

TECHNOLOGY AND THE ART OF WAR

- The mobilization of large armies and the massing of enormous supplies through a narrow logistics network -- magnified by the presence of Napoleon's tactical rigidity, Clausewitz's battle philosophy, and Jomini's formalism -- "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)

? - RAISES QUESTION - ?

- Why were the 19th century and early 20th century commanders unable to avoid over a half century of debilitating casualties?

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.

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.

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Is NATO Building a Technological Achilles' Heel?

Can ET save NATO, and save money to boot? ET stands for "emerging technology," and it conjures up a wondrous world where cheap microchips instead of costly manpower will stem the Warsaw Pact nations' mechanized hordes and give victory to the West.

ET stands for fancy radars that will peer deep into the enemy's hinterland and detect forward-thrusting tank formations before they can get anywhere near the notorious "Fulda Gap" on the West German border. These radars will track and map

Europe

by Josef Joffe

them, feeding that intelligence to super-smart missiles that can destroy targets with pinpoint accuracy across vast distances. These rockets will spew forth dozens of miniprojectiles that—unguided by human hands—will seek out and then hurtle into their moving prey below.

Other missiles will hunt for stationary targets: bridges, airfields, ammunition dumps, command and control centers. At the end of the day, the Warsaw Pact nations' battle plans will lie in tatters. Western technology will have bested Soviet mass and momentum; the attack will grind to a halt for sheer lack of steam. And not a single nuclear weapon will have been launched.

"Deep Strike" — also known as the "Rogers Plan" or "Follow-On Forces Attack" in NATO parlance—hopes to crush the bear's tail in order to blunt its bite. It is no surprise that this concept should have captured so many imaginations so quickly. To rattled political leaders, especially in Europe, the substitution of conventional precision for nuclear havoc promises relief from street-based, anti-nuclear tormentors. To their finance ministers, it holds out a shiny new technology that would be cheaper than adding more units of tactical air power. To the strategists, Deep Strike offers an elegant counter to the nightmare of Soviet tank superiority (3 to 1). If long-range strikes will stave off the Pact nations' second and third echelon, if they unhinge the aggressor's delicate reinforcement schedule, then the North Atlantic Treaty Organization's forward forces will be amply prepared to trap and destroy the aggressor's armies.

Alas, there is no free lunch and no quick fix. Deep Strike now comes with a nice round figure attached: \$10 billion over 10 years. If experience is any guide, costs will soar not by percentages but by multiples. Take the West's last wonder weapon: the cruise missile. Priced at \$2.2 million each six years ago, it now costs closer to \$7 million.

But these are only the familiar cost overruns. In addition, costs will be driven upward by the "slingshot syndrome." Remember that young David was facing a technologically superior enemy in Goliath because the Philistines had already mastered the art of iron forging whereas the Israelites were still fighting with soft bronze swords. Yet David felled the giant with tactical surprise and a cheaper and more primitive counterweapon: a pebble launched via slingshot.

In modern times, the British foiled Exocet anti-ship missiles off the Falklands with a World War II defense: chaff. Smart weapons, which are guided by radar or heat-sensitive seekers, are confused by dumb defenses. To addle the "brains" of these weapons, there is a host of very cheap countermeasures: smoke, radar reflectors, aerosols, flares and decoys. To overcome those, Western weapons will have to be equipped with ever more sophisticated sensors, making them prohibitively complex and costly.

Even now, Deep Strike works only—and then not very impressively—in tests heavily skewed toward success. While one of the critical radar components (JSTARS) managed to "acquire" a handful of moving test targets, these happened to be moving in a setting not exactly typical of Central Europe: in a desert mercifully bereft of obstructions and ambiguous contrasts. In another test, an Assault Breaker missile managed to engage a cluster of tanks. Yet the test was ridiculously easy. The tanks were not in motion, and their engines were running, providing inviting "hot spots" for the missile's infrared seekers. In real life, Russian tanks move "cold," namely on tank trailers, before they get to the front. And real-life tanks have baffles that diffuse hot exhaust gases.

There is also a logical limit to the substitution of precision for raw explosive power. Tanks that are merely pierced by tiny submunitions can still roll onward to victory—as the Israelis demonstrated in Lebanon. And runways that are merely cratered still can be repaired—as opposed to a nuclear blast that obliterates the entire base.

But assume that Deep Strike works, that its delicate eyes and brains work in

the chaos of real warfare, and that the costs somehow can be absorbed. Even then, Deep Strike may only be tomorrow's solution for yesterday's problems. The Soviets are apparently quite aware of threats to their follow-on forces. Beginning in the 1970s, their strategic reforms have aimed at a dual objective: to execute an unreinforced attack, and to deny "lucrative" targets to NATO's longer-range nuclear weapons. The Soviet offensive will no longer be a battering ram, extending all the way from Western Russia, but running water searching for gaps. The Soviets are in the process of rewriting a new book of military tactics favoring surprise, more "disorderly" timetables, and opportunistic breakthroughs along a fluid, indeterminate front.

Such a reform would turn Deep Strike into a revolution without a cause; and to blunt the bear's bite, the West would invest in a costly interdiction technology merely to crush a tail no longer waiting to be hit. It's the jaw that matters—today more than ever. And politics and geography bid NATO to deny territory, not to liberate it after the Pact nations' "supply train" is chewed up. If it ever is—for history shows that interdiction campaigns rarely succeed. Remember the Ho Chi Minh Trail?

Those who worry about NATO's ailments should not seek solutions deep within the Warsaw Pact nations because the real problems are so much closer to home. Logically, the emphasis ought to be on buttressing the vital forward-defense line. And that means massive investments in readiness to deter standing-start attacks, plus highly mobile reserves as insurance. You could buy a lot of tanks, helicopters and self-propelled artillery for \$10 billion.

European finance ministers might want to consider spending money instead on such unglamorous items as bullets, bombs and shells. This would make some Western commanders, who can now only look forward to a few days' supplies, very happy. Or they might finally buy decent air defenses for those bases that will bring in U.S. reinforcements. In the next war, ships will arrive too late.

Stock up on the insurance and then, perhaps, Deep Strike will make sense as reinsurance policy—against the Pact nations' armies once more forced to fall back on concentration and reinforcement strategies because opportunities for pre-emption and speedy breakthroughs aren't there.

Mr. Joffe is a senior associate at the Carnegie Endowment for International Peace in Washington.

Extract from
ADMINISTRATION OF THE NAVY DEPARTMENT IN WORLD WAR II
by Rear Admiral Julius Augustus Furer USN (Retired)
"Adm. E.J. King's Philosophy of Command"
FOR ELECTIVE COURSE IN COMMAND AND CONTROL

Reprinted from Administration of the Navy Department in World War II, by Rear Admiral Julius Augustus Furer USN (Retired), Washington 1959.

Appendix 1

Adm. E. J. King's philosophy of Command

"CINCLANT SERIAL (053) OF JANUARY 21, 1941

Subject: Exercise of Command—Excess of Detail in Orders and Instructions.

1. I have been concerned for many years over the increasing tendency—now grown almost to "standard practice"—of flag officers and other group commanders to issue orders and instructions in which their subordinates are told "how" as well as "what" to do to such an extent and in such detail that the "Custom of the service" has virtually become the antithesis of that essential element of command—"initiative of the subordinate."

2. We are preparing for—and are now close to—those active operations (commonly called war) which require the exercise and the utilization of the full powers and capabilities of every officer in command status. There will be neither time nor opportunity to do more than prescribe the several tasks of the several subordinates (to say "what", perhaps "when" and "where", and usually, for their intelligent cooperation, "why"); leaving to them—expecting and requiring of them—the capacity to perform the assigned tasks (to do the "how").

3. If subordinates are deprived—as they now are—of that training and experience which will enable them to act "on their own"—if they do not know, by constant practice, how to exercise "initiative of the subordinate"—if they are reluctant (afraid) to act because they are accustomed to detailed orders and instructions—if they are not habituated to think, to judge, to decide and to act for themselves in their several echelons of command—we shall be in sorry case when the time of "active operations" arrives.

4. The reasons for the current state of affairs—how did we get this way?—are many but among them are four which need mention; first, the "anxiety" of seniors that everything in their commands shall be conducted so correctly and go so smoothly, that none may comment unfavorably; second, those energetic activities of staffs which lead to infringement of (not to say interference with) the functions for which the lower echelons exist; third, the consequent "anxiety" of subordinates lest their exercise of initiative, even in their legitimate spheres, should result in their doing something which may prejudice their selection for promotion; fourth, the habit on the one hand and the expectation on the other of "nursing"

1. In the three months that have elapsed since the promulgation of the reference, much progress has been made in improving the exercise of command through the regular echelons of command—from forces through groups and units to ships. It has, however, become increasingly evident that correct methods for the exercise of initiative are not yet thoroughly understood—and practiced—by many echelon commanders.

2. The correct exercise of the principle of the initiative is essential to the application of the principle of decentralization. The latter, in turn, is premised on the basic principle known as 'division of labor', which means that each does his own work in his own sphere of action or field of activity.

3. What seems to have been overlooked is that the exercise of initiative as involved in 'division of labor' (as embodied in 'decentralization') not only requires *labor* on the part of those who exercise any degree of command, but, as well and even more particularly, on the part of those who exercise initiative. It also seems to have been overlooked that the correct exercise of initiative is applicable not only to operations but to administration and, as well, to personnel and material matters.

4. (a) Initiative means freedom to act, but it does not mean freedom to disregard or to depart *unnecessarily* from standard procedures or practices or instructions. There is no degree of being 'independent' of the other component parts of the whole—the Fleet.

(b) It means freedom to act only after all of one's resources in education, training, experience, skill and *understanding* have been brought to bear on the work in hand.

(c) It requires intense application in order that what is to be done shall be done as a *correlated part of a connected whole*—much as the link of a chain or a gear-wheel in a machine.

5. In order that there may be clearer understanding—and better practice—in the exercise of initiative, the following paraphrase of certain passages in the reference, together with appropriate additions, are enjoined as a guide upon all those concerned in the exercise of initiative:

... active operations (commonly called war) require the *exercise* and the utilization of the *full powers and capabilities* of every officer in command status';

'Subordinates are to become "habituated to *think*, to *judge*, to *decide* and to *act* for themselves"';

It requires *hard work*—concentration of powers—to exercise command effectively and, frequently, even harder work to exercise initiative *intelligently*;

When told 'what' to do—make sure that 'how' you do it is effective not only in itself but as an *intelligent, essential* and correlated part of a *comprehensive and connected whole*."

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COMMAND AND CONTROL AND UNCERTAINTY

by F.M. Snyder

FOR ELECTIVE COURSE IN COMMAND AND CONTROL

Reprinted from the Naval War College Review, March-April 1979.

COMMAND AND CONTROL AND UNCERTAINTY

Whoever coined the phrase "command and control" really understood psychology. By joining together two such active, forceful words, he created a term that we seldom feel negatively about--unless we find it being used by some senior in the chain of command. The view of command and control as an active, positive process may underplay the role of uncertainty, but such a view is closer to truth than the myth that command and control is primarily an exercise in processing data. In essence, command and control is a system for decision-making, where the decision-maker is at a distance both from the phenomena that he bases his decisions on, and from the people who must carry them out. For most of us a "good" command and control system is one that starts where we happen to be standing on the ladder of command, and goes down; those command and control systems that extend upward seem much less necessary or desirable. Different perspectives generate different views of utility and function.

It is the purpose of this paper to provide some insight into command and control systems from a general perspective so that the reader can appreciate the relationship of command and control to other aspects of naval warfare.

Three characteristics of military command and control are fundamental to its appreciation:

hostilities, which are strategic decisions made at the highest level. In any case, the paramount decision in command and control is the decision to engage the enemy (or if engaged, to disengage), followed in importance by the decision to commit the reserve force.

The reduction of uncertainty--the method of command and control--is the prerequisite to intelligent action. When a command and control system is used to direct the application of force, the commander who initially orders an action, the commander who carries it out, and any intervening commanders must reduce uncertainties so they can act at all. Questions of two kinds need to be resolved in order that action can be taken: What is actually happening? How are events likely to be affected by alternative courses of action? It is important to realize that consideration of either question implies some answer to a prior question--What is the mission to be accomplished? Whenever a commander is uncertain about what he has been directed to do, command and control has failed just as surely as if the real-time information essential to his decision-making is unavailable. Although command and control appears to be primarily a matter of receiving reports and pumping out orders, it really is an "uncertainty-reducing" "decision-making" process.

The importance of command and control can best be appreciated by considering the penalties for its failure. In a

- The FUNCTION of command and control is to direct the application of force.
- The METHOD of command and control is to reduce uncertainties so that commanders can take action.
- The IMPORTANCE of command and control is that it enables commanders to apply force at the right place, at the right time, and in the right amount, or, alternatively, to prevent force from being applied at the wrong time or place.

After these three characteristics are developed in detail, the problems of evaluating the exploiting command and control systems will be considered.

While the function of a command and control system is to direct the application of force, it can usefully be employed to do other things. In fact, because force is applied so rarely in normal peacetime, it is wise to exercise a command and control system for other purposes, so that it will function as intended when the time comes. But if a command and control system becomes optimized for something other than directing the application of force, it might perform its primary function poorly--or not at all--when the time comes for action. During wartime, most decisions to apply force are tactical, closer (both physically and organizationally) to the scene of action than similar decisions made in peacetime or at the commencement and termination of

hostilities, which are strategic decisions made at the highest level. In any case, the paramount decision in command and control is the decision to engage the enemy (or if engaged, to disengage), followed in importance by the decision to commit the reserve force.

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tactical engagement, failure in command and control may prevent the commander from bringing all his resources into action, or from applying them efficiently. As a result, perhaps, an engagement is lost. In a strategic situation, on the other hand, failure in command and control may mean that a great opportunity is lost, or that the level of hostilities has been escalated unnecessarily. In a tense international situation, because there is no margin for error in targeting, timing, or amount of force, extraordinary measures are taken to avoid failure of command and control.

What does a command and control system consist of? Each command and control system (and in theory there is one for each commander) has two inputs--directives and information--two outputs--orders and reports--and two internal processes--situation assessment and the generation of directives and reports. Besides command facilities and intervening communications links, a command and control system also includes such elements as doctrine, training, and rules of engagement--anything, in fact, that helps reduce the uncertainties that will exist at all levels when it is time for decision and action. The frequent discussions Lord Nelson held with his unit commanders and commanding officers were clearly a part of his command and control system. The balance between the "static" components--like rules of engagement and doctrine--and the "dynamic" components--direct communications and

interactive access to computers--will vary from system to system.

It is possible to imagine a rigid command and control system that prescribes specific actions for each anticipated set of circumstances, and that when an unanticipated circumstance arises, prohibits actions without reference to higher authority. On the other hand one could visualize a much looser command and control system that authorizes any action that in the commander's judgment might contribute to the achievement of the unit's broad objectives, and where higher authority would be informed of such actions only "after the fact." It is also possible to visualize a command and control system where each echelon shares the same facts and the same directives, operating on the premise that reasonable men at any echelon, given the same facts and objectives, would most likely take the same action.

The intent of this paper is not to argue the merits and demerits of alternative command and control philosophies, but to stress that alternative philosophies can exist, and that command and control systems that support different command philosophies are likely to be optimized differently. Furthermore, command and control systems tend to be reasonably simple when the number of situations requiring decision are few, and the repertoire of responses to each situation is limited.

Complexity increases in proportion to the number of situations and the number of responses. A large command and control system for strategic warfare is inherently simpler than a tactical system that must cope with a larger number of alternative situations and courses of action.

Because a command and control system is inherently a process for making decisions, it is difficult to evaluate the quality of one without evaluating the quality of the decision making itself--a controversial and generally imprudent thing to do. Yet, one characteristic that might be measured without prejudice to the commanders involved is "time." The uncertainties that a command and control process tries to deal with can all be reduced or even resolved--over time. There is a presumption that timeliness has utility. A system that can tell the commander the status of his forces, the location of the enemy, or the probable result of alternative courses of action with a "time-late" of only five minutes is a better system than one that provides him the same information an hour later. It is not enough that the commander eventually receive the facts and projections on which to take that action. Uncertainties are reduced continuously as more time after an event elapses, so there is, in effect, a time-uncertainty product that remains more or less constant for each system, and the smaller this product is, the better the system.

The time-uncertainty model suggested above is also useful when thinking about the command and control system of an enemy. If one assumes that the utility of any command and control system is degraded whenever it requires more time to resolve uncertainties, it is worthwhile to try to add to an enemy's uncertainties and to lengthen the time he must take to resolve them. Injecting uncertainties to confuse an enemy's command and control system has the effect of increasing the time-uncertainty product of his system.

Even though the principles of command and control systems remain relatively unchanged, technology is changing the way that such systems actually function. Command and control systems are being affected by technological changes in telecommunications and computers in three areas: the means of communicating over great distances, the means by which a commander absorbs and assesses the existing situation, and the means by which he projects and assesses the probable effects of alternative courses of action. These technological changes result largely from the application of digital computers and advanced transmission systems.

Despite the greater use of digital systems, to facilitate both the correlation and transmission of information, the originator and recipient--the commander himself--speaks and perceives in an analog form. In order to utilize digital

computers, it is necessary to convert data and information from analog-to-digital form at input, and from digital-to-analog form at output. Many of the problems encountered in command and control systems are related to these conversions. Who bears the burden for them? Until computer programs can be developed that enable computers to accept human voice input directly, the commander or his staff must make the conversion by typing, formatting, or otherwise disciplining the information so the computer can deal with it.

The contrast between the analog and digital approaches to display can best be seen in clocks and watches. The hands of the clock may convey more about how much of an hour remains, while the display of the digital clock leaves no doubt about the nearest minute. In a financial report, colored graphs can give a sense of proportion while detailed tables of numbers fix exact amounts with presumed precision. Unfortunately, the danger in relying too heavily on displays, particularly digital displays, is that there is no easy way for them to reflect uncertainty. The digital world is based on the definite presence or absence of data, and assumes a certainty that probably does not exist.

Telecommunications is in the midst of a conversion from analog to digital, from systems designed to carry the human voice to systems designed to transmit a digital bit

stream. Until recently, most forms of communication were fitted into some fraction of or multiple of the bandwidth required for a human voice. The fleet broadcast and major ship/shore circuits have for years consisted of 8 or 16 teletype channels organized to be transmitted in the same radio frequency space required for a single voice circuit. While the human voice seems simple to humans, it is quite complex to a computer. Modern cryptographic systems rely on the addition of two digital bit streams--one representing the information, the other being a cryptographic key stream--but the human voice must be converted from analog-to-digital form to be encrypted and from digital-to-analog form to be decrypted.

There is a special symmetry about systems that communicate information. For every step of the process, there must be a corresponding step at the other end that has the opposite effect. Every encryption must be decrypted, every transmission must be received, every conversion must be reversed.

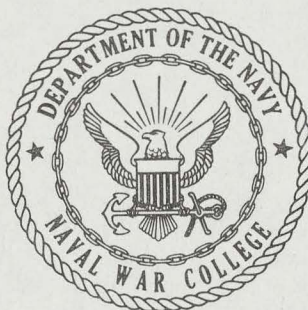
The special themes of this paper are that a command and control system is useful to the extent it can help a commander reduce or resolve uncertainties, and that there are inherent difficulties whenever information must change its fundamental form--from analog to digital or vice versa.

Machines can be programmed to take specific actions in

specific circumstances. It takes a man to act in an ambiguous or uncertain situation. In warfare, that man is the commander. He knows that he will have to take action in the face of uncertainty, but he should also know the capabilities of the system that should reduce those uncertainties--his command and control system.

THE UNITED STATES NAVAL WAR COLLEGE

Naval Operations Department



BLITZKRIEG FROM THE SEA:

MANEUVER WARFARE AND AMPHIBIOUS OPERATIONS

by Captain Richard S. Moore, USMC

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Blitzkrieg From the Sea: Maneuver Warfare and Amphibious Operations*

by

Captain Richard S. Moore, US Marine Corps

Recent military events have reinforced a long-held naval belief in the necessity for a maritime nation to maintain an amphibious assault capability. The British reconquest of the Falklands again demonstrated the efficacy of amphibious forces, even when outnumbered and facing high technology, stand-off weapons. In the Middle East, Israeli Army units sliced into Lebanon using a combination of armored thrusts and amphibious bounds. Of equal significance to American military planners, the Rapid Deployment Force has recently been elevated to the status of a separate unified command, an action that has necessitated a reemphasis on amphibious operations unseen since the 1940s and Inchon. Changes predicted by the disciples of modern weapons development have not diminished the need to structure and deploy forces able to cross the seas and project power ashore.

Yet, if recent events have restated a long-known military fact, modern technology has raised serious, even fundamental, questions concerning the tactical costs of amphibious landings. In the Falklands, heavy casualties jolted the British and could well have been politically decisive had the Argentine forces been better led. Even in its weakness, Argentina shocked military observers by exacting a frightening toll on British shipping; the near-disastrous landing at Port Fitzroy provided a bloody lesson in the destructiveness of today's weapons.¹ Israeli amphibious forces, mindful of Russian-equipped Palestinians, remained closely tied to advancing inland columns; while Israeli soldiers and airmen displayed a healthy respect for PLO fighters armed with antitank and air defense missiles.² Today, planners at the newly established Central Command are grappling with problems echoing those encountered by the British and Israelis and revolving around one question—how best can amphibious landing forces be placed ashore in the face of almost revolutionary advancements in weapons capabilities?

The problem of getting forces ashore becomes more acute when one must deal with well-trained enemy forces bent on denying access to the shoreline. The basic requirements of an amphibious assault, long held to be vital to

*This article won the Admiral Richard G. Colbert Memorial prize, the essay judged to be the most professionally worthy of those submitted for the award.

success, may no longer be attainable. Unlike the Pacific landings of World War II, amphibious objective areas could prove to be impossible to isolate. Air and naval superiority in the objective area may only be achieved temporarily. Finally, enemy defenses and counterattacks may prevent the landing force commander from methodically building up his combat power ashore before breaking out of his beachhead. Since the early months of 1943, naval planners have relied on these three basic requirements being met; indeed, current amphibious exercises assume that they have been. Unfortunately, the future may not be so generous. The amphibious problem has, regrettably, not kept pace with technological development. Newly procured Light Carrier Air Cushions and Joint Vertical experimental-type aircraft, if employed using traditional methods, will change nothing. The solution requires far more than the mere application of technology.

In recent years, military reformers have advocated an approach to land tactics that may offer an alternative. Adopted by the Army in its doctrinal bible, *FM 100-5*, maneuver warfare calls for tactics that target enemy cohesion and command, rather than physical assets.³ The prophets of maneuver warfare have largely ignored the amphibious dimensions of their ideas, and organizational separations between naval and land combat have tended to complicate the tenets of maneuver warfare. This essay will attempt to bridge that gap. Following a discussion of the concepts of maneuver warfare, current amphibious doctrine will be meshed with those concepts in the hope that new tactics and techniques may emerge. Success in such a venture could forestall a return to a Gallipoli-like syndrome.

Maneuver Warfare Concepts. The concept of maneuver warfare centers on the decision analysis done by retired Air Force Colonel John Boyd. First conceived in terms of air-to-air combat, Boyd developed a decision model based on four distinct steps—observation, orientation, decision, and action (OODA). Since every combat situation requires opponents to pass through a cycle of observing a situation, orienting towards it, deciding on a course of action, and then acting on that decision, Boyd postulated that victory would be achieved by the combatant who was able to complete this cycle at a faster tempo. The military force able to “get inside” an adversary’s loop, thus forcing him to react to vague images of surrounding events, creates turmoil within the enemy command. The subsequent confusion and disorientation would compound itself until the enemy, although probably not physically destroyed, proved incapable of continued effective resistance.⁴

Expanding on his theory, Boyd and other military analysts embarked on a detailed study of military history in order to find the means by which victorious armies were able to operate at a faster tempo than their enemies.⁵ The key elements proved to be relatively simple. Through three basic tools—(1) the focus of main effort, (2) surfaces and gaps, and (3) the

commander's intent—military organizations from Napoleon's Grand Army to the Israeli Defense Force have been able to secure victory, often against numerically and technically superior opponents. These three tools enabled victors to reduce the time needed to arrive at decisions and to act, thus creating situations in which their opponents faced rapidly changing and often multiple threats.⁶

The focus of main effort—what the Germans called the *schwerpunkt*—serves as the driving force in maneuver warfare. Like the objective of the familiar principles of war, the focus of main effort provides direction to a military operation. Yet, the *schwerpunkt* is more. It is a conceptual objective that aims at enemy weaknesses, be they physical, moral, or organizational. As such, the focus of main effort changes with the combat situation, constantly searching for a means to shatter the enemy's cohesion. At Chancellorsville, Lee found it among the dining Federal troops of Hooker's right flank. At the Battle of Leyte Gulf, Clifton Sprague's *schwerpunkt* lay in the near suicidal charge of his destroyer escorts against the Imperial Japanese Navy's mighty battleships, who retreated at the moment of victory, their nerve shattered by the fanatical Americans. In both cases the focus of main effort aimed at a vital enemy weakness only momentarily exposed.

Enemy weaknesses, however, are only important if discovered; therefore the second tool of maneuver warfare must be employed, that of surfaces and gaps. Quite simply, the search for surfaces and gaps requires small probing forces to seek out enemy frailties, bypassing or avoiding centers of resistance. The commander, once a gap is located, pushes his reserve forces forward to exploit the discovered crack. The enemy quickly becomes preoccupied with thwarting these probes. By using multiple axes, an attacker can confound his opponent. First used by the German Army in its 1918 Western Front offensives, and soon after delineated in Liddell Hart's "expanding torrent" theory,⁷ the concept of surfaces and gaps became a critical tool in *blitzkrieg* tactics, accounting for many of the German Wehrmacht's victories. During the US Navy's Central Pacific drive of World War II, Marine assault forces employed this concept to drive through Japanese defenses, mopping up bypassed centers of resistance after securing the islands. Despite confined spaces, the Marines quickly disorganized Japanese defenses, significantly reducing their effectiveness.⁸

Neither the *schwerpunkt* nor its extension, the search for surfaces and gaps, can be successful if not controlled by the third tool of maneuver warfare, the commander's intent. Distinct from confining restrictions symbolized by detailed map overlays, the commander's intent acts as a binding glue, giving form to the amoebic movements of subordinates. The intent allows widely separated units, faced with unique situations, to act within the parameters of the commander's wishes without sacrificing initiative and flexibility. The intent differs from mere statements of mission or objective, which are usually expressed in terms of terrain features or geographic locations, in that it

orients on the enemy. A subordinate commander, faced with a unique situation that requires a rapid decision, is thus able to act without specific orders or permission yet remain within his commander's overall scheme. Nelson's ships' captains, prior to the Battle of Trafalgar, clearly understood the intent of their commander after reading his orders, which stated, in part, that "the second in command will after my intentions are made known to him have the entire direction of his line to make the attack," and concluded with the instruction, as clear as it was stirring, "in case signals can neither be seen nor perfectly understood no captain can do very wrong if he places his ship alongside that of an enemy."⁹ Nelson understood the underlying principles of maneuver warfare.

The type of initiative inherent in maneuver warfare, necessary to generate enemy confusion, requires thorough integration of all arms. Not to be confused with the current concept of supporting arms, combined arms seek not to destroy targets, but to create situations in which an action taken to avoid the effects of one weapon quickly exposes the enemy to another. The recent Israeli use of ARM air-to-ground missiles against Syrian air defenses forced the Syrians to shut off pulse-emitting tracking radars. No sooner had they done so than Israeli aircraft, armed with conventional bombs, destroyed the dormant air defense positions. The Syrians faced destruction regardless of the action.¹⁰ Such use of combined arms, by creating multiple threats, produces a synergism far more deadly than that of supporting arms.

The basic tools of maneuver warfare, although vitally important, will be of only marginal utility if not applied with a thorough understanding of the concept of the operational art. Defined as the art of using tactics to strike at an enemy's strategic center of gravity, the operational art is a thought process that enables commanders to see through what has been often described as the fog of war. Concentrating on the whole combat action, a commander skilled in the operational art will be concerned with tactical events only if they impact on his ability to achieve his objectives. The mere seizure of a piece of terrain accomplishes little unless its seizure places the enemy in a disadvantageous position, not in the tactical sense but in the operational sense. Napoleon, perhaps the greatest master of the operational art, or what he called the *coup d'oeil*, suffered many tactical setbacks during the early hours of the Battle of Austerlitz, only to unleash his reserves on the Austrian center, greatly extended and weakened, at the critical moment. The Austrians, seeking to accumulate small tactical success in the hopes of rolling up Napoleon's army, had failed to look beyond their momentary victories. Napoleon, unperturbed by the Austrian advances, observed their dangerously thinned center and smashed it, routing the Austrian army in the process.¹¹

As can be seen in the preceding paragraphs, maneuver warfare possesses unique characteristics. Based on Boyd's OODA decision cycle, it combines the three tools—the focus of main effort, surfaces and gaps, and the

commander's intent—within the concept of the operational art. The result is a style of warfare that, while fluid and decentralized, maintains its orientation on the enemy's strategic weaknesses. In order for maneuver warfare to be successful, new tactics and techniques must be developed that will enable diverse elements to act and react faster than the enemy, creating confusion in the opponent's command structure by forcing him to react to multiple and indistinct images of the battle. Herein lies the critical challenge to practitioners of amphibious warfare.

Applying the Concepts. Modern amphibious doctrine traces its origins to the early years of the Depression, when a few marines at Quantico produced the first manual on landing operations. Tested and expanded in the ensuing years and combat proven in World War II, the principles of amphibious warfare have remained remarkably resilient in the face of changing technology and methods of warfare. Yet, today, amphibious doctrine faces serious challenges. Basic requirements for air superiority, objective area isolation, and methodical buildups ashore may no longer be attainable. Like any tactical doctrine faced with changing external conditions, amphibious doctrine must be capable of adapting new ideas to proven principles. The meshing of maneuver and amphibious warfare may provide such a synthesis to produce a new doctrine as devastating as that formulated fifty years ago at Quantico.

Before molding new tactics and techniques from this doctrinal synthesis, a more fundamental, operational examination of amphibious warfare is necessary. Conceptualizing amphibious landings in terms of the operational art reveals a glaring, and potentially disastrous, division between the so-called ship-to-shore movement and operations ashore.¹² By tactically separating the naval and the land components, amphibious forces have created a functional split that could seriously degrade their ability to create, and react to, rapidly changing situations. Command relationships have always been recognized as critical in an amphibious assault. Rarely, however, have they been based in the operational situation. Too often command structures have conformed to more static, and artificial, divisions of labor delineated by the high water mark. The amphibious landing must be viewed in its entirety. In doing so, naval and land forces become interchangeable components of an operational whole. The key factor in determining command relationships is the operational, not tactical, situation. Both naval and ground force commanders must understand this and be prepared to sacrifice short-term tactical goals to achieve operational objectives. Whether the amphibious task force or landing force commander controls elements of an amphibious landing will be wholly dependent upon what considerations, be they naval or ground, are critical to achieving operational objectives.

In developing the command relationships for an amphibious operation, every effort should be made to ensure total integration of all arms. Naval

gunfire, air support, artillery, as well as combat and service support units require mutual enhancement to be of maximum effectiveness. The current integrative means embodied in the Supporting Arms Coordination Center and the Fire Support Coordination Center, while able to reduce duplication and friction among combat support assets, fails to foster the type of operationally oriented combined arms structure necessary for maneuver warfare. While coordination is important, the ability to combine diverse elements, quickly shifting them to meet rapidly changing situations, is essential. A cruiser armed with Standard missiles may be placed under the operational control of the landing force commander to provide air defense for his forces ashore. In a different situation, land-based Hawk missile launchers could be assigned to the amphibious task force commander. Combined arms synergism cannot be restricted by more traditional, and too often parochial, combinations of weapons.

New command relationships based on an appreciation of the operational art are but the first step in integrating maneuver warfare and amphibious operations. Tactics and techniques must be developed that will retain the battle-proven principles of amphibious doctrine and apply them to the new realities of modern combat. Given today's surveillance capabilities, there is little likelihood that an amphibious task force will achieve strategic surprise. Yet, operational surprise, through the creation of multiple threats and the employment of new combat and logistic techniques is still quite possible, and following are some suggested techniques. It should be remembered that tactics and techniques are only tools with which to develop solutions to combat problems and thus are useless if considered as separate entities.

The operational significance of coastal waters has never been fully appreciated. Unlike inland terrain, with its hills, streams, forests, and various other obstacles, the ocean is relatively flat, even in weather conditions that often slow or stop land campaigns, offering amphibious forces a plain on which to conduct initial operations. The advantages offered by this plain can be exploited using new landing tactics based on multiple landing points and rapid shifting of forces. Instead of the relatively static and predictable broad landing beaches currently used, much narrower landing points of no more than tens of yards width offer an opportunity to seek out enemy weaknesses. By landing his forces across multiple landing points, perhaps in waves of companies, a commander retains the ability to develop situations while committing minimal forces. If successful, initial landing forces can be immediately reinforced by uncommitted units; if not, they can be quickly withdrawn and shifted to more successful landings. Such a concept proved highly successful during MacArthur's drive along the New Guinea coast in 1943 and 1944. Hamstrung by limited quantities of amphibious shipping, and unsure of Japanese defensive concentrations, the Seventh Amphibious Force

became expert at limited visibility landings across lightly defended landing points, rapidly reinforcing success and evacuating failures. Many of these landings faced enemy air and naval superiority.¹³ Orienting on the enemy, the amphibious commander of the next decade, equipped with Joint Vertical experimental-type aircraft and Light Carrier Air Cushions, will be capable of landing at several points along an enemy coastline, seeking out enemy weaknesses and shifting forces to exploit them. Such landings, undertaken at night or in limited visibility and coupled with feints and demonstrations, could prove devastating to the cohesion of enemy coastal defenses.

Effective control of forces landing over dispersed landing points can only be maintained through mission-type orders. Such orders, clearly stating the intent of the overall task force commander, as well as the amphibious and landing force commanders, allow dispersed units to act freely within the operational objective. More importantly, subordinate commanders can fully understand their role if required to shift to another landing point or to drive inland. The glue is the commander's intent, not geographic objectives, beachhead lines, or limits of advance. While these geographic control measures may be helpful in articulating intent, they should be guides, not unbreakable shackles. To adjust his focus of main effort or react to rapidly shifting circumstances, the commander cannot rely on detailed reports; instead he must position himself where he can see the developing situation. Radio lined spaces aboard ships will not provide the landing force commander with the type of information and control needed to get a "feel" for the battle. Placing himself well forward, he can assess the situation and allocate forces to influence the action while retaining operational flexibility and allowing maximum subordinate initiative at the tactical level. Despite appalling losses, marines seized Tarawa largely because Colonel Shoup established a command post ashore and assumed operational control, directing crucial landings of reinforcements. Inland, subordinate commanders fought the tactical battle, fully understanding the landing force mission. Throughout, the 2d Marine Division Commander, aboard the USS *Maryland*, merely watched.¹⁴

The flexibility and rapid response required of maneuver warfare mandates modifications in air, naval, and logistic support procedures. Traditional concepts of close air support face serious challenges from modern, mobile air defense systems. Heavy casualties among Israeli close air support aircraft in the Yom Kippur War of 1973 offers but one tragic example of the lethality of modern antiair weapons. Indeed, close air support, as currently practiced, may be obsolescent. While marine artillery units have grappled with the problems of flak suppression,¹⁵ the answer for vulnerable close air support aircraft may be conceptual rather than technical. One solution involves a combination of decentralized assignment of air assets and battlefield air interdiction. Decentralization can be achieved through a system of forward

operating bases and locations from which V/STOL aircraft and helicopter gunships are staged into the battle area. In place of mission assignment through a Direct Air Support Center, these aircraft are placed under tactical control of ground commanders. Refueling and rearmament are accomplished at the forward operating bases.¹⁶ In the amphibious assault, aircraft would stage initially from seaward platforms, such as LPHs, and would report to ground commanders using landing zones or, in the case of V/STOL aircraft, roadways. In this manner, local flak suppression can be accomplished with a minimum of lengthy coordination and expenditure of ammunition. A combination of attack helicopters and V/STOL aircraft can even provide mutual flak suppression. Currently, Marine Corps aviators are experimenting with elements of this decentralized close air support system with a high degree of success.¹⁷

Battlefield air interdiction provides effective air support to ground forces while largely freeing both air and ground units from detailed, and often restrictive, coordination procedures. Quite simply, battlefield air interdiction calls for conventional fixed-wing aircraft to attack targets beyond the Fire Support Coordination Line.¹⁸ Fully briefed on the ground commanders' intent, pilots flying such missions will be tasked with interdiction of enemy forces beyond the immediate zone of combat. Command centers, logistics elements, and reserve forces are lucrative targets for air attack, the resulting confusion and destruction degrading the enemy commander's ability to react to changing conditions in the ground battle. While battlefield air interdiction will require aviation units to develop tactics similar to those used by the Israelis in the Bequ'aa Valley, it offers a highly flexible and survivable operational alternative for attack aviation supporting amphibious landings.

Naval support of an amphibious landing, like aviation, must also become more flexible. As has been discussed, ships' captains may be required to temporarily come under the control of the landing force commander. To be truly effective, supporting ships require a thorough understanding of operations ashore, particularly the intent of the landing force commander. In the absence of specific orders, actions can then be taken to influence the operational, or even tactical, situation. The destroyer gunfire that decimated German emplacements on Omaha Beach on 6 June 1944—provided without specific request—clearly illustrates this point. Of equal significance, however, are those units directly involved in the landing who, unfortunately, often see their mission in very narrow terms. These elements, which include beachmasters, landing craft, and control craft, serve a vital function that can be made far more effective employing maneuver warfare concepts. Tasked with transporting assault troops and their supplies, these Navy units must become closely attuned to the operational situation ashore, particularly one involving multiple landings and offshore shifting of forces. They must view their mission in its operational context, and be ready to act as

the seaward extension of the landing force. The key rests in closely uniting naval and land forces, not only physically, but operationally.

One final aspect of amphibious operations must be discussed—logistics. No amount of tactical rejuvenation will survive if not supported logistically. Indeed, the tactical characteristics of maneuver warfare equally apply to logistics. In an amphibious assault, logistics plays a *crucial* role and is an essential element of the operational scheme. The current logistics doctrine of on-call resupply and gradual buildup in a Beachhead Support Area is inadequate. Too often clumsy and requiring establishment of a vulnerable supply base, amphibious logistics should, instead, be based on the principle of forward-push logistics, i.e., providing the commander with the type of fluid, operationally oriented logistics necessary to fight a maneuver warfare amphibious battle. Forward-push logistics, first employed successfully by the Germans and subsequently fine-tuned by the Israelis, demands that logisticians be as operationally oriented as combat commanders. Highly decentralized, this system of logistics operates without specific requests for resupply. Instead, ammunition, food, and other vital supplies are pushed forward in accordance with the tactical situation. Needs of combat units are predicted based on the level of combat intensity.¹⁹

In an amphibious landing, forward-push logistics centers on mobile loaded floating dumps and Tactical Logistics (TacLog) groups with expanded responsibilities. Preloading vehicles with combat-essential supplies and similarly organizing logistics and maintenance units largely erases the need for vulnerable dumps and installations ashore. TacLog groups, closely attuned to the situation ashore, then decide which logistics elements are required ashore and order them to land. Once across the beach, these elements are pushed forward by the shore party. Upon completion of their logistics mission, the mobile elements return to amphibious shipping for replenishment and reassignment in the floating reserve. These procedures can be modified to include both helicopter and fixed-wing logistics modules. Tactically, the concept of mobile logistics is undergoing evaluation;²⁰ its application in amphibious operations, however, necessitates that both naval and ground force components, from shipboard crews to forward combat elements, understand the operational aspects of logistics and remember that support must anticipate combat needs, rather than respond to them.

Conclusions and Recommendations. Combining maneuver and amphibious warfare impels a new way of thinking about a doctrine that, after nearly 50 years of existence, has become deep rooted in both the Navy and Marine Corps. Decentralized control, exploitation of enemy weaknesses, and an operational outlook that draws no distinction between land and sea characterize the maneuver warfare approach to amphibious landings. Like

any new military doctrine, maneuver warfare brings new tactics and techniques. Revamped close air support procedures, columnal, instead of linear assault waves storming narrow landing points, task organizations that cross service boundaries, and highly mobile combat logistics comprise a few of these means. Although new, none are revolutionary; indeed many are already being employed or evaluated. Of themselves, however, techniques are useless. They must be ensconced in the operational art, where they may be blended together. Herein lies the key to incorporating maneuver and amphibious warfare.

Such incorporation calls for education and training that develops technical proficiency in maneuver warfare skills and, of far more importance, initiative and boldness in those that must apply them. Training in combined arms integration, rather than supporting arms techniques, and tactical skills that seek enemy weakness, such as infiltration and night or limited visibility techniques, should be coupled with problems that seek innovation. Leaders at even the most junior levels must be encouraged to use their initiative in unplanned for circumstances. This applies equally to ground, air, and naval personnel. Understanding between diverse tactical elements stems from common approaches to problems based on initiative and daring, rather than common solutions. The excellence of the Wehrmacht in World War II rested largely in its innovative core of junior officers and NCOs, fully capable of independent action within the operational context of a combat situation.²¹

Innovativeness, coupled with a clear understanding of the operational art, is a function of education. New amphibious landing tactics and techniques based on maneuver are impotent if not executed by officers who possess intellectual ability. In the Navy and Marine Corps, much effort is spent learning technical details such as planning sequences and formats, but little is expended in developing minds that are able to think beyond their immediate surroundings. While technical expertise is important, its application demands far more than memorization and motor skills. The ability to view combat in terms of the operational art stems from careful intellectual preparation. Brigadier General J. C. Breckinridge, Commandant of the Marine Corps Schools in the early 1930s at the heyday of amphibious doctrinal development, wrote that the purpose of military education should be: "... to urge to be different, to be original, to encourage initiative, to stimulate a difference of opinion that will reason rather than copy; and never to adopt a precedent for no better reason than to copy it Look ahead for progress, not back for precedent. Accept the precedent as a last resort."²² Blending maneuver and amphibious warfare requires such an educational approach.

The preceding pages have attempted to present an alternative doctrinal means with which amphibious forces may cope with modern combat. Historically, the principles of maneuver warfare have often resulted in victory. Quite simple in its basics, maneuver warfare offers a new

amphibious potential for the Navy and Marine Corps. Adoption of the tactics and techniques of maneuver warfare, however, necessitates a fundamental shift in intellectual attitudes and preparation. Parochial divisions between service components can no longer be tolerated. Commanders must trust subordinate initiative, delegating tactical responsibilities in order to concentrate on operational considerations. Success or failure of these principles rests in the training and education of those who execute them; detailed mastery of techniques must lead to more open examination of concepts. Maneuver warfare could easily restore the flexibility and devastating potential of amphibious warfare. In doing so, it cannot be reduced to hardbound precepts. In the end, successful amphibious landings will depend on the willingness of its practitioners to outfight, rather than outmuscle, the enemy.

Notes

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Captain Richard S. Moore, USMC, is an instructor in the Political Science Department of the US Naval Academy in Annapolis.