saying? In other words, you want to have a wide variety of sources you're gathering information to find out those things that hold together and those things that don't hold together. Many-sided, implicit. You got to always look for that. And when you say, "oh, that guy is bullshit," you just rejected information. You're going to need— "Ah horseshit, that's no good" [unintelligible] You don't even give the guy time to explain it.

Now part of it may be baloney, but a good part may be good if you would have listened carefully, you would have got some good nuggets out of that and used it. It's all right to make judgments. But

[14] Boyd is referring to Operation Fortitude-South. Undertaken by Britain and the United States in late 1943 during the World War II, Operation Fortitude-South was a subordinate deception effort to Operation Bodyguard, the strategic Allied deception plan intended to mislead German military leadership about the coming Allied invasion of Europe in 1944. Fortitude-South focused on the Pas de Calais coastal area of northern France. The deception plan included the creation of fake military formations, false radio traffic, and as Boyd noted, the use of double agents trusted by the Germans to disseminate false intelligence and divert German attention from the actual planned landing areas of the invasion.

you don't make them before the fact. You have to listen to everything carefully and get some discussion. Then you obviously are going to have to come to judge as to what fits and what doesn't fit, but not too early. Otherwise, you reject useful information.

But see, now in the Pentagon, meetings are held not to get information, but see who's going to be top dog in the meeting. So, they hurry off to some judgments, and they all look like assholes before it's over then. And make dumb things. Was the meeting, the purpose is trying to educate and learn something? Or was the meeting to find out who's the smartest guy by coming up with clever clips, or quips, or statements? *[35:00]* Or having a hidden agenda that they don't want to let the other people see? But they wouldn't do that, would they? The bureaucracy, you're goddamn right they would do it.

Audience: So, if I just capture something, where we're trying to go is when we write this manual, or this abstract it gives a view of the whole pyramid. Your efforts and what you have done is drawn upon a specialist if you will. And he, for whatever reason we've institutionalized, he's only looking at the one side in varying degrees. He never looked at a second side or anything like that.

Boyd: That's why you want to look at numbers. And that's why—in fact you're bringing up a very key point, and that's why there's a difference between what I call top-down and bottom-up command and control. And that's what the Packard Commission faces.[15] They only looked at the top-down. They always talk about smoothing the lines of communication [unintelligible]. From the bottom up, you have one chain of command going down. But then you want multiple channels coming up, so a guy can look at the different channels and cross reference, and therefore get a good picture of what's going on.

[15] Shorthand name for the President's Blue Ribbon Commission on Defense Management. This commission was created in 1985 by executive order of President Ronald Reagan and chaired by David Packard. Packard was a cofounder of the Hewlett-Packard information technology company and had previously served as the deputy secretary of defense under President Richard Nixon. When the commission was chartered, Packard acted as an advisor to the Reagan White House on defense procurement and management. The commission was created to address problems identified in the budgeting and procurement of defense materiel. Reagan implemented several of the commission's recommendations via executive order, and other recommendations were implemented via the legislation that became the Goldwater-Nichols Act, which reformed the Joint Chiefs of Staff system.

Audience: So, when the Commandant's going with the term—

Boyd: So, it's one down and many up. See, what do I mean by many up? Will each guy have his own little monopoly? No. No. If each guy has his own monopoly, then he's only going to pass up what he knows his boss wants to hear. You want to have competing channels of information going up, or different ones. And that way, so some people will be processing the same information, but they will have different viewpoints. Then you begin to see what is going on. See? It's very important. So many independent channels, not many different monopolies passing information up.

Audience: Back to the pyramid, the Commandant trying to get us away from the specialist into the generalist, with the fog, what is he actually talking? That's worth talking about, to be able to see the whole pyramid, and understand it.

Boyd: See, the argument I gave and what he's appealing to is—I don't think you were here. It was the first day. I said, look, too often—let's pretend there are people in this group and let them go over one more time. Let's say you people all your life—it's a simplistic argument. I'm trying to drive home a point. For one reason, you only got to see pyramids from the side. Hell, you would go through life thinking pyramids were triangles. Then let's say there's another group for some crazy reason who only got to see pyramids from the top. They would think it's a square with intersecting diagonals. Then let's say the two groups interacted. Each group would think the other one didn't know what the hell a pyramid was. And they're both talking only about a piece of it. Neither one has it all. And that's what happened.

You see a lot of the arguments of the Pentagon. Each guy is talking around, one guy has a piece, the other guy has a piece, they're talking about the same thing, but each guy thinks the other guy is wrong. They only got a small piece of it, not knowing that it fits into a larger picture. And that's why you have to make those many-sided implicit cross-references.

How many people—any physicists here? Did people study physics or science? Have you ever heard of the concept of symmetry? They talk about it a lot in modern physics. It's being able to find those things that remain the same when you look at it from many different points of view. In other words, those invariants, those constants.

SLIDE 17

ESSENTIAL IDEA

Patterns (hence, orientation), right or wrong or lack thereof, suggest ability or inability to conduct many-sided implicit cross-references.

?—RAISES QUESTION—?

How do we set-up and take advantage of the many-sided implicit cross-referencing process of projection, empathy, correlation, rejection that make appropriate orientation possible?

And that's what intelligent people try to do. They try to sift the information, and they say, "gee this thing keeps creeping up here and there. There must be something in there." Of course, you got to be careful. If the other guy knows you're doing it, he's going to probably set things up that way too. Insidious game. You got to reach down and be able to see those subtly. Okay, you got it? You see what I'm talking about here then? Okay?

[slide 17]

So, the idea is quite simple. Ability or inability to make those many-sided implicit cross-references. That's how you guard against it. You got to make those cross-references. So, how do we set up and take advantage of this process? So, the next chart's an important chart. I'll let you read it and then I'll comment on it.

[slide 18]

[long pause as audience reads slide]

Now note that first statement there. You want to take a group, they're all the same but they have different orientations, but you expose them to a variety of situations, so the person has an opportunity to see how the other people respond, do you see what I'm saying? So, you can build up an organic whole inside of that group. And

SLIDE 18

MESSAGE

Expose individuals, with different skills and abilities, against a variety of situations—whereby each individual can observe and orient himself simultaneously to the others and to the variety of changing situations.

?—WHY—?

In such an environment, a harmony, or focus and direction, in operations is created by the bonds of implicit communications and trust that evolve as a consequence of the similar mental images or impressions each individual creates and commits to memory by repeatedly sharing the same variety of experiences in the same ways.

BENEFICIAL PAYOFF

A command and control system, whose secret lies in what's unstated or not communicated to one another (in an explicit sense)—in order to exploit lower-level initiative yet realize higher-level intent, thereby diminish friction and compress time, hence gain both quickness and security.

when you do that, what it permits you to do then—in fact, I probably should've underlined "variety" here too—so they can not only observe and orient himself simultaneously to the others, and to the variety of changing situations. Because if you had different people doing it, then you'd never have a common focus so they can operate [unintelligible]. Okay? And that's why it's bad when you transfer people around as individuals, it's better to take groups.

That's what the Germans—remember, how many people read van Creveld's book *Fighting Power*?[16] Remember, that was the key idea. The Germans, what they do, instead of plugging in individuals, they would plug in units. Those guys were used to working with one another. But see, Personnel doesn't like that because it gives them less flexibility. So we run the Marine Corps, the Army, or the Air Force for the benefit of Personnel. *[40:00]* We don't let Personnel operate

[16] Martin van Creveld, *Fighting Power: German and U.S. Army Performance, 1939–1945*, 2d ed. (Santa Barbara, CA: Praeger/ABC-CLIO, 2007).

to the benefit of their Service. It's tough. It's tough on the assignments. Go ahead.

Audience: When we go back and talked about the, like in the 6-1A about maintaining all functions, maintaining all functions as we discussed the other day.[17] Isn't that the purpose of having, we talked about having different types of command posts—

Boyd: Yeah.

Audience: —command and control. One command post is the main command post where you have this information that comes up, you know, through channels, et cetera. But then we have other command posts, for example a forward CP [command post], which allows the CO or whatever to go out, and experience, and see the pyramid from a different side. I mean, isn't that why we have these? When you describe command and control systems—

Boyd: Well, that's why you don't want to have a guy– that's the result of World War I, where the guy was back there at the chateau, you know, trying to figure out what was going on. And that's why they got it back to the front so he can get a sense, he's making it, because the picture up front isn't going to be the same as the one from the rear—

Audience: —not necessarily—

Boyd: —and so if his decision would be related to the front, he should have some understanding as to what was going on out there so he would make the right decision. That's what you're saying.

Audience: Well, you know, a lot of times we say in our MAGTF, the commander shouldn't go forward because he's going to get into the GCE commander's business.[18] But is that really the purpose? Or is it more to see the pyramid from another side?

[17] Based on context the speaker seems to be referring to a military publication, but the specific manual is unclear.

[18] MAGTF refers to the Marine air-ground task force, which is the operational organization construct for the Marine Corps. Doctrinally, the MAGTF is normally comprised of four elements: the ground combat element (GCE), aviation combat element (ACE), logistics combat element (LCE), and command element (CE). MAGTFs are scalable formations that can be tailored depending on the contingency to which they expect to respond. The Marine expeditionary unit (MEU) is the smallest and built around an infantry battalion. The Marine expeditionary brigade (MEB) is a middleweight force built around an infantry regiment. The Marine expeditionary force (MEF) is the largest MAGTF and built around an infantry division.

Boyd: Well, the purpose of going up front and talking to your commanders is to get different viewpoints. You're talking about—

Audience: —is that many-sided implicit—

Boyd: —yeah. So, if you deprive that of the guy, then he's going to have a narrow perspective through which he's going to look at the world. That's exactly right. And that's why the Germans, that's why Guderian and the guys in the panzers, the officers would command from the front.[19] And they had, they had more general casualties than any other army in history because the general officers, they lost a lot of general officers because that's the way they were commanding. The Israelis are the same way, I might add.

Audience: The key then to developing thinking officers who are thinking Marines is to focus not on the decision or the action, but to focus on the orientation.

Boyd: Or—the orientation is really to keep the pressure. The orientation is related outward. In other words, it's an outward focus, not an inward focus. So, you can have the correct orientation.

Because your orientation shapes everything. If you have a crummy orientation, your observation will be crummy, your decision is going to be crummy, and so is your action. What you're trying to do is build up a relevant orientation where you're always looking—

[42:23]

[end of tape 1, side 1]

[start of tape 1, side 2]

[slide 19]

Boyd: What if we can't establish these implicit connections and bonds? Then what we're doing via similar images or impressions; in other words, people don't have exact same orientation, they have different experiences; but they have similar ones, at least, for certain kinds of situations so they can function as an organic whole. If they

[19] Heinz Guderian developed many of the tactics used successfully by Germany's mechanized forces at the outset of World War II. He directly commanded panzer forces during the invasions of Poland and France. In 1941, following the *Wehrmacht*'s failed attempt to capture Moscow, Guderian was relieved of command for pulling his forces back in direct contradiction to Hitler's orders. Thereafter, he held largely ceremonial positions in the German military until the end of the war.

SLIDE 19

?—RAISES THE QUESTION—?

What happens if we cannot establish these implicit connections or bonds—via similar mental images or impressions—as basis to cope with a many-sided uncertain and everchanging environment?

can't do that, they're not going to have a very good basis for coping with a many-sided uncertain and ever-changing environment. Okay?

So, let's look at that. I'll let you read this chart, and I'll comment on it.

[slide 20]

All right, here's where the danger comes in. Remember I said, the previous assumes interaction with both external and internal worlds. Now, let us assume, for whatever reason, in other words, we're fascinated by some new goddamn command and control system or procedure, nothing malicious; and we design it such that it hinders interaction with the external environment. In other words, we have to spend so much time working internal problems, we can't really look out the door. In other words, this implies a focus inward rather than outward. You remember what I said about pulling your adversary back inside himself; in many cases, people do it to themselves; you don't even have to do it, they do it to themselves.

Well, if you think about that, let's bring in some modern science from the nineteenth century, Darwin. The environment selects, it tends to select your behavior; you're trying to adjust to it. So, we're saying your ability or inability to interact and adapt to the exigencies of the environment, they select one in or out. Well, if you only work in the internal environment and the environment's selecting your behavior, then it's the internal environment, not the external environment. But it's the external environment you have to deal with. But bureaucracies, what do they deal with? The internal. Who's going to be where? Who's gonna be, the pecking order, who's going to get

SLIDE 20

ILLUMINATION

- The previous discussion assumes interaction with both the external and internal environment. Now, let us assume, for whatever reason or combination of circumstances, that we design a command and control system that hinders interaction with external environment. This implies focus inward, rather than outward.
- Picking up on this idea, we observe from Darwin that:
  - The environment selects.
  - Ability or inability to interact and adapt to exigencies of environment select one in or out.
- Furthermore, according to the Godel Proof, the Heisenberg Uncertainty Principle, and the Second Law of Thermodynamics:
  - One cannot determine the character or nature of a system within itself.
  - Moreover, attempts to do so lead to confusion and disorder. Why? Because in the "real world" the environment intrudes (my view).
- Now, by applying the ideas of Darwin, the Second Law, Heisenberg, and Godel to Clausewitz one can see that:

  He who can generate many non-cooperative centers of gravity magnifies friction. Why? Many non-cooperative centers of gravity with a system restrict interaction and adaptability of system with its surroundings, thereby leading to a focus inward (i.e., within itself), which in turn generates confusion and disorder, which impedes vigorous or directed activity, hence, by definition, magnifies friction or entropy.

the best perquisites, the nicest offices. They're all worried about that all the time. They don't have time to worry about the external world, therefore, they're not tuned into it.

And then if you look at some things we discussed before—the Gödel proof, the Heisenberg uncertainty principle, and the second law.[20] You cannot determine the character and nature of a system within itself. Proof: Gödel, Tarski, it's been proven many different

[20] Kurt Gödel (1906–78) was an Austrian logician, mathematician, and philosopher. His incompleteness theorem posited that the consistency of any system cannot be proved from within the system. Werner Heisenberg (1901–76) was a German physicist who influenced a number of modern scientific theories, including quantum theory, ferromagnetism, and subatomic particles. His uncertainty principle stated that the very presence of someone observing a system introduced an element of uncertainty into the system being observed. The second law of thermodynamics states that the entropy or disorder of a closed system will always increase over time.

times, modern chaos theory brings it out in a different way.[21] Not only that, but there's something else that comes out of it if you try to do it, attempts to do so lead to confusion and disorder. Because in the real world, the environment really does intrude; now, since you don't understand it, confusion and disorder.

So, we apply these ideas from Darwin, the second law, Heisenberg, and Gödel, and Clausewitz, that statement holds together. I'll let you read it. [Boyd refers to paragraph at the bottom of slide 20] [unintelligible] many noncooperative centers of gravity magnifies the friction. What happened? What it does is it restricts the interaction and adaptability of the system with its surroundings, thereby leading to a focus inward. Bang. Which in turn, generates confusion and disorder, which impedes vigorous or directed activity, hence, by definition, magnifies friction or entropy.

A good example of that: France 1940, when the Germans went through. The French tempo was much slower, they fell behind, so pretty soon, they start—not only that, the French generals, in order to protect themselves in history, started issuing ambiguous orders, which made the thing come apart even more so. They were totally unaware of what really was going on in a timely fashion, or how the time that everything was going; every time they sent something out, many times, it already took place. And all it was doing was breaking their system up further and further.

Audience 1: Sir, if I may just capture one thought, in our experience when you go up to the MEB and the MEF, the scope and the magnitude of the thing, we're looking inward and we forget about projecting outward toward the reality.[22] We talk about that, where the reality of the situation, we're overwhelmed, we're convinced to just eat ourselves.

Boyd: Go ahead.

Audience 2: Although it doesn't impact on a specific combat operation, I would suggest to you that our after action—

[slide 21]

[21] Alfred Tarski (1901–83) was a Polish-American logician, mathematician, and contemporary of Kurt Gödel. Tarski's undefinability theorem states that arithmetical truth cannot be defined in arithmetic, a clear parallel to Gödel's incompleteness theorem.

[22] The MEB and MEF are two different sizes of MAGTF; see note 18.

SLIDE 21

POINT

- Any command and control system that forces adherents to look inward, leads to dissolution/ disintegration (i.e., system comes unglued).

IN A MUCH LARGER SENSE

- Without the implicit bonds or connections, associated with similar images or impressions, there can be neither harmony nor individual initiative within a collective entity, therefore, no way that such an organic whole can stay together and cope with a many-sided uncertain and everchanging environment.

Or equivalently

- Without implicit bonds or connections, we magnify friction, produce paralysis, and get system collapse.

[recording appears to stop, then restart again shortly after]

Boyd: Okay. And so, then here's my point: any command and control that forces adherents to look inwards, leads to dissolution/ disintegration, in other words, the system literally comes unglued. In other words, when the squeeze comes on, it comes apart.

In a much larger sense, what I'm saying is without these implicit bonds or connections, associated with similar images or impressions, there could be neither harmony nor individual initiative within the collective entity. Therefore, no way such an organic whole can stay together and cope with a many-sided uncertain and everchanging environment. That's why you have to have a many-sided implicit process because environments are many-sided, uncertain, and unpredictable also. And narrow repertoires or a narrow focus doesn't allow you to come to grips with that. Or to turn it around equivalently, without implicit connections or bonds, we tend to pump up our friction, produce paralysis, and bring about system collapse.

And now, I want to talk, in fact this is the point to talk about

SLIDE 22

INSIGHT

The key idea is to emphasize implicit over explicit in order to gain a favorable mismatch in friction and time (i.e., ours lower than any adversary) for superiority in shaping and adapting to circumstances.

?—RAISES QUESTION—?
How do we do this?

Nifty Nugget and Proud Spirit, as examples, and particularly about looking inward. And that's exactly what that did, it looked inward. So, they laid out these huge procedures people had to go with, they never worked together before *[05:00]* so they're so busy going by the checklist, they can't adapt to the world. Well, then, if they try to adapt to the world, then they don't know how to work together because they've never done it before, so the whole thing collapsed away in a goddamn sea of anarchy. So, what did they do? They developed more elaborate methods for Proud Spirit, and it collapsed away even faster; they tried to sophisticate it even more.

How many people are here familiar with that? You've read the reports, you know what I'm talking about, right?

[slide 22]

So, here's the insight. It's to emphasize the implicit, because if you look at things explicitly, you can only handle so much; implicit, you can handle many channels in your head. Just think about when you first learned how to drive an auto, you had to worry about this, worry about this, follow the sequence. After you learn how, it's all *fingerspitzengefühl*, you can talk to people, you can do anything you want, you don't worry about how far you turn the wheel, whether you shove the steering column, I mean shove the shifting device, whatever it might be, manual or automatic where it's going to be; you can talk to people when you want.

You want to emphasize the implicit because it allows you to deal

with many things in a simultaneous sense; whereas when you do explicit, you're sort of forced to look at things in sequence. It's almost like a left/right brain kind of thing; with the left brain, you take a look at things in sequence; the right brain, you tend to pull it together, many things together at the same time; one's patterns, one's related sequentially. Step by step, or with the overall pattern.

So, you want to really generate, in order to gain a favorable mismatch in friction and time, obviously ours is lower, so you have superiority in shaping and adapting to circumstances. So, how do we do this?

[slide 23]

Another way of thinking about it—once again, what I'm trying to emphasize is suppress the tendency to build up explicit internal arrangements, because if you build the explicit ones, the guy takes so much time going down through that, he can't work the external problem. That hinders interaction with the external world. Instead, arrange settings so that leaders and subordinates alike are given the opportunity to interact with the external world and with each other.

And that was invented in the German war games; and when they conducted their *kriegsspiel* war games then, they would have the commanders there as well as the staff officers.[23] Of course, we attempted it a few years ago. I don't know if they've changed it or

[23] *Kriegsspiel*—German for wargame—refers to a tabletop game system first developed in Prussia in the late and post-Napoleonic period of the nineteenth century. *Kriegsspiel* used either modular terrain tiles or topographical maps, with military units represented by blocks, and movement and combat regulated by special rulers and dice. A unique aspect of *kriegsspiel* was a "fog of war" mechanic, whereby players could only see opposing units that their own units had revealed, with the game umpire the only person who knew where all units for both sides were across the game board. Based on the incomplete information visible on the game board, players would write down and submit orders to the umpire, who then adjudicated the results based on their complete purview of the game board, the rules, and their own professional military experience. The Prussian *kriegsspiel* evolved later in the nineteenth century to incorporate less rigid rules and remove the requirement for an umpire; and in the twentieth century, the term *wargame* came to encompass a wide variety of tabletop and computerized games. *Kriegsspiel*, however, is typically used to distinguish the first Prussian wargame framework from games that came later.

SLIDE 23

MESSAGE

- Suppress tendency to build-up explicit internal arrangements that hinder interaction with external world.

Instead

- Arrange setting and circumstances so that leaders and subordinates alike are given opportunity to continuously interact with external world, and with each other, in order to more quickly make many-sided implicit cross-referencing projections, empathies, correlations, and rejections as well as create the similar images or impressions, hence a similar implicit orientation, needed to form an organic whole.

Why?

- A similar implicit orientation for commanders and subordinates alike will allow them to:
  - Diminish their friction and reduce time, thereby permit them to:
  - Exploit variety/rapidity while maintaining harmony/initiative, thereby permit them to:
  - Get inside adversary's O-O-D-A loops, thereby:
  - Magnify adversary's friction and stretch-out his time (for a favorable mismatch in friction and time), thereby:
  - Deny adversary the opportunity to cope with events/efforts as they unfold.

not, they'd have just the staff officers, the commander'd be out on the golf course, and the moment the "real" war starts he'd get there; in the meantime, the staff officers now don't know the capabilities and limitations of the commander or vice versa, so you don't have an organic whole.

And the whole idea of holding these war games is so each guy can understand what the other guy is going to do so they're cohesive groups, so when they have to shift gears and the situation unfolds, the guy that knows how to do it, he's going to win, the other guy isn't. And that's why, in real exercises, the commander should be out on the field too, observing at the front and the rear and trying to suck that information from a number of things, so he could get the feel of the organization as well as the feel of the situation. And that way, they can make many-sided implicit cross-references of all this.

And why? Because they get a similar implicit orientation. Now, for the commander and subordinate alike, they will be able to diminish their friction and reduce their time and, of course, the whole

thing cascades. Each thing levers each other, just cascades, work downward on your adversary to pull that off.

How many of you have seen it, in exercises? A good example where the Marines did it beautifully was in Grenada, where Ray Smith had two companies, he made the Army look like a bunch of goddamn fools. They were all stuck and he's running all over the island doing as he pleased.[24]

Audience: Three companies.

Boyd: Was it three companies? I'm sorry. Were you in one of the companies?

Audience: Yes, sir.

Boyd: Oh, you know what happened. The other guys got stuck, you're racing all over. You were confused and disordered; the important thing is the other guy was more confused and disordered. That's where Clausewitz is wrong, he's trying to reduce his own confusion. No, don't worry about that; that's why you make night attacks. Because that's confusing, but as long as it's more confusing for the other guys, it's a damn good night attack.

And that's why it's good to train at that; that's what Terry Allen, infantry general in World War II, understood.[25] He'd give an operation, "We're going to leap off at night." They're going, "bullshit, my guys don't know how to fight at night. It's confusing." "Yeah, but the other guys would be more confused." And that is the name of the game.

So, you know exactly what you're going to do from one moment to the next. The important thing is you kept things going; the other

[24] MajGen Ray Smith commanded Battalion Landing Team, 2d Battalion, 8th Marines, as a lieutenant colonel during Operation Urgent Fury, the invasion of Grenada in 1983. The invasion of Grenada was undertaken by military forces of the United States and several Caribbean nations from 25–29 October 1983, following a coup against the sitting Grenadian government. Though the operation lasted only a few days, the American forces involved experienced significant problems with intelligence, communication, and coordination of Joint operations. These issues were part of the impetus for the reorganization of the Defense Department under the Goldwater-Nichols Act of 1986.

[25] During World War II, Gen Terry Allen commanded the 1st Infantry Division during North Africa and Sicily campaigns and later commanded the 104th Infantry Division during operations in France, the Netherlands, and Germany.

guys came unraveled. The Army says, "Boy, we're going to dig in here and fight the guy." Well, if you dig in to fight, you got to fight.

Remember what Patton said, "Don't give me that crap about holding your position; let the other guy worry about holding his. Hold him by the nose, kick him in the ass. When you're running across somebody, hold some of these guys up, and I want everybody rolling around the son of a bitch, going deep into his ear."[26] Rear, excuse me. But also into his ear. Right? Did I say it incorrectly?

Audience: Sir, it was very confusing; but apparently, they were more confused. [Laughter]

Boyd: And that's the whole point. As long as the other guy's more confused, that's the name of the game, right? *[10:00]* And that's what we're talking about.

[slide 24]

Okay. So, here's the key idea: to shape the character of all these things we talked about in the beginning. So, the implication is very clear: we want to set our system up that plays to and expands, rather than plays down and diminishes, the implicit orientation. That plays to and expands it.

[slide 25]

So, here's a comment: without orientation, there's no command and control worthy of the name. In other words, that's what it all hinges upon; that's what command and control's got to give you, that orientation so you can make the appropriate decisions and act.

Okay, what's that mean?

[slide 26]

[26] Gen George S. Patton served in the U.S. Army during the Pancho Villa Expedition of 1916, World War I, and World War II. He was a key figure in the Army's development of tank warfare doctrine after World War I. During World War II, he commanded Army forces during the invasion of North Africa, Sicily, and across France following Allied landings at Normandy in 1944. Based on the reputation Patton had gained from German leaders as an aggressive and effective combat leader, Patton was named commander of the First United States Army Group, an entirely fictional military formation used to deceive Third Reich leaders about the intended landing place for the Allied invasion of France. Patton was eminently quotable, as Boyd notes here, but also had a reputation for losing his temper—especially in two incidents in which he abused soldiers suffering from what today would be considered post-traumatic stress disorder—and had controversial views on both Germans and Soviet Russians following the war's end.

SLIDE 24

CIRCLING BACK TO THE BEGINNING

- We can see that implicit orientation shapes the character of:
  - Insight and Vision
  - Focus and Direction
  - Adaptability
  - Security

IMPLICATION

- Since a first rate command and control system should possess above qualities, any design or related operational methods should play to and expand, not play down and diminish, implicit orientation.

SLIDE 25

COMMENT

Up to this point we have shown orientation as being a critical element in command and control—implying that without orientation there is no command and control worthy of the name.

VERY NICE

But, simply stated, what does this comment and everything else we've discussed so far tell us about command and control?

And I've already made this point earlier, this illumination. This process represents what takes place during the command and control, in other words, the OODA loop represents what takes place. So, therefore, it means the OODA loop, in a sense, can be thought of as

SLIDE 26

ILLUMINATION

- The process of observation-orientation-decision-action represents what takes place during the command and control process—which means that the O-O-D-A loop can be thought of as being the C&C loop.
- The second O, orientation—as the repository of our genetic heritage, cultural tradition, and previous experiences—is the most important part of the O-O-D-A loop since it shapes the way we observe, the way we decide, the way we act.

IMPLICATION

- Operating inside adversary's O-O-D-A loop means the same thing as operating inside adversary's C&C loop.

being a command-and-control loop, in the sense that it's not only your personal command and control loop, but your overall command and control loop.

Not only that, but the second "O", orientation. As the repository of genetic heritage, cultural tradition, previous experiences, it's the most important part of the OODA loop because it shapes the way we observe, decide, and the way we act. So, operating inside of the guy's OODA loop means you're also inside his command-and-control loop. And some people call it the decision loop, but it's essentially the same idea.

So how do we get effective command and control?

[slide 27]

[slide 28]

Here's some historical snapshots. Napoléon's use of staff officers for personal reconnaissance. He would send them out, not only get it from his normal staffing, but get it from some other people so he's getting information from many channels, so he put it together

SLIDE 27

WHICH
?—RAISES THE QUESTION—?

How can we get effective command and control?

SLIDE 28

SOME HISTORICAL SNAPSHOTS

In responding to this question let us take a look at some evidence (provided by Martin Van Creveld as well as myself) that may help in this regard:

- Napoleon's use of staff officers for personal reconnaissance
- Moltke's message "directives" of few words
- British tight control at the Battle of the Somme in 1916
- British GHQ "phantom" recce regiment in WWII
- Patton's "household cavalry"
- My use of "legal eagle" and comptroller at NKP.

to get an overall picture of what's going on. So-called adjutant generals and special staff officers, he'd send them out there.

Moltke's message directives of few words is a good example because the German Army at that time, or the Prussian Army, regarded themselves as one family, he only sent a message out with 20 words and directive and they knew what to do, instead of these long, detailed reports. In fact, he was criticized for it by the Anglo-Saxons, by the Americans and British, "You can't run an army that way." Well, yeah not the way we did it, you can't; the way they did it, they could. Because they're directives, only about 20 words or so. They had that,

those shared experiences. Just like you're in a family, you know your brothers and sisters, you don't have to give a long explanation; they know you, so tell them one or two words and you're on your way.

British tight control at the Battle of the Somme. Christ, they had all these elaborate procedures laid out, fixed for a certain way, the situation changed, the whole thing went out of sync; and of course, the first day, they lost over 60,000 guys—or almost 60,000, including wounded. Very tight procedures.

Montgomery, in particular, during World War II had what he called a "phantom recce" regiment. They'd report directly back to this headquarters. No intervening. Not only trying to get a sense what the enemy's doing, but watching his own units too—friendly and enemy. Plus, he's getting his normal staff reports, getting intelligence reports, getting all the reports, glues that together, he's on top of the situation, many-sided implicit cross-references.

And Patton, he called it his "household cavalry," he did the same thing. Like he said, you didn't have to work too hard because he was getting that information, same way. Had HF radios, they're out there and they were looking at the enemy, our own people, plus you're getting normal—. He called it his household cavalry, reported directly to him. No intervening. In other words, he's trying to get what: the right orientation. If he's got the right orientation, then he can make the right decisions and right actions. And he's getting the right orientation because he's getting these multiple observations that help give him the right orientation. Many up; one down.

And I did the same thing when I was [unintelligible] over in Thailand, I was put in charge of the base because the whole thing was coming unglued and I'd done some other work and they liked my work. I didn't want to be the base commander, but I had no choice. After I was there a week, I sat down and cried, I couldn't believe they could let something turn to shit as much as they'd done; they'd gone through six or seven base commanders in two years. They said, "You only got a few months."[27]

So, I had two good people. One, I found out right away, it was my legal officer [unintelligible] and my comptroller. *[15:00]* And what

[27] Boyd's deployment in Thailand is summarized in Brown, *A New Conception of War*, 23–28.

I did with them, when I figured out what I had, I said "Item 1, you don't even leave the base without my personal approval, you can't even leave the base. And two, I want your deputy to run your shop, I want you out there all over the place, these are going to be my"—like Napoléon had his special assistants, I had them out there, and I said, "Make no notes, all verbal. I want you to talk to guys, figure out what's going on. If you start making notes they're going to clam up, you're not going to get a goddamn thing. And then every evening, you're going to come back and we're going to talk about what you found out that day."

Now, pretty soon, I can look like Nostradamus. Now, I can ask good questions because I'm getting information, because the whole set-up was designed so I was an emperor who had no clothes; and we talked about that the other day. That's why I liked the old saying, you've heard the old saying, "The emperor has no clothes," he's got no information. So, I was set up so this thing's designed so I don't know anything, so I have to redesign it so I can learn something.

Now, there's a danger when you do that, the guys say, "Well that's spies," when you're going down there, you know, "You're spying on me." In a sense, it is, however, there's an iron law you apply here: under no circumstances what you find out that way will ever be used for disciplinary information. Never. It's an iron rule. Because if they do, you'll lose the whole benefit. And if you don't observe that iron law, you'll tear your own organization apart. That's an iron law. If you can't do it, then don't do it. In the meantime, [unintelligible] you'll lose anyway.

How many people are reading all this new stuff in business? All these new things they're coming up with, they're talking about all these interconnecting nets at all levels looking at one another, go down, top-down, these good companies. Same thing. So, people at the top get a feel of what's going on at the bottom and vice versa. And that's how you build this organic whole.

In any case, my point on this is very simple, but before I make that point, I want to show you one more.

[slide 29]

Audience: Sir, can I capture one thought really quickly? The way we have the approach is, we're kind of hung up on this commander's critical information requirements, there's a happy medium there,

SLIDE 29

A RICHER VIEW
(A LA MARTIN VAN CREVELD—"COMMAND"—1982)

In the June 1967 War, "General Yashayahu Gavish spent most of his time either 'accompanying' units down to brigade level—by which, according to his own definition, he meant staying at that unit's command post and observing developments at first hand—or else helicoptering from one unit to another, again, in his own words, 'there is no alternative to looking into a subordinate's eyes, listening to his tone of voice'. Other sources of information at his disposal included the usual reporting system, a radio network linking him with three divisional commanders, which also served to link those commanders with each other, a signals staff whose task it was to listen in to the divisional communications networks, working around the clock and reporting to Gavish in writing; messages passed from the rear, i.e., from General Headquarters in Tel Aviv, linked to Gavish by 'private' radiotelephone circuit; and the results of air reconnaissance forwarded by the Air Force and processed by Rear Headquarters. Gavish did not depend on these sources exclusively, however, not only did he spend some time personally listening in to the radio networks of subordinate units (on one occasion, Gavish says, he was thereby able to correct an 'entirely false' impression of the battle being formed at Brigadier Gonen's headquarters) but he also had a 'directed telescope' in the form of elements of his staff, mounted on half tracks, following in the wake of the two northernmost divisions and constantly reporting on developments."

there's a philosophy that you can't overload the commander with information; but the reality of it is, there's got to be some kind of filter too. I go back to the exercise we had, Bob, observing—we were able to capture all that information but it never got to the key people because we were [unintelligible].

Boyd: Could you have done your job, or could Ray Smith and you guys have done your job, if you didn't understand what the guys below you—[recording appears to stop, then restart again shortly after]—change so those guys don't bumble into something they shouldn't; otherwise, he keeps his nose out of it. Not to command, but just to keep in touch.

Okay. Any comments? Okay, so, the key idea here is very simple. [slide 30]

You see our old friend in it, many-sided implicit cross-referencing process. That's what you're doing; you're doing it all the time, looking at that pyramid from many different sides. So, where does this lead us?

SLIDE 30

POINT

The previous discussion once again reveals our old friend—the many-sided implicit cross-referencing process of projection, empathy, correlation, and rejection.

?—RAISES QUESTION—?
Where does this lead us?

SLIDE 31

EPITOME OF "COMMAND AND CONTROL"

Nature

- Command and control must permit one to direct and shape what is to be done as well as permit one to modify that direction and shaping by assessing what is being done.

What does this mean?

- Command must give direction in terms of what is to be done in a clear unambiguous way. In this sense, command must interact with system to shape the character or nature of that system in order to realize what is to be done;

whereas

- Control must provide assessment of what is being done also in a clear unambiguous way. In this sense, control must not interact nor interfere with system but must ascertain (not shape) the character/nature of what is being done.

Implication

- Direction and shaping, hence "command", should be evident while assessment and ascertainment, hence "control", should be invisible and should not interfere—otherwise "command and control" does not exist as an effective means to improve our fitness to shape and cope with unfolding circumstances.

What I call the epitome of command and control. I'll let you read it.

[slide 31]

[long pause as audience reads slide]

SLIDE 32

ILLUMINATION

- Reflection upon the statements associated with the Epitome of "Command and Control" leave one unsettled as to the accuracy of these statements. Why? Command, by definition, means to direct, order, or compel while control means to regulate, restrain, or hold to a certain standard as well as to direct or command.
- Against these standards it seems that the command and control (C&C) we are speaking of is different than the kind that is being applied. In this sense, the C&C we are speaking of seems more closely aligned to leadership (rather than command) and to some kind of monitoring ability (rather than control) that permits leadership to be effective.
- In other words, leadership with monitoring, rather than C&C, seems to be a better way to cope with the multi-faceted aspects of uncertainty, change, and stress. On the other hand, monitoring, per se, does not appear to be an adequate substitute for control. Instead, after some sorting and reflection, the idea of appreciation seems better. Why? First of all, appreciation includes the recognition of worth or value and the idea of clear perception as well as the ability to monitor. Moreover, next, it is difficult to believe that leadership can even exist without appreciation.
- Pulling these threads together suggests that appreciation and leadership offer a more appropriate and richer means than C&C for shaping and adapting to circumstances.

So, the commander would shape but the other guys watch what's going on, but they don't involve; when you get into control when you're a commander, you're going to get contradictory information and the whole thing comes unglued. Make a big distinction. And of course, the implication is quite clear. The commander has to shape, I mean, has to interact so that people understand what's going on, so they know what his intent is and they're all playing equally. On the other hand, you don't want to have people controlling the thing but stay within broad guidance. Okay?

Now, some people are going to be dissatisfied with that, but there's another chart—you can skip the next one, it's just a different way of saying the same thing.

[slide 32]

So, let's bring some illumination on it, reflect upon it, you might object to it. Let's read these statements. Know what the definition "command" is, and what "control" is. In other words, we're talking about something a little bit different; in this sense, what we're speak-

SLIDE 33

?—RAISES QUESTION—?

Where does this lead us?

ing about is more closely aligned with "leadership," rather than command, and "monitoring ability" rather than control. To control, it means you're making these guys perform like automatons; you don't want to do that, you want to give them freedom of action *[20:00]* within an overall framework so they can realize the purpose.

The Air Force seems to recognize that. Any pilots here by any chance? Well, pilots have seen it where we have this goddamn argument between close control and broadcast control. In a close control, they try to tell you exactly what to do and it screws it up; so, pilots like the broadcast control, "Just give me the information; I'll do the job." That's what we're talking about.

Okay, when you take it even further; it's not quite there, allow me to take it even further. We're going to talk about appreciation. The reason I'm bringing up appreciation is because we're bringing value to it. Note these comments. Why? First of all, appreciation includes the recognition of worth or value. Moreover, next, it's difficult to believe you can even have leadership without appreciation. If you can't appreciate [unintelligible], how can you be a leader? You can't. It's not a sufficient condition, but it's a necessary condition. You can have appreciation and be a lousy leader; but without it, you won't be a leader. So, I'm really saying at the end of this, appreciation and leadership of a more appropriate and richer means than command and control for shaping and adapting to circumstances.

[slide 33]

So, to raise the point where does this lead us? And we'll modify that chart.

[slide 34]

Now, I want to talk to this before you start reading it; but note what I got there: appreciation and leadership. Command is what? Top down; and control is top down, where in the hell's the bottom-up?

SLIDE 34

APPRECIATION AND LEADERSHIP

Nature

- Appreciation and leadership permit one to discern, direct and shape what is to be done as well as permit one to modify the direction and shaping by assessing what is being done or about to be done (by friendlies as well as adversaries).

What does this mean?

- Appreciation, as part of leadership, must provide assessment of what is being done in a clear unambiguous way. In this sense, appreciation must not interact nor interfere with system but must discern (not shape) the character/nature of what is being done or about to be done;

whereas

- Leadership must give direction in terms of what is to be done also in a clear unambiguous way. In this sense, leadership must interact with system to shape the character or nature of that system in order to realize what is to be done.

Implication

- Assessment and discernment should be invisible and should not interfere with operations while direction and shaping should be evident to system—otherwise appreciation and leadership do not exist as an effective means to improve our fitness to shape and cope with unfolding circumstances.

Command and control, you have to have both bottom-up and top-down [unintelligible] command's top-down and control's top-down. It's not surprising [unintelligible] top-down viewpoint. Appreciation and leadership—appreciation tends to be bottom-up and leadership tends to be what? Top-down, based upon that appreciation. So, you got it going both ways; and how can you get appreciation without making many-sided implicit cross-referencing? There's no way.

So, now, it's organic, and that's when you have a so-called command-and-control system. It has to permit or has to feed this, what I call this appreciation and leadership idea; and if it doesn't feed it, it's a lousy system. If it doesn't permit it and feed that appreciation and leadership, it's a lousy system. So, you want to get both bottom-up and top-down, because command is top-down, and control is top-down. Okay. You go ahead and read it.

[long pause as audience reads slide]

Also, I don't talk about determining, I talk about *discern*; you can't

SLIDE 35

SUSPICION

The previous discussion suggests that the title "Organic Design for Command and Control" is not appropriate.

?—WHY—?

C&C represents a top-down mentality applied in a rigid or mechanical (or electrical) way that ignores as well as stifles the implicit nature of human beings to deal with uncertainty, change, and stress. (Examples: The Battle of the Somme, Evacuation of Saigon, Mayaguez Affair, Desert I, Nifty-Nugget and Proud Spirit C&C exercises, etc.).

RESOLUTION

With these thoughts in mind, I suggest that the following title more clearly reflects the spirit and content of this presentation.

determine what's going on, you sort of discern what's going on. *Determine* implies you know more than you know. Note how I changed that word; it was *determine* previously, now, I have discern. When you've determined something, you're implying you know more than you know. Like in your situation, you were sort of trying to discern what's going on, you really couldn't determine, all you wanted to be sure you weren't confusing orders [unintelligible]. Exactly right.

So, then you see, now we just inverted things with the same idea, except it's more fluid, more loose, more able to deal with a changing uncertain situation. Okay?

[slide 35]

So, it kind of leads to a suspicion. There's a reason I use quotes, why do I say this? Command and control represent the top-down mentality; remember, I said command's top-down, and control's top-down. The reason I use "electrical" is because we use all these electrical things now for command and control. It tends to stifle the implicit nature because they have to make everything in a standardized format, otherwise you can't use the system. And I'll give you a lot of examples.

Talk to your Commandant, General Gray, about when he was over in Saigon, the evacuation of Saigon, what a disaster that was, they tried to do it through these many centralized [unintelligible], and he said, "Bullshit, we're going to do it our own way."[28] They had to turn off the goddamn machine. They had to turn off the machine, they said all it was doing was confusing everything.

Audience: But yet, the Air Force colonel who was locked in and didn't have the orientation said everything was working smoothly.

Boyd: I know. Bullshit. You got to talk to General Gray, the guy who knew it all.

Audience: For sure that aspect of it, that's how they got the argument and the critique or something like that they were talking?

Boyd: That's exactly right. Some guys are saying it worked smoothly, but that was the people who weren't there. In other words, that's the general in World War I back in his chateau with his dolly and his glass of wine that didn't even see what the hell was going on the front; the same idea. Actually, I'm being a hardass to make a more dramatic effect; he didn't have a girl, obviously—or maybe he did, I don't know. *[25:00]* Point I'm trying to make, he was divorced—the point is they were divorced from what was going on, they were not tied into what was going on. And here, they thought they were controlling something, but they were controlling nothing. You're like the captain of the ship, he's at the wheel, the wheel's not connected up to the rudder, and the throttles aren't connected with the engine, and he thinks he's running a goddamn ship. He's running nothing. That was Weinberger, when he was in the Defense Department, I used to tell them, Weinberger at the Defense Department, he's at the wheel, but Christ, the wheel's not connected to anything, and the throttle isn't connecting anything, and he thinks he's running the Defense Department.[29] He wasn't running anything. And I might add he's not the only one. He's not the only one like that.

[slide 36]

[28] Gen Alfred M. Gray (1928–2024) was the 29th Commandant of the Marine Corps from 1987 to 1991. Among his achievements as Commandant was the publication of FMFM-1, mentioned above, which formally codified maneuver warfare as the Corps' capstone warfighting philosophy.

[29] Caspar Weinberger (1917–2006) served as secretary of defense under President Ronald Reagan, from 1981 to 1987.

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APPRECIATION AND LEADERSHIP

So, the resolution: with these thoughts in mind, maybe there's a better—really a better title for the presentation.

And basically, what we've been talking about here is what I call appreciation and leadership. That's what we've really been talking about, that's what the organic design is about. You have to have both the bottom-up and the top-down. So, you have—as a commander, you have to set your system up so you're always testing it, all the time, keep changing it, keep getting from different attributes, because that's going to give you that *fingerspitzengefühl*. And if you give people monopolies of information, when they get in trouble, they're only going to give you what you want to hear, therefore the very thing you need, you don't get. And that's why you want these multiple independent channels coming up. It's a crosscheck.

Because people have different perceptions. Even the German general staff—remember they used to have the general staff, the command channel went up separate from the regular command channel too. And the commanders hated that because they knew that this information was going to be different, and they complained about it and in the end, they said, "Well, that's right." And like Balck himself, he said, "Why do you think I went down to talk to the troops? Because I admired their cuisine?" He said, "No, because I tend to learn different things when I talk to them than I got at my headquarters and it was important that I know that."

[slide 37]

Okay. So, basically, this is what we've been talking about, and sharing my definitional chart here where I lifted these definitions out. Look at control, the one I really want you to look at there, because it's defined. It means the power or authority to regulate, restrain, or verify, usually against some standard. And it comes from medieval Latin, which actually means "checklist" mentality, control is

SLIDE 37

DEFINITIONS

- Understanding—means to comprehend or apprehend the import or meaning of something.
- Command—refers to the ability to direct, order, compel with or without authority or power.
- Control—means to have power or authority to regulate, restrain, verify, (usually against some standard) direct or command. Comes from medieval latin contrarotulus, a "counter roll" or checklist (contra, against plus rotulus, list).
- Monitoring—refers to the process that permits one to oversee, listen, observe, or keep track of as well as to advise, warn, or admonish.
- Appreciation—refers to the recognition of worth or value, clear perception, understanding, comprehension, discernment, etc.
- Leadership—implies the art of inspiring people to cooperate and enthusiastically take action toward the achievement of uncommon goals.

a checklist mentality, "contrarotulum," which comes out of medieval Latin. Whereas leadership is quite different.

So, the most important message I'm giving here is you've got to learn to get information from many different sources, so you get an overall picture of what's going on, so you get an idea what not only your own organization's doing or what it can do, but the situation you have to face up to. And it's crucial. In many of our command-and-control systems, it's everything they don't do, which I think is the reason they're not so good.

Any questions? Anybody? I said I would show you one wiring diagram like I promised. See, that's why when I went out—in fact, I went out to MITRE Corporation, which is responsible for a lot of the command and control. And I said, "All you guys are looking at is CME." I said the same thing to them, "You're not doing command and control, [unintelligible] you're just doing communications and wiring; that's not command and control. And if you don't understand

this, how do know you designed the right system?" "We really don't know." So, now I know, "You've just told me, you're designing a system you don't know if they're any good or not. That's great." So, you really want to test some of these models that you're going to use out there, and find out which ones seem to be easier to work through for the various people who are going to have to use the design.

So, they couldn't tell me what worked, and what circumstances would tend to hinder their process, and what circumstances would tend to help the process. Well, if that's the case, then what kind of a system are you getting?

Audience: A lot of our R and D efforts are designed to go out and get hardware.

Boyd: That's right; they're just all hardware-oriented.

Audience: I mean, say we have the human engineering aspects, but in actuality, it's just one system feeding another problem. Do we have the proper software that connects the two pieces of hardware? Because that's our main focus.

Boyd: Right. You don't want to let them do that to you; see, that hardware has to serve the people, not the people who serve the hardware; and we're letting the people serve the hardware, not the hardware serving the people. We've got that back-asswards. *[30:00]* That's what I'm trying to say.

[there is some cross talking and an audience question from a speaker too far away for the microphone to pick up distinctly]

And also, I brought out indirectly, which I also really emphasized, though I didn't incorporate in my briefing except I talked about the *fingerspitzengefühl*. But you can really characterize the German system, what I call their climate in which they operate in, into four components: Their Einheit principle, and "Einheit" means oneness, or organic, or mutual understanding, mutual trust. Their "Einheit", which stands for mutual trust, or understanding, or organic harmony; their *fingerspitzengefühl*, which is that instinctive feel we talked about, and then the—

[31:06]

[end of tape 1, side 2]

CHAPTER



Revelation

TRANSCRIBER'S NOTE

Unfortunately, there are no extant recordings of John Boyd offering commentary on this "presentation," which—at a single slide—is the shortest of his briefings. Yet, Boyd often used the snowmobile analogy, as readers will note in both "The Strategic Game of ? and ?," and "The Conceptual Spiral." Boyd clearly felt the analogy captured a sufficiently vital concept that he took the time to give it its own slide. As Frans Osinga noted, this "revelation" is a distillation of Boyd's recurring theme of requiring "both analysis *and* synthesis, destruction *and* creation, and creativity" (emphasis original) in striving for survival on one's own terms.[1]

[slide 1]

[1] Osinga, *Science, Strategy and War*, 219.

SLIDE 1

METAPHORICAL MESSAGE

- A loser is someone (individual or group) who cannot build snowmobiles when facing uncertainty and unpredictable change;

whereas

- A winner is someone (individual or group) who can build snowmobiles, and employ them in appropriate fashion, when facing uncertainty and unpredictable change.

CHAPTER



The Conceptual Spiral

Introduced by Frans P. B. Osinga

Sixteen years after completing the first version of "Patterns of Conflict," John Boyd finished "The Conceptual Spiral." This 38-page presentation reflects Boyd's wide interest in subjects far beyond the traditional focus of military history or strategic studies and focuses on uncovering survival mechanisms. It amounts to the equivalent of the essay, yet it is less philosophical and packaged in a more recognizable and accessible format. In fact, Boyd revisits his essay and reformulates the same argument but inserts illustrations from science, engineering, and technology, fields that, according to Boyd, are learning, self-correcting mechanisms. The themes he addresses echo his earlier work: the pervasive uncertainty as prime characteristic of life; the essence of combining analysis with synthesis and marrying induction and deduction; the importance of novelty, mismatches, and creativity; and the requirement to combine multiple perspectives to form adequate orientation patterns.

The title hints at the core argument, which is a reference to a book by Piaget that Boyd had read: survival mandates reveling in a continuous conceptual spiral of induction and deduction, of creation and destruction. Indeed, according to Boyd, in real life we are sur-

rounded by uncertainty, novelty, ambiguity, and everchanging environments. Therefore, adaptation depends on a continuous mental process of reorientation and analysis/synthesis in order to comprehend, shape, and adapt to an unfolding, evolving reality. The "Conceptual Spiral" stands for nothing less than a paradigm for survival and growth.

Where "Patterns of Conflict" extrapolates patterns for winning and losing—survival—from examples in military history that his audience would be familiar with, in this presentation he argues that outside of the military domain—the self-correcting and evolving systems of science, engineering, and the pursuit of technology—similar dynamics determine whether ideas and technologies thrive, are adopted, or become obsolete. In doing so he demonstrates again the similarities between the dynamics at play in disparate fields. It enhances, according to Boyd, the validity of his arguments unfolded in the essay and subsequent presentations and their relevance for strategy. It also substantiates his claim in "The Strategic Game" about the value of a multispectral and multidisciplinary approach for strategic thinking. Embedded is the message that in order to survive in a highly dynamic environment, in peace as much as in war, organizations need to embrace uncertainty and novelty.

Presentation: "Conceptual Spiral"
Place: Either Air War College or Air Command and Staff College, Maxwell Air Force Base, Montgomery, AL
Date: 25 September 1993
Transcriber's notes:

1. While the video files from which this transcript was generated did not have detailed labeling of when this brief was delivered, based on contextual comments throughout this presentation it is highly likely that this was delivered as part of the Spacecast 2020 project run by the Air Force in 1993. Several folders in the John Boyd collection at the Marine Corps History Division include materials from Spacecast 2020, including a speaker list that features Boyd on 20 September 1993 on the topic of "Destruction and Creation

Thinking." (See "Air University: SPACECAST 2020," Advisory Group Conference, John R. Boyd Collection, COLL/2062, box 19, folder 4, 24 January 1994, Archives, Marine Corps History Division, Quantico, VA.)

2. The transcriber could not identify by name or branch of Service any of the audience members (no class roster is included in the archived material). Given the framework under which the Spacecast 2020 study was conducted, it is highly likely that the audience consists primarily of Air Force servicemembers and affiliated civilians. Individual speakers are identified by the name "audience."

Speaker: —today, who comes to us all the way from Delray, Florida, Colonel John Boyd.

[audience applause]

Boyd: Thank you. Before we start, I want to ask a couple of questions: item one, how many people here have the—do you have a handout? No handouts? I know some of you people should have handouts. Okay, for the ones that don't have it, of course, we can't get it out now, you might want to get it later on. The reason why I say this is because in the handout, the people who have it, there are two basic items in there, one being the paper "Destruction and Creation," that's an essay form; and then one right behind it—you'll see if you about halfway through, you'll pick it up—a presentation called "Conceptual Spiral." Now, the "Destruction and Creation" is written very tight; I think it's 16 pages, if I recall, and I wrote that back in 1976 and was, in a sense, what really got me going into the kind of things I'm doing today, and the "Conceptual Spiral" was a take-off on that.

Together, what they really represent is basically what I call a foundation for vitality and growth or, in a more formal sense, what I call a foundation for comprehending, shaping, and adapting in an unfolding, evolving reality that is uncertain, ever-changing, unpredictable in a very formal sense. The difference between them—and they both talk about the comprehending, shaping, and adapting—in the second part is bringing out not only that uncertainty, not only that change and the unpredictability, but in a much deeper sense, at least

in some sense, the much deeper sense, why it has to be that way.

So, today, I will not be briefing on the "Destruction and Creation" per se; the presentation I'll be giving today will be on the "Conceptual Spiral." That's the presentation you see on the screen up there, that's what we'll be going through.

Before that, though, in order to get a sort of a feel for how you people are, except for the ones that have heard—I see some familiar faces here—except for the ones that have heard the presentation before, I'm going to ask a few questions and would you raise your hand. The first question I'm going to ask is how many people here are familiar with Isaac Newton or have heard about him or read about him? Well, I see almost all hands go up; that's not too surprising. How many people here have heard of Albert Einstein? That's another famous name. How many people here—I'm going to go in a different area now—how many people here have heard of Clausewitz? I'd be very surprised if you all hadn't heard or read about Clausewitz. And another one then, what about Sun Tzu? You should all probably have heard of Sun Tzu.

Now, let's switch gears and look in another area. How many people here have heard of Werner Heisenberg?[1] Few hands, but notice, very small minority. Now, I'm going to take you down to even a smaller minority. Remember the ones that have heard the presentation before, I don't want to see your hand. How many people here have heard of Kurt Gödel? Kurt Gödel.[2] Hardly anybody, guy in the back; it's even smaller. Now, I'm going to shift into a new area, and I'll explain why I'm doing this in just a minute; obviously, I'm doing this for a reason. The next two people I want to ask: how many people here

[1] Werner Heisenberg (1901–76), German physicist who influenced a number of modern scientific theories, including quantum theory, ferromagnetism, and subatomic particles. His uncertainty principle stated that the very presence of someone observing a system introduced an element of uncertainty into the system being observed.

[2] Kurt Gödel (1906–78), Austrian logician, mathematician, and philosopher. His incompleteness theorem posited that the consistency of any system cannot be proved from within the system.

have heard of Taiichi Ohno?[3] I'm talking about production manufacturing. Taiichi Ohno. Okay. I'll flip-flop it the other way: how many people here have heard of Henry Ford.[4] Everybody. But nobody's heard of Taiichi Ohno, I don't see any hands. How many people here have heard of Shigeo Shingo?[5] No hands. Well, he's done some phenomenal work, has a big impact today and you don't even know about him. Isn't that interesting. Henry Ford was quite a ways back.

The point that I'm making is these other people you haven't heard about had a very major impact upon the way we do business and I'm not talking about business and businesses only, but also in science, engineering, philosophy, and other areas too. And we're going to talk about that today. That's we're going to get into. I'm going to acquaint you with some people you haven't heard about and show you the impact; it's very important, and particularly for you people who are going to be in Spacecast, be-

[3] Taiichi Ohno (1912–90), Japanese industrialist and businessman credited with helping develop the Toyota Production System (TPS). The TPS is a management philosophy intended to smooth out inconsistencies and stressors in the production process that cause waste. This includes consideration of the human elements of production such as the workers, suppliers, and customers. Industrial concepts such as just-in-time production and lean manufacturing emerged from the TPS. Ohno wrote several books concerning the TPS and business management, including *Toyota Production System: Beyond Large-Scale Production* (New York: Productivity Press, 1988) and *Workplace Management* (New York: Productivity Press, 1988).

[4] Henry Ford (1863–1947), American engineer and industrialist best known as the founder of the Ford Motor Company. Ford led the industry in the construction and sale of affordable automobiles, beginning with the Model T. He also pioneered a number of labor and marketing innovations, including a daily wage that was double the average rate, a five-day work week, and car dealership franchising (the assembly line was also first introduced in Ford factories, though the concept came from internal Ford employees).

[5] Shigeo Shingo (1909–90), Japanese industrial engineer whose Japanese-language work in documenting and consulting on manufacturing practices eventually helped introduce concepts such as the TPS to English-speaking audiences.

cause I don't think Clausewitz is going to help you too much here.[6]

These other people can help, maybe not in a one-on-one situation, but in an indirect way can help quite a bit. That's what I want to bring out today. Before we do that, I got one more preliminary—a few more preliminary remarks. The first thing, there's three ways *[05:00]* by which you can insult me. Three ways. One is if you call me an "analyst." If you call me an analyst, you're telling me I'm a halfwit, I got half a brain. A second way you can insult me is if you call me an "expert." That means I got it all figured out and I can't learn anything new. You ever notice on TV, we always have these analysts and these experts? Got halfwits and people who got it all figured out—the talking heads, they talk about that. And the third way you can insult me is when you call me an analytical expert. Not only am I a halfwit, I still think I got it all figured out. That's the worst insult of all.

Now, to give you a feel why I say that, I'm going to take you through two thought experiments. The first thought experiment, some of you people have heard it before and you know what I'm going through, so don't tip anybody off. I want you all to imagine you're out on a ski slope. Now you all have different images, I don't care. I might have an image different than yours, couldn't care less. Store that image. Okay?

Now, imagine you're down in Florida—I happen to live there but I used this before I arrived there—that you're on an outboard motorboat, you might even be towing water skiers. Stow that image; you don't have to stow the water skier. We're going to have two more images and then we'll operate on it.

Third image. Let's imagine that it's a nice spring day, and you're out there riding on bicycles with other people. Store that image. Final image. Let's imagine you're a parent—some of you probably are—

[6] Spacecast 2020 was a study on space topics directed by the Chief of Staff of the U.S. Air Force. It leveraged students attending the Air Command and Staff College and Air War College at Maxwell Air Force Base during the academic year 1993–94. Participants were directed to identify and develop concepts for space technologies to support military operations in the twenty-first century. Boyd was one of several outside consultants brought in to share innovative perspectives with the study participants. See "Air University: SPACECAST 2020 into the Future," John R. Boyd Collection, COLL/2062, box 19, folder 6, Archives, Marine Corps History Division, Quantico, VA.

it's Christmas time, you take your son to a department store, young son—my oldest is like this way too—and you notice he's very fascinated by these toy tanks and tractors with these caterpillar rubber treads. Got it? Store that image. About this point you think, "Boyd's gone bananas," and maybe I have. But let's continue.

Now, let's operate on those images. Let's go to the first image: let's highlight the skis and subdue everything else. Hang onto the skis and subdue everything else. Second image, let's highlight the outboard motor and subdue everything else. Third image: let's lift off the handlebars off the bicycles; we'll hang on to those, subdue everything else. Final image: we'll highlight the rubber treads, hang onto those and subdue everything else.

Now, let's tote it up. You got skis, you got an outboard motor, we've got handlebars, we've got rubber treads, for those that haven't done it. Glue those together. What do you have, anybody?

Audience: A snowmobile.

Boyd: Precisely. But it wasn't there, now you got it. Isn't that amazing. You got a different domain.

Let's examine what we did, let's examine what we did there. So, out of the first image, we took a feature; in this case, happened to be the skis. In the second image, we took out a feature; and this is the case in every image, we took out only one feature. It doesn't mean you have to do that, but we did that. When you go from a whole down to its parts, what do we call that? Analysis. When we go from a whole to its part, that's called analysis. Then what did we do? So, we did analysis; in this particular case, four times. That's "analyses," plural.

Okay, then what did we do? In our mind's eye, we glued it all together and rendered the snowmobile, some people call it skimobile; either one's all right. We rendered that. What kind of a process do you call that? Anybody? That's right. We did synthesis; if we didn't do the synthesis, there's no snowmobile. So I'm asking you, what's your job in Spacecast? You've got to build snowmobiles. Metaphorically. You're going to have to look at different domains, pull this out, pull this out, pull this out, glue things together and do it in some kind of a compressed form so even the generals can understand it. Do you understand what I'm saying? Incidentally, that's something we used to always say in the Pentagon, "We got to make this so even the gen-

erals can understand it." So, it's not unusual. They knew it was being said too.

So, that's the point. So, the point is you do analysis and synthesis. *[10:00]* Now, you see why I get angry when a person calls me an analyst because I'm only a halfwit, I'm only doing half the job, I only got half a brain. You look at all these books—universities, authors, lecturers, et cetera put out—and they're always talking about deducing and analyzing, deducing and analyzing, which is another form of the process. They hardly ever use the word "synthesis"; they feel embarrassed to have to use it. I've heard people say, "Well, that's a synthetic argument." What the hell's wrong with that if it's a good argument? You've got to weave them together.

Now, let me give you a more subtle example—next thought experiment I'll give you a more subtle one—and some of these names will come up here. And the name that I asked you that you haven't heard of is I'm going to use first of all. A more subtle argument. We use three domains this time. The first one I'm going to talk about—thought experiment—is Kurt Gödel. Mathematical logician. 1931. Came up with what we call his two incompleteness theorems, of which I'll use the second one here. The second one using arithmetic of whole numbers, he proved one cannot demonstrate the consistency of such a system within itself [unintelligible]. In other words, you can't use the system's own workings to determine whether it's consistent or not. Period. Even though it's consistent, you still can't do it, can't do it that way. Doesn't mean you can't say it's consistent, but you're going to have to reach outside, that's the whole point. Got it? Hang on to that one.

Second one. The name I used, some of which you heard of, Werner Heisenberg, associated with the Heisenberg uncertainty principle. And the principle states very explicitly, "One cannot simultaneously determine the position and moment of a particle." Of course, the particle he's talking about is a subatomic particle, in other words, like electrons. You cannot do it simultaneously.

Now, there was a lot of discussion of that when that came out—that was 1927, I might add, when that came out; and particularly Bohr and Heisenberg were very much caught up in it, and they ex-

plained it, why that had to be that way.[7] It's because the phenomena of observation, the stuff you're using to observe things with, is no different than the phenomena being observed. In other words, you're using electrons and photons to look at electrons and photons. Well, if that's the case, isn't that a system examining itself? They're talking about electrons and photons where Gödel was talking about whole numbers. But what you see, then, that's also related to what Gödel was talking about.

Now, let's take the third one—well, if we take those two together before I make the synthesis. So, therefore, if we generalize that statement, we can say one cannot determine the character and nature of a system within itself—not just mathematical inconsistency and you're talking about other kinds of phenomena in quantum physics—one cannot determine the character and nature of a system within itself.

But now, let's fold in the second law, second law of thermodynamics.[8] In the most general sense, it states all observed natural processes generate entropy. How many people have heard of the second law here? I'm sure a lot of you have. Okay. It might state it differently, but I'm using the general statement. All observed natural processes generate entropy. And well, how do they describe entropy? Oh, they describe it many ways. Unavailable energy, incapacity to do work, confusion, disorder, equilibrium states, et cetera.

Okay. Now, let's examine that. So, what does a physicist do to wax eloquent? He says, imagine a closed system and we have the second law operating. And we'll do that. Let's say we want to operate inside of a closed system, we want to observe what's going on inside that system, figure out what the system's doing. Anything we do in that system, including observations, because it affects information theory, that means we're going to pump up the entropy. If that's the

[7] Niels Bohr (1885–1962), Danish physicist best known for developing the Bohr model of the atom. Although the Bohr model has been supplanted by newer models, its basic principles still stand and it is often used as an introductory model for students prior to the instruction of more advanced atomic models.

[8] The second law of thermodynamics states that the entropy or disorder of a closed system will always increase over time.

case, we're going to know less at the end of it than we do in the beginning. Closed system. Exactly right. That being the case then, since they closed it, that means you're using the system's own ingredients to examine itself, you being part of the system. So, that also fits with Gödel and Heisenberg, the second law.

So, in a very general way, folding all three together, you can say one cannot determine the character and nature of a system within itself; moreover, attempts to do so lead to confusion and disorder. Now, why would that be, you say? [unintelligible] blow that off.

Well, it turns out I used that concept. How many people have heard of the OODA loop here?[9] I've used that concept many years ago back in the '70s. I thought about that combined with other things; I don't want to get too much detail here because I got a presentation I got to go through here, but I want to give you some feelings how this works. And it occurred to me, because of some tests we'd run and many other things, that if that's the case, if I have an adversary out there, what I want to do is I want to fold my adversary back inside himself *[15:00]* so he can't really consult the external environment he has to deal with; if I can do that, then I can drive him into confusion and disorder, and bring about paralysis.

And, initially, when I stated, I said I'm going to do it in a temporal domain. In other words, as long as I can put him—if I can operate at a rhythm or tempo faster than he can operate at, well, he can't keep up with me; in effect, then, I fold him back inside himself. And if I do that, ball game. And you saw that in Desert Storm, you see in basketball games, I got a whole other bunch of stuff here, we see in many different areas. And it fits very directly: Gödel, Heisenberg, second law. Tarski, also; in linguistics, we find it in E. T.

[9] Boyd's shorthand for the observation-orientation-decision-action loop he developed as an output of his life-long exploration of conflict and competition. See Ian T. Brown, *A New Conception of War: John Boyd, the U.S. Marines, and Maneuver Warfare* (Quantico, VA: Marine Corps University Press, 2018), 116–19, 140–45.

Hall, cultural anthropology, and a whole bunch of different areas.[10]

We can't say it's not true. But then once again, if you only know military history, you're not going to see that; if you only know technology, you're not going to see that; if you only know mathematics, you're not going to see it; if you only know this, you're not going to see it. You got to know different things. We'll bring that up in the discussion here. And I can't overemphasize it. Not at all.

[slide 1]

Okay, having built that up, let's hop in the presentation. The title—you'll understand why I picked the title I did—next chart.

[slide 2]

Okay, note what I say there: "Make evident how science, engineering, and technology influence our ability—." Now, why would I even want to use that? Remember, mathematics, science, that's the most precise way we can look at the world. Now, if we see some problem areas in there, that means we're going to have larger problem areas elsewhere, aren't we?

So, the question is what can we learn from that, and what impact might that have elsewhere? In the Air Force, we know it's had a big impact: without airplanes, there's no Air Force. The Air Force tends to be very technology-oriented; in some cases, maybe too much in some areas, to its own detriment. I'm not saying you don't want technology, but sometimes we can do it badly.

But the reason why I'm looking at this, because if I can get some understanding there, maybe—and I've already given you some hints right now for those thought experiments I took you through—maybe we can get some insights in the way we can deal with the world, wherein we haven't been dealing with it as appropriate as we could have. Next chart.

[slide 3]

So, for openers, what I want to do is reexamine the abstract.

[10] Alfred Tarski (1901–83), Polish-American logician, mathematician, and contemporary of Kurt Gödel. Tarski's undefinability theorem states that arithmetical truth cannot be defined in arithmetic, a clear parallel to Gödel's incompleteness theorem. Edward T. Hall (1914–2009), American anthropologist noted for his development of proxemics, which studies the human use of physical space, and the impacts of population density on human communication, interaction, and social behavior.

SLIDE 1

CONCEPTUAL SPIRAL

SLIDE 2

FOCUS

To make evident how science, engineering, and technology influence our ability to interact and cope with an unfolding reality that we are a part of, live in, and feed upon.

SLIDE 3

FOR OPENERS

Let's reexamine our abstract

?—What do we find—?

Now, the abstract that I'm talking about here is the abstract that I have in my green book, which I call my green book, *A Discourse on Winning and Losing*.[11] What I'm going to show you in the next chart is

[11] Boyd is referring to a two-page abstract he wrote for his *Discourse on Winning and Losing*, a collection of briefing slides from several of his presentations that were assembled and bound in the Green Book he refers to here. It included the essay "Destruction and Creation" and the briefs "Patterns of Conflict," "Organic Design for Command and Control," "The Strategic Game of ? and ?," and "Revelation."

SLIDE 4

KEY PASSAGE

. . . the theme that weaves its way through this "Discourse on Winning and Losing" is not so much contained within each of the six sections, per se, that make up the "Discourse"; rather, it is the kind of thinking that both lies behind and makes up its very essence. For the interested, a careful examination will reveal that the increasingly abstract discussion surfaces a process of reaching across many perspectives; pulling each and every one apart (analyses), all the while intuitively looking for those parts of the disassembled perspectives which naturally interconnect with one another to form a higher order, more general elaboration (synthesis) of what is taking place. As a result, the process not only creates the "Discourse" but it also represents the key to evolve the tactics, strategies, goals, unifying themes, etc., that permit us to actively shape and adapt to the unfolding world we are a part of, live in, and feed upon.

a key passage out of that abstract, a key passage, and then kind of give you an idea why that passage is key. Next chart.

[slide 4]

I'll let you read that passage, then I'll talk to it. As a matter of fact, that's the final passage in my abstract.

[long pause as audience reads slide]

Anybody, what idea do you see in that passage? The key idea is the game of analysis and synthesis, that's the key idea. And note what I say in that last sentence: "As a result, the process not only creates the 'Discourse,' but it also represents the key to evolve the tactics, strategy, goals, unifying things, et cetera, that permit us to actually shape and adapt to the unfolding world we're a part of live in, and feed upon." We can deal with that world out there; that's the game you play. I'm going to make it even more graphic as we go through the presentation. That's the game, and that's very important. I just took you through two thought experiments, that's what we're talking about. Next chart, please.

[slide 5]

SLIDE 5

?—WHY IS THIS PASSAGE KEY—?

- Because it suggests a general way by which we can deal with the world around us.

More specifically we shall show that:

- By exploiting the theme contained within this passage and by examining the practice of science/engineering and the pursuit of technology we can evolve a conceptual spiral for comprehending, shaping, and adapting to that world.

So, I say, why is this passage key? And I've already sort of suggested it, because it suggests a general way in which we deal with the world around us, or more specifically, by exploiting the theme contained in that passage—that's what we're talking about so far, is that theme—and examining the practice of both science, engineering, and the pursuit of technology, we can evolve a conceptual spiral—and I'll explain later why we call it a conceptual spiral—for comprehending, shaping, and adapting to that world. First of all, we got to comprehend the world, get new information, sense and shape our view of that world. And then because we're acting upon that world, we also have to adapt to it too; *[20:00]* in fact, in some cases, because we're changing the world itself, then it has a changed characteristic, then we got to change our characteristics of the way we're going to deal with it. So, it's one of those incestuous feedback processes in some sense. That's the way it works.

[slide 6]

Okay, next chart. Now, if we're going to use this, I want to sort of have a common ground of where we want to be. So, what I'm saying in the last sentence, in speaking of science, engineering, and

SLIDE 6

NOW

If the practice of science/engineering and the pursuit of technology are going to be a key for unveiling this "conceptual spiral,"

we should ask ourselves:

In speaking of science, engineering, and technology what do we mean?

technology, what do we mean? I want to have a common departure point. We're going to expand upon that departure point in a different way. So, the next chart, we get that common departure point.

[slide 7]

So, I have this, I call this my simple-minded message. That'll be evident as we go through because, as I get down toward the end, I'm going to modify the message. So, what I say here: science can be viewed as a self-correcting process of observation, hypothesis, and tests. That's not really a unique statement; other people have said it in a very similar way. So, science really is a process; not just a result, it's a process. But you make observations, you hop out hypotheses, you test those hypotheses, you might find out it didn't quite hold up and you got to go back through and reobserve, rehypothesize, retest until finally, it seems to fit, and you say you got a working one. At the point when you have a working hypothesis, you say now we'll declare it a theory, it seems to work. Yet, some people have theories before they have hypotheses, which means that's baloney because if it's untestable, they don't have much of a theory, at least from a scientific viewpoint. And likewise in engineering, except when we're talking about design, you're trying to render some kind of a design.

And then technology, which flows out of that, can be viewed as the wherewithal or state of the art produced by that, all that activity.

SLIDE 7

SIMPLE-MINDED MESSAGE

- Science can be viewed as a self-correcting process of observation, hypothesis, and test.

whereas

- Engineering can be viewed as a self-correcting process of observation, design, and test.

while

- Technology can be viewed as the wherewithal or state of the art produced by the practice of science and engineering.

We talk about new ideas, new materials, new systems, et cetera. Or even new processes.

And then, with those new things, it causes us to look at the world a different way, then therefore we generate even better observations or new kinds of observations, new hypotheses, new tests, new designs, et cetera. So, it's one huge, cascading feedback loop that it's feeding on. That's exactly what it is. Okay? Next chart.

[slide 8]

Now, what I'm interested in, if this stuff is so fantastic, and it's done so much for us—could be good or bad—then I'm kind of interested in the results. What did they pump out; what is that output? Like I'm always output-oriented. Now, let's examine that output, and what does that output tell us? What has it given us or done for us? That's what I want to know, what has it given us and done for us. I want to look at the output. And in the next four charts, we're going to look at some of them. Next chart please.

[slide 9]

SLIDE 8

?—RAISES QUESTION—?

What has the practice of science, engineering, and the pursuit of technology given us or done for us?

SLIDE 9

EXAMPLES FROM SCIENCE

Some Outstanding Contributors	Contributions
• Isaac Newton (1687)	• "Exactness"/predictability via laws of motion/gravitation
• Adam Smith (1776)	• Foundation for modern capitalism
• A. M. Ampere/C. F. Gauss (1820s/1830s)	• Exactness/predictability via electric/magnetic laws
• Carnot/Kelvin/Clausius/ Boltzman: (1824/1852/ 1865/1870s)	• Decay/disintegration via second law of thermodynamics
• Faraday/Maxwell/Hertz (1831/1865/1888)	• Union of electricity & magnetism via field theory
• Darwin & Wallace (1838/1858)	• Evolution via theory of natural selection
• Marx & Engels (1848–1895)	• Basis for modern "scientific socialism"
• Gregory Mendel (1866)	• Inherited traits via his laws of genetics
• Henri Poincare (1890s)	• Inexactness/unpredictability via gravitational influence of three bodies

So, we'll look at science first and I have two charts on that. And note where I start, Isaac Newton.[12] Remember I asked you that, everybody is familiar with Isaac Newton. And what are his contributions? Exactness, predictability by his laws of motion and gravitation? What happened? What did he basically do? Prior to Newton, they thought

[12] Isaac Newton (1643–1727), English polymath with contributions in mathematics, physics, and astronomy.

there were certain kind of laws that applied to people on Earth; there were different kind of laws that provided in the heavens or out there in the cosmos. And so, what he did, he showed the same laws apply in the cosmos as well as on earth. It was called, as a matter of fact, the grand—note the word—it wasn't called the "grand analysis," but the "grand synthesis." Newton's grand synthesis. Okay?

Then you got Adam Smith.[13] You're familiar with him, the foundation of what I call modern capitalism. Then you got Ampere and Gauss.[14] Note that. Exactness/predictability via electric/magnetic laws; you had electric laws, had magnetic laws, hadn't joined them at that point; they were separate. Then we got Carnot, Kelvin, Clausius, Boltzmann, and we already talked about decay and disintegration via the second law of thermodynamics, and the dates indicated.[15] Then we got Faraday, Maxwell, and Hertz, oh very interesting, union of electricity and magnetism by a field theory, today we call it the Electromagnetic Theory.[16] In other words, second grand synthesis, which Faraday came up with the idea of fields; Maxwell put it together in his four equations, and then Hertz came up with a critical experiment to demonstrate, "Hey, guys, it's true. It works." And today, it's very fundamental to many things we do today in many areas, very fundamental kind of stuff.

Okay, and then you've got Darwin and Wallace, evolution via theory of natural selection.[17] Then you've got Marx and Engels.[18] And

[13] Adam Smith (1723–90), Scottish philosopher and economist.

[14] Andre-Marie Ampere (1775–1836), French mathematician and physicist Johann Carl Friedrich Gauss (1777–1855), German physicist, mathematician, and astronomer.

[15] Nicolas Leonard Sadi Carnot (1796–1832), French physicist and military engineer; William Thomson, first Baron Kelvin (1824–1907), British engineer, physicist, and mathematician; Rudolf Julius Emanuel Clausius (1822–88), German physicist and mathematician; and Ludwig Eduard Boltzmann (1844–1906), Austrian physicist and mathematician.

[16] Michael Farady (1791–1867), English physicist and chemist; James Clerk Maxwell (1831–79), Scottish physicist and mathematician; and Heinrich Rudolf Hertz (1857–94), German physicist.

[17] Charles Robert Darwin (1809–82), English geologist, naturalist, and biologist; and Alfred Russel Wallace (1823–1913), English geographer, anthropologist, naturalist, and biologist.

[18] Karl Marx (1818–83), German political theorist, economist, and socialist; and Friedrich Engels (1820–95), German philosopher, political theorist, and socialist.

some people object to that, they say "what the hell, Boyd, what did you put that in there for? It didn't work." Basis for modern scientific socialism, just because it didn't work doesn't mean they didn't try it. They had some observations, they had hypotheses, we ran the test over 70 years, and it bombed out; didn't make it. It's their term, not mine, they call it "scientific socialism," but it didn't work out. Sort of a painful experience, *[25:00]* but we went through it.

Then we got Gregory Mendel, laws of genetics, you all heard about that. Then you got Henri Poincare.[19] Inexactness. He did other things too, but I'm pointing at this one in particular. Inexactness/unpredictability via a gravitational influence of three bodies. Remember what Newton did, he was always looking at two bodies. This was three bodies. And what he found out, what they were trying to do from Newton on, they want to get what they call a closed-form, an exact solution. Poincare proved you can't do it when you have three or more bodies. No way, Jose. Cannot be done. Cannot get those closed-form solutions, it's an open solution.

Now, they have ways of dealing with it, but not exactly. There's unpredictabilities associated with it. Okay. Sort of keep that chart in mind. Next chart.

[slide 10]

Now, we're up to twentieth century. We got Max Planck; date indicated.[20] Now, we're beginning—discreteness/discontinuities via his quantum theory; in other words, things just didn't—one thing just didn't flow nicely into something else, you get hops, skips, jumps, that kind of stuff, begin to show up.

Albert Einstein put it all nice back together again via his special and general relativity theory. Then we have these next guys that came along—Bohr, de Broglie, Heisenberg, Schrödinger, Dirac, and still going on to the present day, that's why I call it "et al."[21] Uncertain-

[19] Gregor Johann Mendel (1822–84), Austrian biologist, mathematician, meteorologist, and Augustinian friar; and Jules Henri Poincaré (1854–1912), French engineer, physicist, and mathematician.
[20] Max Karl Ernst Ludwig Planck (1858–1947), German theoretical physicist.
[21] Louis Victor Pierre Raymond, seventh Duc de Broglie (1892–1987), French theoretical physicist; Werner Karl Heisenberg (1901–76), German theoretical physicist; Erwin Rudolf Josef Alexander Schrödinger (1887–1961), Austrian-Irish theoretical physicist; and Paul Adrien Maurice Dirac (1902–84), English theoretical physicist and mathematician.

SLIDE 10

EXAMPLES FROM SCIENCE

Some Outstanding Contributors	Contributions
• Max Planck (1900)	• Discreteness/discontinuity via his quantum theory
• Albert Einstein (1905/1915)	• Exactness/predictability via his special & general relativity theories
• Bohr/de Broglie/ Helsenberg/Schrodinger/ Dirac/et al (1913/1920s ...)	• Uncertainty/indeterminism in quantum physics
• L. Lowenheim & T. Skolem (1915–1933)	• Unconfinement (non-categoricalness) in mathematics & logic
• Gödel/Tarski/Church/ Turing/et al (1930s . . .)	• Incompleteness/undecidability in mathematics & logic
• Claude Shannon (1948)	• Information theory as basis for communication
• Crick & Watson (1953)	• DNA spiral helix as the genetically coded information for life
• Lorenz/Prigogine/ Mandelbrot/Feigenbaum /et al (1963/ 1970s . . .)	• Irregularity/unpredictability in nonlinear dynamics
• G. Chaitin/C. Bennett (1965/1985)	• Incompleteness/incomprehensibility in information theory

ty/indeterminism in quantum physics. Uncertainty/indeterminism, you can't pin things down. End of the nineteenth century.

Then you've got Lowenheim and Skolem, dates indicated, unconfined or what I call noncategoricalness in mathematics and logic.[22] Let me explain that: basically, they came up with the idea that you just cannot make mathematical statements and say it's unique only to that system; you can say it's unique to that system, but not only; those things can leak out and go in different areas. Just like we built snowmobiles and took things off here, things off here and it leaks out. Same thing happens in mathematics and logic.

Now, they use the term *noncategoricalness*. I tend not to like that term, so I use the word *unconfinement*, I like that better. You really can't confine things, you can't say that. Okay?

[22] Leopold Lowenheim (1878–1957), German mathematician; and Thoralf Albert Skolem (1887–1963), Norwegian mathematician.

Gödel, Tarski, Church, and Turing.[23] I already talked about Gödel, incompleteness/undecidability in mathematics and logic. Gödel did it in mathematical logic, Tarski also did it, and there he also showed, in natural languages, you have the same problem. Many of you people have had computer science and obviously heard of the Turing machine and all that work that Turing did. How many people here have heard of Turing? I'm sure many of you have. So, we see it there.

Then you got Shannon, 1940.[24] Information theory as the basis for communication; and interestingly enough when Shannon came up with information theory, he derived an interesting equation. Came up with one. He looked at that equation and he says, "Isn't that interesting?" Then he noticed that it had the same—it was the same equation that Boltzmann and guys came up with in the second law of thermodynamics. So, in a sense, he was tying information theory to the second law; as a matter of fact, in information theory, they used the idea of what? Entropy. Exactly. Exactly. Sometimes, they call it Gibbs entropy too, but they used the term "entropy." Okay? Then you've got Lorenz, Prigogine, Mandelbrot, Feigenbaum, and a whole bunch of other guys since the '60s and '70s and still going on.[25] What we call nonlinear dynamics. And today, anybody, what's the buzzword they use today to describe that? Chaos theory. It's a mistake. It's not that you don't have chaos—chaos may be in nonlinear dynamics and it may not; sometimes, it goes chaotic, sometimes not.

And so, the reason why they chose chaos is because they're trying to suck out money from the government and other people. That was a buzzword and you want to get the right words so you can get more money from people; in fact, the guy admitted that. He said, after all, we got to survive too. He didn't say it exactly that way, but that was clear what he was talking about.

[23] Alonzo Church (1903–95), American philosopher, computer scientist, logician, and mathematician; and Alan Mathison Turing (1912–54), English biologist, mathematician, computer scientist, cryptanalyst, and logician.
[24] Claude Elwood Shannon (1916–2001), American cryptographer, mathematician, computer scientist, and electrical engineer.
[25] Edward Norton Lorenz (1917–2008), American meteorologist and mathematician; Viscount Ilya Romanovich Prigogine (1917–2003), Belgian physical chemist; Benoit B. Mandelbrot (1924–2010), French-American polymath and mathematician; and Mitchell Jay Feigenbaum (1944–2019), American mathematical physicist.

PR [public relations]. They use PR too. Okay. And then you've got Chaitin and Bennet, incompleteness/incomprehensibility in information theory.[26] As a matter of fact, what Chaitin calls algorithmic information theory, he was demonstrating the same things that Gödel demonstrated in mathematical logic. It was also in information theory.

Now, if I reach back up and look at Tarski up there, he was demonstrating those same kinds of things in natural languages. So, it goes to many different areas, so it can't be ignored. The question I have to ask you now: what's the difference between this chart and the preceding chart? Anybody? Take the whole chart.

Okay, I'll broaden it. In the previous chart, what are they trying to do: they're trying to put everything in a nice, neat package; *[30:00]* in the second chart, they blew the package apart. Not that neat. First chart, you've got neatness; here it's got very un-neat. Or as he was saying, indeterminate—in other words, "determined" is very neat cause-and-effect relationship. Here, you get cause-and-effect relationships, but they're very un-neat. It's not what you call strict determinism. There might be some of it there, there's a lot of stochastic processes there you can't even tie back to the determinant. So, one's neatness, one's sort of un-neat. So, the more we look at the world, the more we find that out.

So, you people then were familiar with Newton than Einstein, you were putting neatness—you weren't familiar with the un-neatness. Uncomfortable. But that's the world we got to deal with. It's the world you've got to deal with. I want to make you uncomfortable, because then you're going to have to do something. Okay, next chart.

[slide 11]

Now, look at engineering. Note the first one: Savery, Newcomen, and Watt.[27] Steam engine; date's indicated. Stephenson , steam

[26] Gregory John Chaitin (b. 1947), Argentine-American computer scientist and mathematician; and Charles Henry Bennett (b. 1943), American information theorist and physicist.

[27] Thomas Savery (1650–1715), English engineer and inventor; Thomas Newcomen (1663–1729), English inventor; and James Watt (1736–1819), Scottish chemist, inventor, and mechanical engineer.

SLIDE 11

Some Outstanding Contributors	Contributions
• Savery/Newcomen/Watt (1698/1705/1769)	• Steam engine
• George Stephenson (1825)	• Steam railway
• H. Pixii/M. H. von Jacobi (1832/1838)	• AC generator/AC motor
• Samuel Morse (1837)	• Telegraph
• J. N. Nieqce/J. M. Daguerre/Fox Talbot (1839)	• Photography
• Gaston Plante (1859)	• Rechargeable battery
• Z. Gramme/H. Fontaine (1869/1873)	• DC generator/DC motor
• Nicholas Otto (1876)	• 4-cycle gasoline engine
• Alexander G. Bell (1876)	• Telephone
• Thomas A. Edison (1877)	• Phonograph
• Thomas A. Edison (1879)	• Electric light bulb
• Werner von Siemans (1879)	• Electric locomotive
• Germany (1881)	• Electric metropolitan railway
• Charles Parsons (1884)	• Steam turbine
• Benz/Daimler (1885/1886)	• Gasoline automobile
• T. A. Edison/J. LeRoy/T. Armat/et al (1890–1896)	• Motion-picture camera/projector
• N. Tesla/G. Marconi (1893/1895)	• Wireless telegraph
• Rudolf Diesel (1897)	• Diesel locomotive
• Italy (1902)	• Electric railway

railway.[28] Pixii and Jacobi, AC generator and AC motor.[29] Note the dates, very early in the nineteenth century. And then you got Samuel Morse, you're all familiar with that, learned that in high school or grade school, telegraph.[30] Niepce, Daguerre, and Talbot there, photography.[31] And then you look at Plante, first rechargeable battery; Gramme and Fontaine, DC motor; Otto, four-cycle gas engine—very important, what do we have in our automobiles today, four-cycle

[28] George Stephenson (1781–1848), English mechanical and civil engineer.
[29] Hippolyte Pixii (1808–35), French instrument maker; and Moritz Hermann von Jacobi (1801–74), German-Russian physicist and electrical engineer.
[30] Samuel Finley Breese Morse (1791–1872), American painter and inventor.
[31] Joseph Nicephore Niepce (1765–1833), French inventor; Louis-Jacques-Mande Daguerre (1787–1851), French artist, scientist, and photographer; and William Henry Fox Talbot (1800–77), English scientist and inventor.

gasoline engine.[32] Very important idea. And then you got Alexander Graham Bell, the telephone.[33] Then you got Thomas Edison, the phonograph, puts on a recording.[34] Then you've got Edison again, electric light bulbs; Siemans, electric locomotive; Germany, electric metropolitan—in other words, they take a locomotive and make an electric metropolitan railway within the city; Parsons, steam engine; Benz/Daimler, gasoline automobile.[35] Look what we have today, now we've got automobiles, take the engine, put it in there. Horseless carriage, gasoline automobile.

Okay, then you got Edison, LeRoy, Armat, et cetera—I want to talk about this one, motion picture camera projector.[36] Could they have done that without photography? No. Could they have done it without optics? No. Could have done it without mechanics? No. Electricity, et cetera. In other words, they took different features, they made their snowmobile, took something here, something here, something here, and something here, glued it together. Result? Motion picture camera and projector; that was their snowmobile. Using my metaphor.

Tesla and Marconi threw the wires away, wireless telegraph.[37] Rudolf Diesel, diesel engine.[38] Now, we got steam, got electric, we got diesel, named after him. Italy, electric railway, 1902, between cities. Next chart.

[slide 12]

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[32] Gaston Plante (1834–89), French physicist; Zenobe Theophile Gramme (1826–1901), Belgian electrical engineer; Hippolyte Fontaine (1833–1910), French electrical engineer; and Nicolaus Otto (1832–91), German engineer.
[33] Alexander Graham Bell (1847–1922), Canadian-American inventor, engineer, and scientist.
[34] Thomas Alva Edison (1847–1931), American businessman and inventor.
[35] Ernst Werner Siemens (1816–92), German inventor, industrialist, and electrical engineer; Sir Charles Algernon Parsons (1854–1931), English-Irish inventor and mechanical engineer; Karl Friedrich Benz (1844–1929), German automotive engineer and engine designer; and Gottlieb Wilhelm Daimler (1834–1900), German industrialist, industrial designer, and engineer.
[36] Jean Aime LeRoy (1854–1932), American inventor; and Thomas J. Armat (1866–1948), American inventor and mechanic.
[37] Nikola Tesla (1856–1943), Serbian-American engineer, inventor, and futurist; and Guglielmo Giovanni Maria Marconi, 1st Marquess of Marconi (1874–1937), Italian politician, inventor, and electrical engineer.
[38] Rudolf Christian Karl Diesel (1858–1913), German mechanical engineer and inventor.

SLIDE 12

Some Outstanding Contributors	Contributions
• Wright Brothers (1903)	• Gasoline powered airplane
• Christian Hulmeyer (1904)	• Radar
• V. Paulsen/R. A. Fessenden (1904/1906)	• Wireless telephone
• John A. Fleming/Lee De Forest (1904/1907)	• Vacuum tube
• Tri Ergon/Lee De Forest (1919/1923)	• Sound motion picture
• USA—Pittsburgh (1920)	• Public radio broadcasting
• American Car Locomotive (1925)	• Diesel-electric locomotive
• J. L. Baird (1926)	• Television
• Warner Brothers (1927)	• Jazz Singer/sound motion picture
• Germany/USA (1932/1934)	• Diesel-electric railway
• Britain/USA/Germany (1935–1939)	• Operational radar
• Germany/Britain/USA (1935/1936/1939)	• Television broadcasting
• Hans von Ohain/Germany (1939/1939)	• Jet engine/jet airplane
• Eckert & Mauchly (1946)	• Electronic computer
• Bardeen & Brattain & Shockley (1947)	• Transistor
• Ampex (1955)	• Video recorder
• J. Kilby/R. Noyce (1958/1959)	• Integrated electric circuit
• T. H. Maiman (1960)	• Laser
• Philips (1970)	• Video cassette recorder
• Sony (1980)	• Video camcorder

We've got one more of these and we get off these charts. But I have to give you these charts. Gasoline-powered airplane. Note that, Christian [Hulsmeyer], 1904; first idea on radar in 1904, he had a patent.[39] Of course, we didn't get it till just before World War II. Then you got Poulsen and Fessenden, wireless telephone; now, they threw the wires away and you can talk to people without wire.[40] And just before World War I, then you got Fleming and Lee De Forest, vacuum tube.[41] Why was that—that's what I call a first revolution in electronics—why was that important, that vacuum tube? Anybody? Why was the vacuum tube important? Say it. Somebody said it. Exactly. You amplify

[39] Christian Hulsmeyer (1881–1957), German entrepreneur, inventor, and physicist.

[40] Valdemar Poulsen (1869–1942), Danish engineer; and Reginald Fessenden (1866–1932), Canadian-American inventor and electrical engineer.

[41] Sir John Ambrose Fleming (1849–1945), English electrical engineer; and Lee de Forest (1873–1961), American electrical engineer and inventor.

your signal; before that they couldn't reach that far before they had vacuum tubes. Fleming, the diode, and De Forest, the triode, and, of course, since then they were up to pentodes and all that stuff, but they amplified the signal so you could reach out great distances. Before that, they had spark gaps and all that. Another synthesis.

Then you got USA-Pittsburgh, that's KDKA, first public radio broadcasting. No letter today, I think, KDK. Then you got American Car Locomotive, now you're combining diesel with electric. Then you've got Baird, the Scotsman, television, 1926; very grainy picture, but he had one there.[42] Then you got Warner Brothers, first jazz sound motion—I mean the first sound motion picture was a commercial called *The Jazz Singer*. Germany, USA '32, '34, diesel electric railway. Britain, USA, Germany. Operational radar; all of them had it just before World War II; of course, some were better than the others, but nevertheless, it was there and we still got it to this day, it's been amplified, going all kinds of different directions now.

And you got Hans von Ohain in Germany, jet engine, jet airplane.[43] Anybody know when that came out? Anybody know here? Somebody said it—who? Well, late '30s, came out before World War II; *[35:00]* they had that thing flying before World War II. And, of course, you all heard of the Me 262 which actually grew out of that process toward the end of the war; but they delayed it, and they hurt themselves.

Okay. Then you got Eckert and Mauchly, the first electronic computer.[44] Anybody know what the name of that was? Somebody said it. The ENIAC, some big building, basement of the University of Pennsylvania. Huge monstrous affair, vacuum tube wires always breaking down, but they had it. Now, we can do better than that on a little PC.

And then you got Bardeen, Brattain, and Shockley, the transistor; the second revolution.[45] Throw away the vacuum tubes, now we got transistors. And we squeeze things down. Then you got

[42] John Logie Baird (1888–1946), Scottish electrical engineer and inventor.
[43] Hans Joachim Pabst Von Ohain (1911–98), German engineer and physicist.
[44] John Adam Presper Eckert Jr. (1919–95), American electrical engineer and computer innovator; and John William Mauchly (1907–80), American physicist.
[45] John Bardeen (1908–91), American physicist; Walter Houser Brattain (1902–87), American physicist; and William Bradford Shockley (1910–89), American inventor, physicist, and electrical engineer.

SLIDE 13

?—RAISES QUESTION—?

Looking at the past via the contributions these people have provided the world:
What can we say about our efforts for now and for the future?

Ampex, first video recording; and Kilby and Noyce, first integrated electric circuit.[46] Now, that's the basis for all our microchips today including transistors, we just squeezed it down even further. Smaller, then they're micro. Very important. That's the third revolution. And Maiman, you can see him, laser; Philips, video cassette recorder; Sony, finally, video camcorder, and I cut it off in 1980; of course, there's other things too.[47] You can throw some other things in here. We see that.

Okay, so, now, we've looked at science, we've looked at engineering, what's the message? Next chart.

[slide 13]

So, we ask ourselves, look at the past, via the contributions of these people that provide for the world, what can we say about our efforts for now and the future? What can we say? And we've got a lot of evidence out here, so let's just squeegee all that down that we've looked at and let's lay out what I call a "grand message." Next chart.

[slide 14]

I'll let you read it. In fact, after you read this chart, we'll take our first 10-minute break. Only 10 minutes, I'm cheating on you, not 15. Because I didn't get you for two hours and we started late; I got to

[46] Ampex Data Systems Corporation; Jack St. Clair Kilby (1923–2005), American electrical engineer; and Robert Norton Noyce (1927–90), American entrepreneur and physicist.

[47] Theodore Harold Maiman (1927–2007), American physicist and engineer.

SLIDE 14

GRAND MESSAGE

In a mathematical/logical sense we can say:

- Taken together the theorems associated with Godel, Lowenheim & Skolem, Tarski, Church, Turing, Chaitin, and others reveal that: Not only do the statements representing a theoretical system for explaining some aspect of reality explain that reality inadequately or incompletely but, like it or not, these statements spill out beyond any one system and do so in unpredictable ways.

Or conversely

- These theorems reveal that: We can neither predict the future migration and evolution of these statements nor just confine them to any one system nor suggest that they fully embrace such system.

Now if we extend these ideas and build upon them in a scientific/engineering sense we can say:

- Any coherent intellectual or physical systems we evolve to represent or deal with large portions of reality will at best represent or deal with that reality incompletely or imperfectly.
- Moreover, we neither have nor can we create beforehand a supersystem that can forecast or predict the kind of systems we will evolve in the future to represent or deal with that reality more completely or more perfectly.
- Furthermore, such a supersystem can neither forecast nor predict the consequences that flow from those systems that we create later on.
- Going even further, we cannot determine or discern the character or nature of such systems (super or otherwise) within themselves.

Which altogether imply that:

- People using theories or systems evolved from a variety of information will find it increasingly difficult and ultimately impossible to interact with and comprehend phenomena or systems that move increasingly beyond and away from variety—that is, they will become more and more isolated from that which they are trying to observe or deal with, unless they exploit the new variety to modify their theories/systems or create new theories/systems.

take a piece out of your hide; otherwise, we won't get through, that's why.

Note what I'm saying there in the beginning, look at that first thing. I'll add all those things, names, and say not only do the statements representing a theoretical system for explaining some aspect of reality explain that reality inadequately or incompletely but, like it or not, these statements spill out beyond any one system and do so in unpredictable ways. And then I turn it around the other way; we can neither predict the future migration and evolution of these statements nor just confine them to any one system, nor suggest they fully embrace any such system. Note that. And marching up into the scientific/engineering sense, the four statements I have there. Squeegee it down even tighter, so my last thing, which all together imply that, and I put it down in one statement at the bottom

SLIDE 15

?—RAISES QUESTION—?

Taken together, what do the many contributions and Grand Message suggest?

there.[48] Take all that above and you squeegee it down, that's what we got to face up to, which implies the bottom statement, the implication flows out of that, which also flowed out of the previous stuff we looked at.

Well, if that's true, then what those people wanted to do in the nineteenth century can't be done; you can't get all that pretty; you're not going to nail things down, like it or not. You may nail some things down, but other things you're not going to nail. And what I'm telling you, that's the way it is. Now, does anybody have any questions before we take our break? I'll give you a 10-minute break. Go ahead.

[inaudible question from audience]

What chart are you talking about? Oh, you're talking about when I had the contributors? Oh, between the two charts. That's correct. That's correct. I didn't do that, and that's correct. You'll notice that particularly when you go down that chart, that's absolutely correct. And we see more of that today, you have to do it by teams, it gets more complicated, at least more often, and that's a good observation. Anybody else? Let's take a 10-minute break and come back, because we've got some other things I want to go through with this, because this—we're coming up with some key information here. Please take 10 and no more. Thank you.

[Break] *[40:00]*

[slide 15]

Okay, so now, what we've done, we've shown these contributions, we've shown the grand message, so, obvious question: when

[48] Boyd often used the term *squeegee*, or sometimes *squeeze*, as a metaphor for distilling or filtering information down to an essential point.

SLIDE 16

IMPRESSION

While we can comprehend and predict some portions of the everchanging world that unfolds before us, other portions seem forever indistinct and unpredictable.

SLIDE 17

?—RAISES QUESTION—?

Very nice, but what does all this have to do with our ability to thrive and grow in such a world that is seemingly orderly and predictable yet disorderly and unpredictable?

you look at these things together, what do these things really suggest? It raises an interesting question.

[slide 16]

And what am I really getting at? Here's the point I'm getting, here's an impression we're left with—and that's what I call it, an impression—while we can comprehend and predict some portions of the ever-changing world that unfolds before us, others seem forever indistinct and unpredictable. In other words, you get two kind of things: some things we can predict, other things we can't: we have two parts of the world. In order to build on that, let's go to the question.

[slide 17]

So, raise a rather interesting question. Very nice, but what does

SLIDE 18

COMMENT

- To get at this question, let's take a closer and more general look at what science, engineering, and the pursuit of technology produce and how this is accomplished.
- Furthermore, suspecting that these practices and pursuit are not wholly accidental nor obvious and that they seem to change us in some ways, let's also examine what keeps the whole enterprise going and how this enterprise affects us personally.

all this have to do with our ability to thrive and grow in such a world that is seemingly ordered and predictable, yet disorderly and unpredictable? In other words, it seems—we got a kind of a mixed bag here, and that's exactly right. But how is it mixed? We're not really sure. Let's take some ideas from this new world, whatever they call it—of course, not a new world, it's been there, but the new way they've been expressing it: nonlinear dynamics. And we have people saying—and knowing—from their own experience, the linear phenomena swims in a nonlinear sea. In other words, the nonlinear stuff totally overwhelms the linear phenomena. In fact, some people say if you want to look at an iceberg, the linear phenomena is only the tip of the iceberg, and some other people say it's really the tip of the tip. And somebody's remarked, "Yeah, but that's the stuff we like to study." Easy. That's why. Unlinear: messy, gory, hard to come to grips with. That's the world we're in, primarily. That's the overwhelming part of the world we've got to deal with; and the more you lift yourself away from math, physics, chemistry, into biology, anthropology, sociology, the more nonlinear, more unpredictable, the more messy it becomes, you still got to deal with it. And you're going to have to deal with it in your efforts in the Spacecast and other activities. Okay, let's keep that in mind.

[slide 18]

SLIDE 19

In other words in order to gain a richer image of science, engineering, and technology we will address the following questions:

- What do science, engineering and technology produce?
- How is this accomplished?
- What is the driving mechanism that keeps the process alive and ongoing; or put another way, what phenomena sustains or nourishes the whole enterprise?
- Finally, how does this enterprise of science, engineering, and technology affect us personally as individuals, as groups, or as societies?

So, here's the comment I want to get at. Get at that question we had in the previous chart. Let's take a closer and more general look at what science, engineering, the pursuit of technology has produced and accomplished. No, two points here: what the heck are we producing here, and how are we going about that? And the second bullet: furthermore, suspecting that these practices are not wholly accidental or obvious, and they seem to change us, let's also examine what keeps the whole enterprise going and how this enterprise affects us. In other words: what's the mechanism that seems to make this whole thing unfold the way it does and how is it changing us as individuals, or as groups, or societies or whatever?

[slide 19]

To make it very graphic, let's go to the next chart: we're going to address really, basically, four questions then, which were in a previous chart. What does science, engineering, and technology produce? How is it accomplished; what's the driving mechanism, how does it affect us? We'll go through in that order, attack in that order.

[slide 20]

Let's take the first question here: what do science, engineer-

SLIDE 20

FIRST OF ALL

?—What do science, engineering, and technology produce—?

If we examine the contributions from the practice of science and engineering and generalize from these individual contributions what do we see? We see new ideas, new systems, new processes, new materials, new etc.

In other words

Science, engineering, and technology produce change via novelty.

ing, and technology produce? Now look at that. Note what I'm saying here: if we examine all that stuff we've been talking about here, what do we see? We see new ideas, new systems, new processes, new materials, new et cetera, et cetera, et cetera. New. New. New. New. In other words, science, engineering, and technology produces change via novelty; we're producing novelty using that, different kinds of novelty. Newton couldn't have known what Faraday, Maxwell, and Hertz, and what we're doing today, couldn't have known that; and the things we're doing today, we can't know what some people are going to do many years hence. Some things, we will; many other things we won't. That's the way it is. So, that's what I'm saying. What does it produce? Change via novelty. Next chart.

[slide 21]

Now, this one, you're sort of familiar with, I gave you some thought experiments. How is the novelty produced? I want you to read that, then I'll talk to it. [long pause as audience reads slide]

SLIDE 21

?—How is this novelty produced—?

- To examine novelty we speak of it in terms of those features that seem to be part of that novelty. In other words, we reduce a novel pattern down to some features that make up that pattern. Different people in examining such a pattern may see differing features that make it up. In other words, there are different ways by which a pattern can be reduced hence the possibility for differing features or parts. Regardless of how it comes out, we call this process of reduction: analysis.
- Pushing this process even further we can reduce many different patterns (analyses) to parts that make up each pattern and use these parts, or variations thereof, to make a new pattern. This is done by finding some common features that interconnect some or many of these parts so that a new pattern—whether it be a new concept, new system, new process, new etc.—can be created. We call this process of connection: synthesis.
- Now if we test the results of this process with the world we're dealing with, we have an analytical/synthetic feedback loop for comprehending, shaping, and adapting to that world.

[45:00] In other words, to deal with that world, we're pulling things apart, and we're putting back together, we're going through the analyses and synthesis. And since we're part of that world, we're actually interacting with the world, so not only are we trying to comprehend shape and adapt to that world, but we're also changing the world in a sense; and as already inferred, we're probably changing in the ways we really don't understand, or it's also changing us in ways we really don't understand—maybe some ways, but many other ways we don't. We find out much later. Exactly.

[slide 22]

And so, this is my point on that: novelty is produced by a mental/physical feedback processes of analyses, synthesis that permits us to interact with the world so we can comprehend, cope with, and shape that world as well as be shaped by it; we're not only shaping it, it's also shaping us. Now, in terms of some of the new ideas since Darwin, where he talked about natural selection, now they're talking about self-organization and natural selection. In other words, we're

SLIDE 22

Pulling all this together we can say that:

Novelty is produced by a mental/physical feedback process of analyses and synthesis that permits us to interact with the world so that we can comprehend, cope with, and shape that world as well as be shaped by it.

Which carries us to the question

reorienting all the time. Orientation is just not a state you're in, it's a process: you're always orienting. Otherwise, the world's static and there's no change out there and you got to keep working that.

How many people here have heard of the OODA loop, haven't you? Let me just digress here, it's related to this; and it's very important, this idea of orientation, I want to connect it to the OODA loop right now, which is another presentation, but it turns out it's important. And it goes like this: remember we talked about earlier where we want to get inside a guy's tempo or rhythm, so we could pull him down; and we know that human beings have to do it, we have to observe what's going on out there, we've got to get an image or picture in our head which we call orientation; then we have to make a decision what we're going to do, and then implement the decision. So, we call it O-O-D-A: observe, orient, decide, act, and we look at the actions in our observations, plus drag in new data, get a new orientation, new decisions, new actions added to an item.

But the most important part of that OODA loop is the orientation: it's the driver, it's the s*chwerpunkt*, it's the key.[49] The reason why, your orientation is made up of three things: one, your genetic heritage affects that; your cultural traditions, and your previous experience. And that's you. That's you, that's the repository in you. So, what

[49] *Schwerpunkt* is a German term roughly translated for military use as main effort or focus of effort. Introduced to the military lexicon by Prussian officer and military theorist Carl von Clausewitz in *On War*, *schwerpunkt* has evolved in meaning but generally refers to an aspect of an operation that is considered to be decisive and thus weighted heavily in terms of troops and supporting resources required to ensure its success.

happens is you just don't see the world any old way; those things such as your genes, your cultures, and your experiences color the way you look at the world, they color the way you look at the world. If you and I would read the same book, because we have different orientations, I would tend to highlight things differently than you did, so I can get a different image than you get. That's not bad. To use an example, many of you people play this parlor game in which you put 20 guys in a circle or girls and guys, whatever you want to call it, and you give a message to the person on the left—not too simple, but reasonable message and you say, "I want you to pass the exact message on," and have each one do it all the way back till it comes back to the guy that passed it on. When he gets back to him, it's not what he said.[50]

Why? Anybody, why did that happen? And the people weren't being malicious, they're really trying to get it right. Why would that happen? We already talked about it. Come on. Cough it up, somebody. Exactly. Say that aloud. That's right: each guy's got a different orientation, so what are they doing? Each person is highlighting and subduing, or emphasizing, deemphasizing different things; and after you walk that through about 20 minds, it's different. Exactly. We all don't have the same orientations—they're similar, but not the same. If you work together, it gets more and more similar, but always not the same. Okay?

[Boyd seems to skip slides 23 and 24 of his normal presentation here (see appendix for these slides); moves to slide 25]

So, the orientation, the second O in the OODA loop, is the most important O because it drives the whole loop. Colors your observation, colors your decisions, colors your actions. In fact, we can consider it the guidance and control part of the OODA loop, guides and controls the other activity.

[50] Boyd is referring to the game of "telephone," in which the first player thinks of a simple message or phrase and repeats it solely to the person next in the game sequence. Once the message has been passed from player to player, the last player reveals the message and compares it to the original created by the first player. Although the goal is to attempt to pass the message around all players as accurately as possible, much of the game's enjoyment comes from seeing just how much the final message has diverged from the original.

SLIDE 25

NOW

- If we reverse direction and reexamine where we have been we can see that: Without the intuitive interplay of analyses and synthesis we have no basic process for generating novelty; no basic process for addressing mismatches between our mental images/impressions and the reality it is supposed to represent; and no basic process for reshaping our orientation toward that reality as it undergoes change.

Put simply

- Without the interplay of analyses and synthesis we have no basis for the practice of science/engineering and the pursuit of technology—since novelty, mismatches, and reorientation as the life blood ingredients that naturally arise out of such practice and pursuit can no longer do so.

With that in mind, note what I'm saying here. Now, I like to always go back. I'm one of these guys who likes to look back into something; I said we reverse direction, reexamine where we've been, what can we see or we can see with that? Without the intuitive interplay of analysis, we have no basic process for generating novelty. We throw that out, how are you going to generate the novelty? No way, Jose.

The second part: we have no basic process for addressing mismatches between our mental images/impressions and the reality it is supposed to represent. And thirdly, no basic process for reshaping our orientation toward that reality as it undergoes change. We know that's happening. Or put simply: without the interplay of analyses and synthesis, we have no basis for the practice of science/engineering and the pursuit of technology, since novelty, mismatches, and reorientation as the lifeblood ingredients that naturally rise out of such *[50:00]* practice and pursuit can no longer do so. Period. Can't happen.

[slide 26]

Now, I want to go back again. Now, remember I had that

SLIDE 26

VIEWED IN THIS LIGHT

The preceding statements seem to suggest that the "Simple-Minded Message" presented near the beginning whereby:

Science can be viewed as a self-correcting process of observation, hypothesis, and test

whereas

Engineering can be viewed as a self-correcting process of observation, design, and test

should be modified as follows:

Science can be viewed as a self-correcting process of observations, analyses/synthesis, hypothesis, and test

whereas

Engineering can be viewed as a self-correcting process of observations, analyses/synthesis, design, and test.

?—Why—?

Without the interplay of analyses and synthesis one can evolve neither the hypothesis or designs and follow-on test nor the original "Simple-Minded Message" nor this presentation itself.

simple-minded message in the beginning in which I said we can view science as indicated above and engineering; in other words, those self-correcting processes, science being self-correcting in terms of observation, hypothesis, and test; engineering, observation and design. But I said in view of what we've done here, we've looked at things, we probably should modify that. Why? Because if you look at a hypothesis, that didn't arrive out of a vacuum, that just didn't happen; things had to take place there; and we know it had to take place: you not only have observation, but you had to do the analysis and synthesis; and not just an observation, many observations. Otherwise, your system is all locked up inside yourself. Then we should say: can be viewed as a self-correcting process of observations, analyses/synthesis, hypothesis, and test; and likewise engineering, except we put in design rather than hypotheses. Or an artist, he makes observation, analyses more intuitive, now synthesis, and you can call it a rendering and a test; test it against the public, they buy it or don't.

Now, we see something else here too. If you look at that, observations is certainly related to OODA loop observation; analysis and synthesis, when you're getting your orientation, you're doing analysis and synthesis, and the decision is nothing more than the rendering, or the design, or the hypothesis. Well, the OODA loop and that are directly related; one may be a little bit more informal than the other, but it's still done. The same thing. And the test is the action, or the implementation, or whatever you want to call it. Same stuff. No different. So, we can see that. Very important. I can't reemphasize that.

So, what happens if you go through that? Let's take the science for example—observation, analysis/synthesis, hypothesis, testing—you keep going around and finally say, "Hey, that thing's kind of holding together." Then we have a theory. You can't call it a theory before you run the test, because the theory assumes that what you're saying about the world there indeed is kind of correct; if it isn't, and it's flawed, no hypothesis. If someday, some guy says, "I got a theory, totally untestable, not even related to the world." That's not a theory; I don't know what it is. Might not even be a hypothesis; then again, it might. Some kind of a rendering, but I don't know.

In any case, why would I make that statement, make those modifications? Without the interplay of analyses and synthesis, one can evolve neither the hypothesis or design and follow-on test, nor the simple-minded message, nor even this presentation itself. I couldn't do this presentation if I didn't. No way.

So, you people are going to be involved with Spacecast, you're going to have to look at all different kinds of things. Not as individuals, but as individuals working together, and you're going to have to cough up something, not just another. . . like I said this morning, more analyses by itself; you're going to have to cough up some kind of a sync, you're going to have to pump that up. The Pentagon, when I arrived there—I guess I talked about that this morning—the Pentagon, when I arrived here, and they put me in charge of plans—of course, just because you have "Plans" over the door doesn't mean you do any planning; that's a facade. You know what their plans were? Road maps. I said, "We want some new road maps." Okay, I started looking into it. My God, I couldn't believe what I found with road maps all over that damn building.

So, I penetrated even deeper, I said, "Where do these things come from?" And then I found out: each little bureaucracy, their little cell, every year they go through this drill, they got to have an R and D [research and development] community come up with a new road map of what they're going to do, and they all know that they're going to do it annually; so, they have the previous roadmap, so they just keep adding new and new things on to it, and you got this huge, gargantuan mess, all these bits and pieces unrelated.[51] And they want me to contribute to that mess. So, I said, "I'm going to hose the general on this one, so I'm going to go up here and he's going to get angry, but he's going to listen."

So, the first thing, I went in and I said, "The first thing we've got to do is have no more roadmaps." My God, they went into shock; they thought I was against all R and D. But now I'm going to explain why. I say, "Let's examine: are we getting smarter *[55:00]* and able to do business better as a result of these additional roadmaps, or are things getting more confusing?" They admitted that. I said, "Well, that means we don't want any more roadmaps, we got to put this stuff together." That's the analytical side. See what I'm getting at here? Got to put things together. That's why when they kept putting out road maps, they weren't doing planning; planning assumes there must be some kind of a synthesis there; that's why I say just because they have "Plans" over the door doesn't mean they do planning; likewise with strategy. A lot of guys have "Strategy" over their door. That's also another synthesis, that doesn't mean they have any strategy, it's only strategy in the name. Okay.

[slide 27]

So, you probably wonder, "What the hell is all this bearing on winning and losing? Because, after all, we've gone through this drill, we kind of like it to be related to the business we're about." Okay, let's go to the next chart then.

[slide 28]

[51] In a military context, *research and development* refers to the early stages of the acquisitions process in which military Services invest in developing new weapons, equipment, vehicles/aircraft/ships, software, and other prospectively useful technologies. Research and development is often undertaken by specialized entities, both within and outside of the military, with personnel, equipment, and processes optimized for this purpose.

SLIDE 27

?—RAISES QUESTION—?

What bearing does all this have
on
Winning and Losing

SLIDE 28

ILLUMINATION

Novelty is not only produced by the practice of science/engineering and the pursuit of technology, it is also produced by the forces of nature, by our own thinking and doing as well as by others. Furthermore, novelty is produced continuously, if somewhat erratically or haphazardly. Now, in order to thrive and grow in such a world we must match our thinking and doing, hence our orientation, with that emerging novelty. Yet, any orientation constrained by experiences before that novelty emerges (as well as by the Grand Message discussed earlier) introduce mismatches that confuse or disorient us. However, the analytical/synthetic process, previously described, permits us to address these mismatches so that we can rematch thereby reorient our thinking and action with that novelty. Over and over this continuing whirl of reorientation, mismatches, analyses/synthesis enables us to comprehend, cope with, and shape as well as be shaped by novelty that literally flows around and over us.

I'll let you read it. Illumination. Note what I'm saying: novelty is not only produced by the practice of science/engineering and the pursuit—it is also produced by the forces of nature, by our own thinking and doing as well as by others. And that's just coming out of the woodwork everywhere.

Note the next statement: it's not smooth; it's erratic or haphazard, you don't know how that's going to all happen. So, what I get

down to at the bottom, what I'm saying if you go through that whole thing—over and over, this continuing whirl of reorientation, mismatches, analyses/synthesis, reorientation, et cetera, et cetera. And what does it do? It permits us to comprehend, cope with, shape—and be shaped—by that novelty that's always flowing over us or through us, around us. That's what happens.

In a nice, tight little world where there's no change, they're dinosaurs, they're going to die. The name of the game is not to become a dinosaur. I don't want to go up there and get to the high peak and then walk around like a vegetable the last 10 years of my life; I want to keep myself going until the last minute when all the lights go out. Bang. Over. And if it looks like I'm going there, I'm going to probably call Kevorkian and say, "goddamn you, I got a job for you."[52] A lot of people are listening to this guy—when they're in pain and things are going—they don't want to go through it. Plus, the medical profession takes all your resources, and you have nothing left either. I don't want them to get it, that's why I'll call Kevorkian. Hell with them. Or better yet, I like to do things, so let the brain just explode and it's all over. I'm 66 and I kind of think about those things.

You get older and you start reading obituary pages and all that kind of stuff, and say, "How am I going to go out?" The way I want to go out, I want a nutty one. When I was a fighter pilot many years ago, we were a wild bunch, we didn't have any rules when I went into it. It was fantastic. Of course, we killed a lot of guys—our own—we killed more guys in training than we did in Korea; we were wiping them out every day. At Nellis out there one year, we killed 21 guys in one year; of course, they would never permit that today.[53] You know what the word was they said when I went through there? "If you make it through here, Korea's easy." We had a guy out there

[52] Murad Jacob "Jack" Kevorkian (1928–2011) was an American pathologist who gained attention in the 1990s as a proponent and enabler of physician-assisted suicide. Nicknamed "Dr. Death," he was alleged to have assisted in the deaths of at least 130 people and was ultimately convicted of second-degree murder in 1999.

[53] Nellis Air Force Base is a major U.S. Air Force installation located near Las Vegas, NV. Boyd served as an instructor for the Fighter Weapons School at Nellis during the 1950s. It was in this capacity that he first began to think more deeply about the need to construct new mental frameworks to deal with real-world challenges.

MAYBE SO

Yet, upon reflection, we still have a puzzle. Why does our world continue to unfold in an irregular, disorderly, unpredictable manner even though some of our best minds try to represent it as being more regular, orderly, and predictable?

called Clay Tice, he said, "This is a tiger program and these guys got fangs."[54] Headquarters sort of didn't like it, but they didn't know what to do about it—jets were new and they didn't know how to handle it; eventually, they did learn how, but they had this one good thing. And I never thought I would live beyond 40, actually, so I said, "Boy, am I going to have fun." So, I surprised myself, I'm still here, so the problem's been delayed a little bit.

In any case, let's go to the next chart.

Go ahead.

[slide 29]

Audience: [unintelligible]

Boyd: That's right. Well, some people would say it's an unnatural part too, but I understand what you're getting at. There's a nice book out that addresses that, and I told Dick *[1:00:00]* and some other people, and it's a soft cover book, and I think you can get it, of course—nowadays, softcover books cost almost as much as hardcover a few years back—it's called *Theories of Everything* by John Barrow.[55] And the key idea that he brings up there is you've got a world out there and what you have to do, is you have to be able to, in some sense, be able to compress that world into certain ideas and that so you can deal with the whole world. So, they talk about the idea of compression, in other words. And also, Chaitan; remember I mentioned Chaitan on the algorithmic information theory, that he talks about that too, we'll be able to have what they call compressibility.

[54] Boyd is likely referring to Col Clay Tice Jr., who was the training group commander for new pilots at Nellis during the mid-1950s.

[55] John D. Barrow, *Theories of Everything: The Quest for Ultimate Explanation* (New York: Ballantine Books, 1992).

And what you want to do your adversary, make his world incompressible; so, he can't compress all that stuff, so all he's dealing with is pandemonium, chaos, confusion, disorder, and you sweep out the debris; in other words, you want to fold him back inside himself. We talked about that earlier. And so, if you make his world incompressible, he naturally is pulled back inside himself, he can't cope with the world, so he's out of date with the world. So, in effect, then he comes up with all those dysfunctional characteristics you like to have in your adversary, not yourself. Some people do it naturally and other people when they don't mean to, and that's not too good. Okay.

Does that help answer your question? Compress, you got to learn how to do it. There's a nice book on it called *Theories of Everything*. And somebody asked about that earlier, about "theories of everything;" the reason why it puts "theories of everything" in there—we got a lot of theories of everything, but there's no theory of everything. My question to that, if you have a theory of everything, and included within the theory, and you've heard about these new superstring theories and all that crap, you know, and these physicists are talking about, they're nontestable and all that, and if it's such a great theory, and it includes everything, then within that theory should be how they came up with that theory; but they never have that in there. If it's the theory of everything, they should be able to describe how they came up with it; it can't be everything. It's something; I don't know what, but it's not everything.

Okay. Now, we talk about the previous chart. Maybe so relative to that last statement, that previous chart. Yet, upon reflection, we still have a puzzle: why does our world continue to unfold in an irregular, disorderly, unpredictable manner, even though some of our best minds try to represent it as being more regular, orderly, predictable? We've got a problem there. Why is that the case?

[slide 30]

Or what I say more pointedly: with so much effort over such a long period—we've had people for centuries looking at this stuff now—by so many people to comprehend, shape, and adapt the world that we depend upon for vitality and growth, why does such a world, although richer and more robust, continue to remain uncertain, ever changing, unpredictable. Now, we're going to get down to nitty-gritty here. Next chart.

SLIDE 30

MORE POINTEDLY

With so much effort over such a long period by so many people to comprehend, shape, and adapt to a world that we depend upon for vitality and growth: Why does such a world, although richer and more robust, continue to remain uncertain, everchanging, and unpredictable?

SLIDE 31

RESPONSE

Very simply, review of "Destruction and Creation," this presentation, and our own experiences reveal that the various theories, systems, processes, etc. that we employ to make sense of that world contain features that generate mismatches that, in turn, keep such a world uncertain, everchanging, and unpredictable.

[slide 31]

I'm not putting you off the next chart, I'll give you the features, but I say very simply, review of "Destruction and Creation," of which you've got a copy there, this presentation, "Conceptual Spiral," and your own experiences in the world, and they're very valuable, reveal that the various theories, systems, processes, et cetera, that we employ to make sense of that world, contain features that generate mismatches that, in turn, keep such a world uncertain, everchanging, and unpredictable. But that raises the question, "What the hell are these features?"

[slide 32]

These features include everything we've been talking about: uncertainty associated with the unconfinement, undecidability, incompleteness theorems of mathematics and logic. They're there and we don't know how to get rid of those. Period. Numerical imprecision

SLIDE 32

THESE FEATURES INCLUDE:

- Uncertainty associated with the unconfinement, undecidability, incompleteness theorems of mathematics and logic.
- Numerical imprecision associated with using the rational and irrational numbers in the calculation and measurement processes.
- Quantum uncertainty associated with Planck's Constant and Heisenberg's Uncertainty Principle.
- Entropy increase associated with the Second Law of Thermodynamics.
- Irregular or erratic behavior associated with far-from-equilibrium, open, nonlinear processes or systems with feedback.
- Incomprehensibility associated with inability to completely screen, filter, or otherwise consider spaghetti-like influences from a plethora of everchanging, erratic, or unknown outside events.
- Mutations associated with environmental pressure, replication errors, or unknown influences in molecular and evolutionary biology.
- Ambiguity associated with natural languages as they are used and interact with one another.
- Novelty generated by the thinking and actions of unique individuals and their many-sided interactions with each other.

associated with rational and irrational numbers in the calculation and measurement processes. I want to talk to that. If you have a rational number—some people might not even know what a rational number is—and then you don't have to, I'm not trying to be insulting; you know, some things you study, some things you don't. But think one-third, whole number over a whole number, that's a rational number. And so, what do you have, one-third; if you try to put that in decimal form, 0.333—forever. An infinite expansion. At some point, you got to truncate that thing; and any place you cut it off, you've got an error. It's approximate, you don't have the right answer. Bigger or not, they might not be as big an error, but you still got it.

Now, in terms of rational numbers, there's a lot of those kinds of numbers—one-third. In terms of irrational numbers, all of them are that way, they're all nonending. And once again, guess what, irrationals dominate the rational. Another favorite statement: the rationals swim in a sea of irrationals. Period.

That's the world out there. Now, how many of you people have

studied chaos theory or nonlinear dynamics? Anybody here? Note what they say, they're always talking about "the problem is the initial condition." Note it's the initial condition. Why do they have the problem with initial conditions? Because we have rational and irrational numbers, they never can pin it down; and also, we've got Heisenberg's Uncertainty Principle because they keep reaching back, they're eventually back in that domain, you can't pin it down. So, the initial conditions come about because of that kind of phenomena; yet, they never explain that. *[1:05:00]* That's what they should say, say, "Why initial conditions?" Because of that phenomena.

And then you've got the entropy increase we talked about, the second law of thermodynamics; and we've got the irregular, erratic behavior of nonlinear processes; the irregular, erratic behavior shows they're far from equilibrium, open, nonlinear systems or processes with feedback. And that's most of the world.

If you're in an equilibrium condition, you're dead. And you've got incomprehensibility, associated with the inability to completely screen, filter, or otherwise consider spaghetti—I call them spaghetti-like influence, I couldn't figure out another word—from a plethora of ever-changing, erratic, or unknown outside events.

And you've got mutation associated with environmental pressure, replication errors, or unknown influence. They still haven't figured that out. Ideas are mutations. You get a new idea, that's a mutation, a mental mutation: a new idea or two spins off of that.

Ambiguity, associated with language. Not only language is interacting with one another. You know how they say, "Well, the structure this thing really doesn't allow you to put it in same context in a new language." Also, within a language, you've got ambiguity. Is that bad? No, it's good because if you didn't have ambiguity, it means we have everything figured out, we couldn't learn anything; the ambiguity then permits new ideas, the ambiguity helps to make adjustments to adapt, to adjust to the world. Not necessarily bad. It can be.

And then novelty, we talked about that. Those things are there; those are inherent in our various ways we do business with one another, mental processes, et cetera.

Therefore, what am I getting at?

[slide 33]

The underlying message is very simple then: there is no way out

SLIDE 33

UNDERLYING MESSAGE

There is no way out, unless we can eliminate the features just cited. Since we don't know how to do this: we must continue the whirl of reorientation, mismatches, analyses/synthesis over and over again ad infinitum as a basis to comprehend, shape, and adapt to an unfolding, evolving reality that remains uncertain, everchanging, unpredictable.

unless we can eliminate the features just cited. Well, the problem, though, we don't know how to do this. Since we don't know how to do this, we must continue the whirl of reorientation, mismatches, analyses/syntheses, over and over again, ad infinity as a basis to the ability to comprehend, shape, and adapt to an unfolding, evolving reality, that remains uncertain, ever-changing, and unpredictable. That's the way it is, guys. Sorry.

And this stuff is very recent kind of stuff; this is stuff that's come out in the twentieth century. This is not the stuff that Newton and those guys found out. Very recent stuff. That's why I asked you about in the beginning when I said, "Who's Gödel?," hardly anybody knew. Heisenberg, a few knew about him. Chaitan, I'd mentioned him before. That's why.

[slide 34]

So, now, we're getting down to it. Now, if we can connect this continuing whirl with all this stuff we talked about up there, we can see that we have, what, a conceptual spiral for exploration, discovery, innovation; thinking, doing, achieving; learning, unlearning, relearning. That third one's very important. You got to learn how to unlearn too; if you keep some ideas in there, that inhibits your ability to go and arise to a new state; in other words, it'll keep you from making snowmobiles or adapting to new conditions. And people who can't unlearn, we call them dinosaurs because they can't relearn.

Comprehending, shaping, and adapting. Hence, a conceptual spiral for what I call insight, imagination, initiative. Next chart.

SLIDE 34

NOW

If we connect this continuing whirl of reorientation, mismatches, analyses/synthesis and the novelty that arises out of it with the previous discussion we can see that we have:

A
Conceptual Spiral
for

- Exploration — Discovery — Innovation
- Thinking — Doing — Achieving
- Learning — Unlearning — Relearning
- Comprehending — Shaping — Adapting

hence a
Conceptual Spiral
for generating

- Insight — Imagination — Initiative

SLIDE 35

WHICH
?—RAISES THE QUESTION—?

Can we survive and grow without these abilities?

[slide 35]

We're about done. Which raises the question, "Can we survive and grow without these abilities?"

[slide 36]

It's very clear. One word: No. Period.

[slide 37]

Which suggests then, the conceptual spiral we've presented here, is a paradigm for survival and growth, that's exactly right. What I'm really showing is the answers aren't as neat as a lot of people

SLIDE 36

! NO !

SLIDE 37

WHICH SUGGESTS

The conceptual spiral also represents:

A
Paradigm
for
Survival and Growth

like to make it out to be. They tried it, but don't know how to do it. Period. Last chart.

[slide 38]

So that's my point, my final point of the presentation. I'm sorry. If you lose, you're losing the game of survival and growth: the name of the game is to survive and grow, and it impacts us in many different dimensions. This is not just military we're talking about, this is living or dying, or advancing, or decaying. That's what we're talking about. This is *the* game; the real game. *[1:10:00]*

Any questions?

SLIDE 38

POINT

Since survival and growth are directly connected with the uncertain, everchanging, unpredictable world of winning and losing we will exploit this whirling (conceptual) spiral of orientation, mismatches, analyses/synthesis, reorientation, mismatches, analyses/synthesis . . . so that we can comprehend, cope with, and shape, as well as be shaped by that world and the novelty that arises out of it.

CHAPTER



The Essence of Winning and Losing

Introduced by Frans P. B. Osinga

This final addition to "A Discourse on Winning and Losing" was finished on 28 June 1995, two years before John Boyd's death. Its brevity—covering only five slides (including the title slide)—belies its importance. This presentation contains, as the title suggests, what Boyd considered the essence of his entire opus, and it includes the only graphic representation of the OODA loop, which so far he had only described in various sections of different presentations. In these few slides, Boyd tries to provide a synthesis—the core message—of all of his work. In just a few sentences and bullets, Boyd brings to mind key issues addressed in previous presentations and the essay, and takes his audience back to the arguments of some of the earliest literature he had studied in the early 1970s, such as Piaget, Popper, Polanyi, Monod, Bronowski, and Conant, while directly marrying these once more to several of the key arguments and definitions he developed in "Patterns of Conflict," "Strategic Game of ? and ?," and "Organic Design for Command and Control." Even more than those, this short set reflects the intellectual interests of the final part of his life: coevolution, sociobiology, genetic engineering, chaos

theory, complexity, and nonlinearity. He demonstrates how the insights derived mainly from looking at military history, but inductively informed by the OODA loop idea and the themes from the essay, are conceptually related to the insights from "Strategic Game of ? and ?" and "Organic Design for Command and Control," which find their basis much more in the sciences.

The highlight of these slides is the comprehensive model of the OODA loop that, instead of the simple single loop, now shows a double-loop model. It is in one sense a decision-making model, but it is perhaps better understood as an epistemological process, a sense-making cycle. Just as "Patterns of Conflict" makes clear there is more than just going through the OODA loop more rapidly than one's opponent, in Boyd's own hands the model gains a more profound meaning.

It refers to the conceptual spiral as discussed in the previous presentation, to the process of learning, to doctrine development, to command-and-control processes, and to the Popperian/Kuhnian ideas of scientific advance. The (neo-)Darwinists have their place, as do epistemologists and cognitive scientists, while complexity theorists are deliberately referred to in Boyd's key statement in the final slide that follows the OODA loop picture. The OODA loop, in short, depicts his view on the generic individual and organizational adaptation processes. Each observation is infused with an unsurmountable dose of uncertainty, and in the orientation phase culture, experience, education, and analytical processes in turn filter the incoming information. The resulting decision is just a hypothesis to be tested by action that has been decided on, after which the cycle starts all over. In this model, Boyd has come full circle to his essay.

SLIDE 1

THE ESSENCE OF WINNING & LOSING

SLIDE 2

KEY STATEMENTS

- Without our genetic heritage, cultural traditions, and previous experiences, we do not possess an implicit repertoire of psychophysical skills shaped by environments and changes that have been previously experienced.
- Without analyses and synthesis, across a variety of domains or across a variety of competing/independent channels of information, we cannot evolve new repertoires to deal with unfamiliar phenomena or unforeseen change.
- Without a many-sided implicit cross-referencing process of projection, empathy, correlation, and rejection, (across these many different domains or channels of information), we cannot even do analyses and synthesis.
- Without OODA loops, we can neither sense, hence observe, thereby collect a variety of information for the above processes, nor decide as well as implement actions in accord with those processes.

or put another way

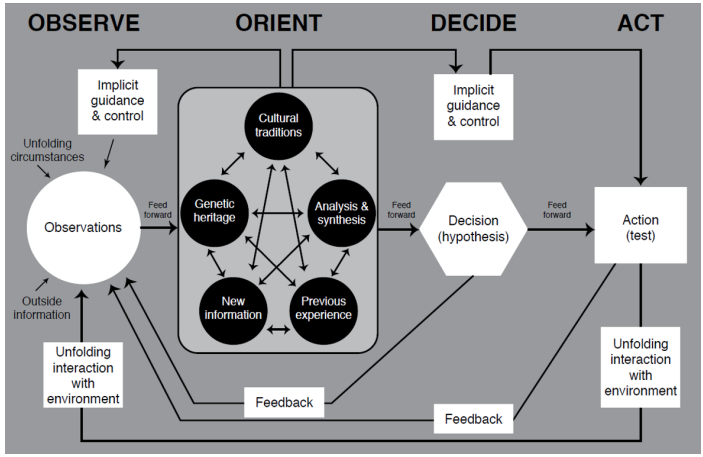
- Without OODA loops embracing all the above and without the ability to get inside other OODA loops (or other environments), we will find it impossible to comprehend, shape, adapt to, and in turn be shaped by an unfolding, evolving reality that is uncertain, everchanging, unpredictable.

SLIDE 3

WE CAN FURTHER CLARIFY THESE STATEMENTS AND THEIR INTERACTIONS BY THE FOLLOWING SKETCH

SLIDE 4

THE OODA "LOOP" SKETCH



INSIGHTS

- Note how orientation shapes observation, shapes decision, shapes action, and, in turn, is shaped by the feedback and other phenomena coming into our sensing or observation window.
- Also note how the entire "loop" (not just orientation) is an ongoing many-sided implicit cross-referencing process of projection, empathy, correlation, and rejection.

SLIDE 5

ILLUMINATION

By pulling all this together, we can see that the Key Statements, OODA Loop Sketch, and related Insights represent an evolving, open-ended, far-from-equilibrium process of self-organization, emergence and natural selection.

CHAPTER



The OODA Loop

Introduced by Ian T. Brown

Editor's note: this material is adapted from Ian Brown's review of The Blind Strategist *and a presentation given to Wardley Maps in 2020.*[1]

No discussion of John Boyd's ideas would be complete without a detailed look at his well-known—and oft-misunderstood—OODA loop, with its constituent parts of observation-orientation-decision-action. While referenced as a concept in all of the recorded briefings presented in this book, Boyd did not explain his OODA loop in any significant detail in the recordings. As noted elsewhere by Frans P. B. Osinga, Boyd did not even develop a diagram of the loop until 1995, two years before his death.[2]

The reluctance to commit the OODA loop to paper came in part from continued misunderstanding about the loop's origins and its intended application to decision-making. These misunderstandings

[1] Maj Ian T. Brown, "Opportunity Lost," *Journal of Advanced Military Studies* 12, no. 2 (Fall 2021): 199–211; and Wardley Maps, "John Boyd and the OODA Loop," 19 July 2020, educational video on YouTube, 22:17.

[2] Frans P. B. Osinga, *Science, Strategy and War: The Strategic Theory of John Boyd* (New York: Routledge, 2007), 229.

were contemporaneous with the years Boyd spent delivering his presentations and ranged from accusations that the loop was simply a codification of single-fighter, air-to-air combat or lifted from German ideas about blitzkrieg in World War II.[3]

Boyd attempted to correct these erroneous perceptions where he could, sometimes in his own hand, as shown in figure 1. Depicted here is one such rebuttal dating to the early 1980s that Boyd wrote in the margins of a critique by Roger Spiller, a professor at the Army's Combat Studies Institute.[4] Boyd was adamant that the OODA loop emerged as an output of the variations in human performance and perception he first observed during flight tests of the General Dynamics F-16 Fighting Falcon and Northrop YF-17 prototype aircraft in the early 1970s. The erroneous origin story of the OODA loop has nevertheless persisted in modern historiography, with Stephen Robinson's *The Blind Strategist* repeating them as recently as 2021.[5]

Given the decades-long persistence of misunderstandings surrounding the OODA loop, then, it seems worth spending a few pages of explanation to correct—permanently, one can hope—the historical record.

Culmination, Not Genesis

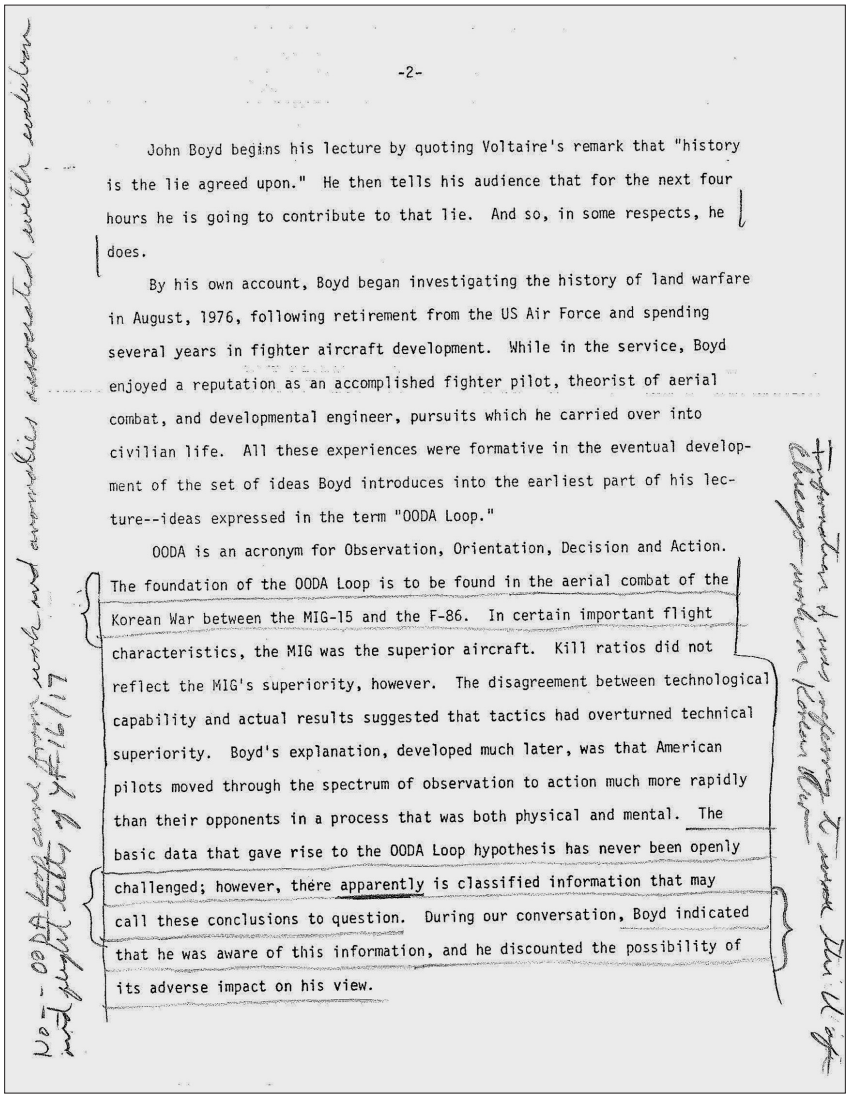
The illustrations in Boyd's own hand show that the OODA loop did

[3] Ian T. Brown, *A New Conception of War: John Boyd, the U.S. Marines, and Maneuver Warfare* (Quantico, VA: Marine Corps University Press, 2018), 116–19, 140–45.

[4] Roger Spiller, "Critique of John Boyd's 'Patterns of Conflict'," undated, box 7, folder 6, Col John R. Boyd Papers, John R. Boyd Collection, COLL/2062, Archives, Marine Corps History Division (MCHD), Quantico, VA. Though the Spiller critique is undated, it references another critique of "Patterns of Conflict" by Jay Luvaas (then a history professor at West Point Military Academy), which is dated 1981, so it is fair to assume Spiller's critique was also written in 1981 or shortly thereafter. See also Jay Luvaas, "Patterns of Conflict in History," 9 March 1981, box 7, folder 5, Col John R. Boyd Papers, John R. Boyd Collection, COLL/2062, Archives, MCHD.

[5] Stephen Robinson, *The Blind Strategist: John Boyd and the American Art of War* (Dunedin, NZ: Exisle Publishing, 2021), 11, 30. Robinson observes in an endnote that Boyd stated that the OODA loop came from the YF-16 and YF-17 fly-off tests; see Robinson, *The Blind Strategist*, 321. However, Robinson does not inject this rather salient observation by the OODA loop's creator anywhere in the main body of the book's text, reiterating instead the Korean War version of the loop's origin.

Figure 1. Hand-written notes on Spiller critique



-2-

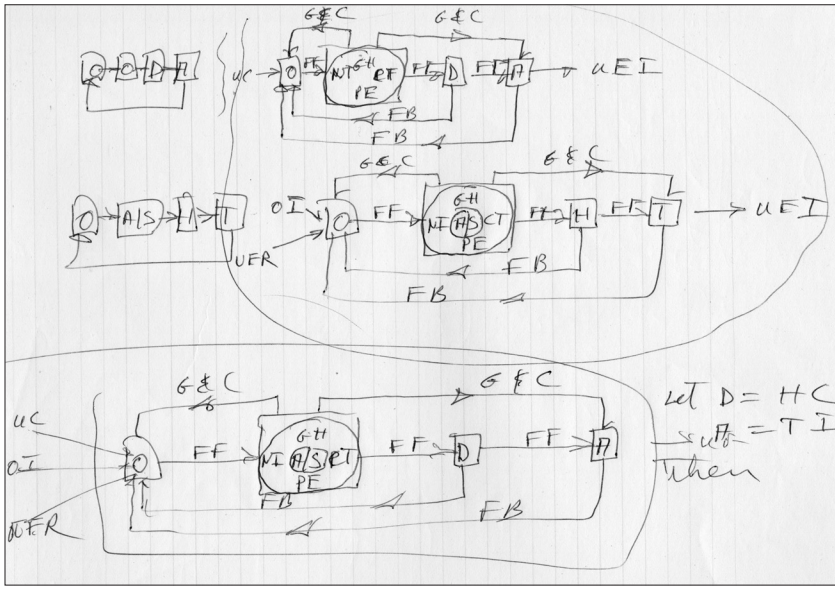
John Boyd begins his lecture by quoting Voltaire's remark that "history is the lie agreed upon." He then tells his audience that for the next four hours he is going to contribute to that lie. And so, in some respects, he does.

By his own account, Boyd began investigating the history of land warfare in August, 1976, following retirement from the US Air Force and spending several years in fighter aircraft development. While in the service, Boyd enjoyed a reputation as an accomplished fighter pilot, theorist of aerial combat, and developmental engineer, pursuits which he carried over into civilian life. All these experiences were formative in the eventual development of the set of ideas Boyd introduces into the earliest part of his lecture--ideas expressed in the term "OODA Loop."

OODA is an acronym for Observation, Orientation, Decision and Action. The foundation of the OODA Loop is to be found in the aerial combat of the Korean War between the MIG-15 and the F-86. In certain important flight characteristics, the MIG was the superior aircraft. Kill ratios did not reflect the MIG's superiority, however. The disagreement between technological capability and actual results suggested that tactics had overturned technical superiority. Boyd's explanation, developed much later, was that American pilots moved through the spectrum of observation to action much more rapidly than their opponents in a process that was both physical and mental. The basic data that gave rise to the OODA Loop hypothesis has never been openly challenged; however, there apparently is classified information that may call these conclusions to question. During our conversation, Boyd indicated that he was aware of this information, and he discounted the possibility of its adverse impact on his view.

John Boyd's hand-written notes correcting Spiller's critique of the OODA loop read, in the left margin: No—OODA Loop came from work and anomalies associated with evolution and flight tests of YF-16/17; in the right margin: Information I was referring to with the U of Chicago work on Korean War.
Author's collection

Figure 2. OODA loop variations



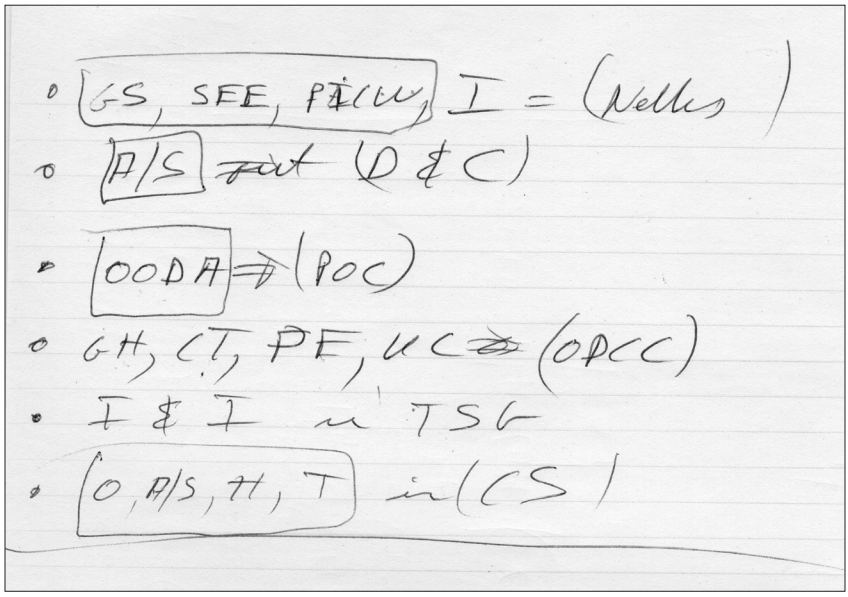
A hand-sketched concept of Boyd's OODA loop depicting variations he considered for inclusion in his final diagram.
Author's collection

not precede his ideas, but was rather a conceptual consolidation derived from his decades spent thinking and rethinking them. Two drawings from the archives make this clear (figures 2 and 3).[6]

Figure 2 shows some of the variations that Boyd had considered for depicting the final loop. Figure 3 is a key that highlights which of his mental lines of inquiry, manifested in his different briefings, fed into each of the loop's components. "[A/S] = (D&C)" drew on his concept of analysis and synthesis in "Destruction and Creation." "[OODA] = (POC)" cites his regular references to the OODA loop as a process for creating mismatches in "Patterns of Conflict." "GH, CT, PE, UC = ODCC" highlights the different filters applied in the loop's orientation phase—genetic heritage, cultural tradition, previous experiences, and unfolding circumstances—upon which Boyd elaborated in

[6] "OODA Loops [Handwritten Draft of the 'Essence of Winning and Losing']," folder 9, box 7, Col John R. Boyd Papers, John R. Boyd Collection, COLL/2062, Archives, MCHD.

Figure 3. OODA loop origin notes



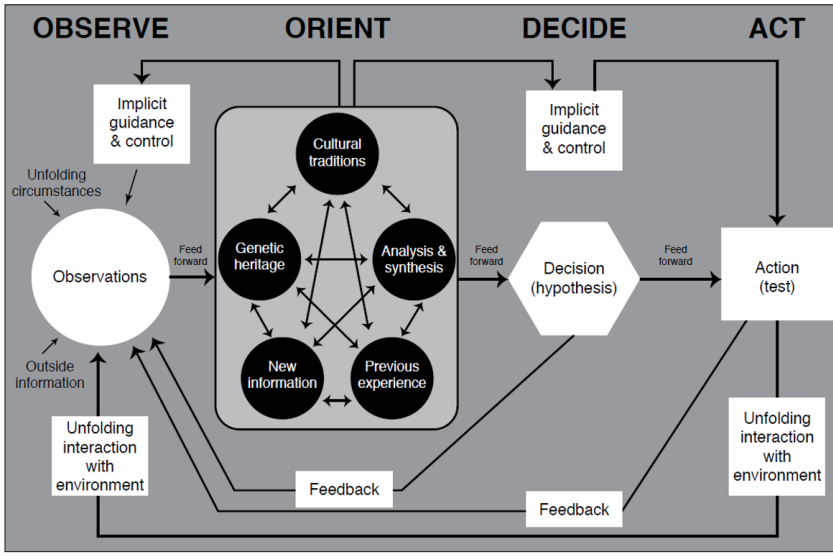
A hand-written key to Boyd's lines of inquiry that fed into each of the OODA loop's components.
Author's collection

his presentation "Organic Design for Command and Control." "I&I" refers to the duality of interaction and isolation he described in the briefing "The Strategic Game of ? And ?." Finally, "[O, A/S, H, T] in (CS)" captures Boyd's description of the scientific process—observations, analyses/synthesis, hypothesis, and test—as an analog to the OODA loop in the "Conceptual Spiral" presentation. These few lines demonstrate that the OODA loop was the ultimate consolidation—not the origin—of the different ideas on conflict and survival that he developed during decades of study and that are found within this book.

The Loop's Components

While Boyd did not commit a formal illustration of the OODA loop to paper until near the end of his life, his frequent references to it in his briefings show that he had a clear concept of its functionality and employment. It was a consolidation of the various concepts he explored in his different presentations, yet its components still formed

Figure 4. Complex OODA loop



Boyd's complex OODA loop design.
Adapted by MCU Press

their own independently useful framework, which will be expanded on here.

The OODA loop "begins" with *observation*, although the OODA sketch clearly shows that the loop does not have a true static beginning but continually cycles through its various components. Observation encompasses inputs seen by the observer, but these inputs can include new external information, new unfolding circumstances connected to that external information, as well as feedback from any previous decisions and actions undertaken by the observer prior to this particular moment in time. Moreover, observation also includes an *implicit guidance and control* input from the observer's preexisting orientation. Boyd regularly described orientation as the most critical aspect of the OODA loop (more on that below), and the "implicit" feedback from orientation shapes how and what the observer views across the many information inputs presented to them in observation.

The next component of the loop is *orientation*, which Boyd al-

ways saw as the vital engine that drove the rest of the loop.[7] In reviewing the subcomponents of orientation, one is struck by the implicit expansiveness of the factors that shape this step. Orientation is the entire background of experience and knowledge—even down to a body's physical capabilities—that an individual brings with them to the contest. Moreover, the subcomponents are not abilities passively accrued along the path of one's life but can be actively managed, developed, and enhanced to an extent limited only by a person's willingness to do so. As Boyd noted, a strong orientation "shapes observation, shapes decision, shapes action, and in turn is shaped by the feedback and other phenomena coming into our sensing or observing window."[8] Orientation is where the exhaustive process of cultivating *fingerspitzengefühl*, trust, adaptability, flexibility, initiative, and cohesion on the friendly side, and analyzing those factors on the adversary's side—processes described in different ways in all the presentations included in this book—paid its real dividends.

Given the importance of orientation, it is worth examining what Boyd wanted his audiences to understand about how each constituent subcomponent affected this part of the loop:

- genetic heritage: every human being is an amalgamation of the genetic heritage bestowed by their parents, grandparents, and family lines going back many generations. But from the moment a person is born, it is entirely within that individual's power to build upon that physical baseline by things like diet, exercise, sleep cycle, consumption of substances like nicotine or alcohol or caffeine. Developing these things over years raises the floor for the health of one's body in supporting the decision-making muscle of the brain in the moment. Conversely, spending years creating a strong body to support a healthy brain can be offset by poor physical choices such as lack of sleep or a hangover from the night before.

[7] See chapter 4, "Organic Design for Command and Control," 519, 521, 527–28, 538–39; chapter 6, "The Conceptual Spiral," 589–90; and chapter 7, "The Essence of Winning and Losing," 609.
[8] See chapter 7, "The Essence of Winning and Losing," 609.

Less obvious physical variables, such as one's emotional state from having a good or bad day, also have physiological effects on the body and brain, thus impacting the ability to make good or bad decisions at any given moment.

- previous experience: one can draw on their own personal experiences, but one can also leverage the experiences of others. This is why military leaders study military history or football players study the tape from their opponents' previous games. Whatever the case, the specific conditions of a problem from another's experiences might vary, but with a similar overall scenario there could still be valuable lessons to learn from how others solved that problem.
- new information: this encompasses new information an individual observes immediately around them in the moment, but can also include new information related to one's field of expertise—a new weapon system for the military professional, a new method of treatment for a doctor, and so on. Moreover, even changes in fields nominally unrelated to one's own may be worth monitoring, such as the impact of additive manufacturing on the proliferation of cheap battlefield drones.
- cultural traditions: human beings are shaped by a multitude of cultural influences, and this goes beyond the specific locality in which they are born. Humans are influenced by the culture of their childhood households; local, regional, and national cultures of their country; ethnic culture, religious culture, popular culture, the corporate culture of one's workplace, even the unique idiosyncrasies of a favorite sports team. All of these shape one's decision-making processes, and studying cultures apart from one's own can provide new insights into different approaches to problem-solving.
- analysis and synthesis: as noted by Boyd in figure

> 3, the OODA loop's process of analysis and synthesis is precisely the same theoretical construct described in "Destruction and Creation." If orientation is the loop's engine, then analysis and synthesis is its combustion chamber where the observer critically examines old information and new; challenges old premises if they no longer make sense or match the new current situation; and builds new ideas and new ways of approaching problems by breaking down and rearranging information through all the other filters inside orientation.

To reiterate: Boyd's conception of orientation was as a rich and incessantly active central processor that made all the other steps of the OODA loop work. Orientation encompassed a multitude of subordinate factors and processes that began the moment a human being was born. And most importantly of all: a person could actively shape and improve each of orientation's factors and processes. Indeed, doing so was vital to ensure that in the moment of crisis or decision, a person's orientation was as robust as possible; once a crisis unfolded, it was too late to wish for having gotten a better night's sleep or having read a vital book.

Having applied one's orientation—built during a lifetime—to the observations from the situation at hand, one develops a *decision* to help themselves survive their current situation. One then takes *action* on that decision; observes the impact of that action on the environment around them; and cycles through the process again, and again, and again—indeed, even when a moment of crisis passes, the loop itself never stops. That was precisely Boyd's point throughout "Destruction and Creation"—that the cycle is never-ending if one wants to survive and thrive on one's own terms.

Worth a final note are the many *feedback* and *implicit guidance and control* linkages that operate outside of the loop's steps and in many ways short-circuit them. As noted above, in part this represents the influence of orientation on how and what the observer observes. However, more broadly, these linkages represent a cognitive habit pattern of intuitive responses developed through a life-

time of observing, orienting, deciding, and acting. They represent the unconscious efficiencies gained by constant interaction with the same group of people inside an organization. Boyd gave examples of sport teams or families several times in his presentations.[9] They are *fingerspitzengefühl* made manifest.

[9] See chapter 2, "Patterns of Conflict," 99, 102, 264, 311, 328–29, 388–89; and chapter 4, "Organic Design for Command and Control," 540–41, 564.

Appendix

Omitted Presentation Slides

As noted in the preface, Boyd delivered his presentations countless times and each iteration was tailored to its audience; consequently, he might emphasize or deemphasize certain slides depending on where the live discussion went. Occasionally, he would skip some slides entirely. Boyd did precisely that in the versions of the "Patterns of Conflict" and "The Conceptual Spiral" presentations published in this volume (chapter 2 and chapter 6, respectively). Their omission is noted in the transcripts. Additionally, "Patterns of Conflict" included several slides on which Boyd listed the sources he used to create the presentation, but he did not discuss those sources with the audience. Nevertheless, his list of citations is very useful for gaining a deeper understanding of the wide repertoire of disciplines from which he drew to build his framework for survival in conflict. For the sake of completeness, all the omitted slides are included here.

Slides Omitted from Chapter 2: "Patterns of Conflict"

SLIDE 147

COUNTER-BLITZ
a'la SUN TZU

Maneuver Scheme
- Employ Cheng/Nebenpunkte as basis to repeatedly and unexpectedly tie-up, divert, stretch-out, or drain-away adversary attention and strength in order to expose vulnerabilities and weaknesses for decisive stroke(s) by Ch'i/Schwerpunkt.

Aim
- Blind-side adversary regardless of circumstances.

SLIDE 148

COUNTER-BLITZ
a'la SUN TZU

STRATEGY

Shape Adversary Impression
Arrange elements of defense (in harmony with penchant for humans to generate mental patterns), as basis to guide adversaries to form or project patterns on the environment they are facing. In other words, emphasize certain features so that adversary intelligence, recce, patrols, and other observation activity generate mental pictures of what we seem to be doing. In this sense, we cause adversary to project tempo or rhythm as well as a sense of form or gestalt upon the environment. Naturally, this raises the question: How do we want our posture to appear to an adversary—or put another way, what kind of mental picture do we want to generate in his mind?

SLIDE 149

COUNTER-BLITZ
a'la SUN TZU

How?
Set-up positions echeloned-in-depth (similar to German philosophy) with flexibility to quickly rotate or shift both front and flank maneuver schemes—yet convince adversary (with help from "shaping" and "disruption" agencies/activities—intelligence, electronic warfare, etc.) that he is facing, for example, an in-depth strongpoint/checkerboard or multiple belts of an in-depth linear or elastic defense. In this sense, we suggest three belts or bands behind the front as follows:

- Emphasize intelligence, reconnaissance (air and ground) and set-up screen of forward outposts and patrols to report on adversary activity and warn of any impending or actual incursions.
- Deploy, disperse, and frequently redeploy/redisperse reconnaissance and mobile anti-tank/infantry/armored teams together with artillery in region behind screen, so that they can mask dispositions, as well as move inconspicuously/quickly to focus and shift local main efforts against adversary thrusts.
- Place armored teams, as mobile reserve, in echelon behind recce, anti-tank/infantry/armor and artillery so that they can easily focus effort, and quickly move-in to decapitate any local breakthrough—or push-off for a Blitz counterstroke.

SLIDE 150

COUNTER-BLITZ
a'la SUN TZU

Game

- Shift from such an ambiguous or misleading posture into a gauntlet of defense with alternate channels, sectors, or zones by thinning-out some sectors or zones in order to strengthen others.
- Basic notion is to think in terms of channels, avenues, and gauntlets (instead of just belts, bands and fronts) so that ambush gauntlets will naturally evolve or be set-up to deal with forward as well as lateral (roll-out) thrusts of adversary. In this way, ambush gauntlets can then be set-up at any level from platoon to theater.

SLIDE 151

COUNTER-BLITZ
a'la SUN TZU

TACTICS

Basic Maneuver

- Use obstacles, delaying actions, hit-and-run attacks, and/or baited retreats in thinned-out sectors/zones together with "shaping" and "disruption" activities to disorient adversary as well as pile-up or stretch-out his maneuver. Combine this action with fire and movement into adversary flank and/or rear from strengthened adjacent sectors/zones to:
  - slow momentum and blow adversary away (during pile-up) or
  - channel momentum then decapitate and break-up cohesion of thrust (during stretch-out).

Mental Picture

- Think of obstacles, delay, hit-and-run, and baited retreats together with "shaping" and "disruption" activities as Cheng or Nebenpunkte to create gaps, exposed flanks, and vulnerable rears by the pile-up/congestion or stretch-out of adversary maneuver.
- Think of Ch'i or Schwerpunkt maneuver (fire and movement) hitting unexpectedly thru gaps into adversary flank/rear, or blind-side, as a decisive stroke to pull enemy apart and roll-up his isolated remnants.

SLIDE 152

COUNTER-BLITZ
a'la SUN TZU

TACTICS

Action

- Employ air and fast moving mobile/armored recce teams, with mobile anti-tank teams, artillery, and "shaping"/"disruption" activities in support, as Nebenpunkte to determine direction/strength of thrusts and (by local front/flank combinations) to continuously harass with repeated delaying actions and hit-and-run attacks. Object is to:
  - disorient adversary;
  - provide information to senior commanders to help them decide which sectors to thin-out and which to strengthen;
  - pile-up or stretch-out adversary maneuver to "shape" (or disrupt) tempo/rhythm and pattern of Blitz attack as well as create gaps, exposed flanks, and vulnerable rears.
- Inconspicuously move-in with high speed mobile anti-tank/infantry/armored teams together with air and artillery support as Schwerpunkt to strengthen appropriate sectors that flank adversary thrusts. From here, exploit gaps, or any other vulnerabilities and weaknesses, to ambush adversary with fire together with sudden/sharp flank and rear counter-thrusts into his forward, roll-out, and resupply efforts moving through out thinned-out sectors. Object is to work Schwerpunkt in harmony with Nebenpunkte in order to break-up cohesion and roll-up isolated remnants of Blitz thrusts.

SLIDE 153

COUNTER-BLITZ
a'la SUN TZU

GRAND MANEUVER

Mental Picture

- Imagine the fluid Cheng/Ch'i or Nebenpunkte/Schwerpunkt counter-operations just discussed to be Super Nebenpunkte operations that are used to tie-up or drain-away adversary strength. Idea is to set-up and launch a Blitz counter-stroke, or Super Schwerpunkt, deep into adversary weakness while he (with his strength) is preoccupied in overcoming the challenge posed by the Super Nebenpunkte operations.

Action

- Keep pressure on and continually force adversary to adapt to many abrupt and irregular changes generated by the ongoing Super Nebenpunkte operations.
- When adversary is strung-out, or disconnected, and vulnerable: Unleash swift armored forces (held in reserve) together with air to hook-in behind and roll-up adversary Blitz as well as push-off for a Blitz Counteroffensive. Shift forces, as appropriate, from local Nebenpunkte/Schwerpunkt operations (as well as from other sectors) into this Super Schwerpunkt to both generate and exploit a decisive success.

SLIDE 154

COUNTER-BLITZ
a'la SUN TZU

CAUTION

- Extensive use of many lower-level Nebenpunkte/Schwerpunkt actions across many sectors/zones drains-away resources needed for fewer but decisive large scale Nebenpunkte/Schwerpunkt operations.
- Furthermore, experience has shown, when under active pressure, it is difficult to disengage forces committed to these local efforts and shift them to the larger operation.
- In this sense, these many shallow lower-level actions or maneuvers across a broad front tend to take-on the character Battle or Attrition Warfare while deep, large scale (up to theater level) Nebenpunkte/Schwerpunkt operations take-on the character of Strategic Maneuver.

SLIDE 155

COUNTER-BLITZ
a'la SUN TZU

Underlying Idea
Pull adversary apart and bring about his collapse by causing him to generate or project mental images that agree neither with the faster tempo/rhythm nor with the hidden form of the transient maneuver patterns he must compete against.

SLIDE 187

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Slides Omitted from Chapter 6: "The Conceptual Spiral"

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?—What is the driving mechanism that keeps the process alive and ongoing; or put another way, what phenomena sustains or nourishes the whole enterprise.—?

- One thing is clear: If our ideas and thoughts matched perfectly with what goes on in the world; and if the systems or processes we designed performed perfectly and matched with whatever we wanted them to do, what would be the basis for evolving or creating new ideas, new systems, new processes, new etc.? The answer: There wouldn't be any!

In other words

- The presence and production of mismatches are what sustain and nourish the enterprise of science, engineering, and technology, hence keep it alive and ongoing—otherwise there would be no basis for it to continue.

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VERY NICE
BUT

?—How does this enterprise of science, engineering, and technology affect us personally as individuals, as groups, or as societies—?

- As already shown the practice of science/engineering and the pursuit of technology not only change the physical world we interact with—via new systems, new processes, new etc.—but they also change the mental/physical ways by which we think about and act upon that world.

In this sense

- The practice of science/engineering and the pursuit of technology permit us to continually rematch our mental/physical orientation with that changing world so that we can continue to thrive and grow in it.

Put simply

- The enterprise of science, engineering, and technology affects us personally as individuals, as groups, or as societies by changing our orientation to match with a changing world that we, in fact, help change.

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