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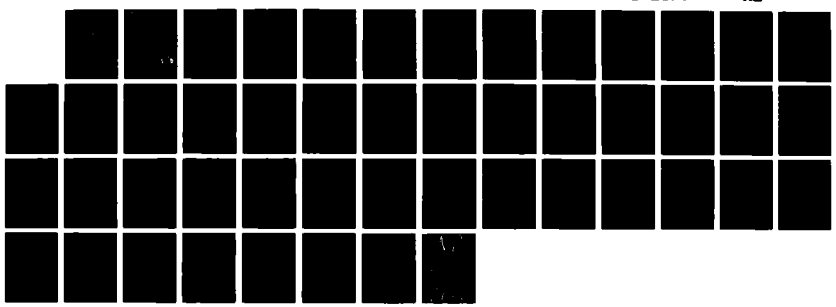
THEY SHALL NOT CROSS: INCORPORATING A RIVER BARRIER  
INTO THE DEFENSE(U) ARMY COMMAND AND GENERAL STAFF COLL  
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They Shall Not Cross:  
Incorporating a River Barrier into the Defense

by

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29 January 1987

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areas before a fully adequate doctrine could be written. It then recommends specific actions to assist in the creation of such a doctrine.

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## INTRODUCTION

"rivers ... are dangerous and alluring objects, which have often led to wrong decisions and into dangerous situations." [1]

One of the significant advantages accruing to the defender is the benefit of knowing, and therefore making best use of, the terrain. On numerous occasions in both the distant and recent past, defending armies have attempted to utilize one type of terrain feature in particular, a river barrier, as a significant "combat multiplier" contributing to tactical victory. These efforts have occasionally been successful, as for example along the Rapido River in Italy in 1944 [2] or at Arnhem in the Netherlands that same year [3]; but have also failed, as at Sedan in 1940 [4] or along the Rhine River in 1945 [5], resulting in "dangerous situations" indeed for the defenders.

For many and various reasons, the North Atlantic Treaty Organization, as a defensive alliance, intends initially to await any invader on Western soil. U.S. forces defending in Europe can be expected, therefore, to attempt to make use of every terrain advantage possible --including the use of rivers as obstacles. In Western Europe such potential barriers appear to

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- [1] Clausewitz, Carl Von. On War, pg 433.
  - [2] Blumenson, Martin. Salerno to Cassino, pgs 322-351.
  - [3] McKee, Alexander. The Race for the Rhine Bridges, pgs 101-261.
  - [4] Horne, Alistair. To Lose a Battle: France 1940, pgs 235-337.
  - [5] Weigley, Russell F. Eisenhower's Lieutenants, Vol. 2, pgs 908-941.

be numerous:

" . . . 10-20 meter wide water obstacles occur about every 10 kilometers, those between 20 and 100 meters every 35-60 kilometers, those between 100 and 300 meters wide every 100-150 kilometers, and those more than 300 meters wide every 250-300 kilometers. In addition, every third water obstacle tends to be a canal with steep banks which will require special techniques to cross.[6]

However, because relatively few of these water barriers traverse major training areas, and because during the past few decades technological advances in river-crossing equipment have caused attention to be focused largely on improving offensive river-crossing techniques, U.S. forces train for the defense of river lines only infrequently. Their experience thus being extremely limited, commanders of U.S. units will be forced to rely in the initial stages of a war almost exclusively on published doctrine as a basis for their defensive measures. Accordingly, if U.S. tactical doctrine for incorporating a river into the defense is not sound, commanders may be lured into "wrong decisions and . . . dangerous situations" from which our adversary may be able to gain tactical advantage.

The purpose of this paper, then, is to examine current U.S. Army doctrine for a defense incorporating a river and to make recommendations for improving that doctrine. Specifically, the paper will first demonstrate that current doctrine is inadequate. Then the paper will provide the necessary

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[6] ACSI. Interdiction of Warsaw Pact Bridges (U)  
(Secret), pg 1.

foundation for the creation of a new doctrine. This will be accomplished through an examination of: theories for the defense incorporating river barriers; the lessons learned from defending against the Soviets in World War II; and the likely impact on defensive theory and lessons from previous practice of the most significant changes apparent since World War Two in offensive river-crossing capabilities (especially Soviet). Finally, the paper will provide conclusions and recommendations regarding further development of an adequate doctrine for incorporating river barriers in the defense.

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CURRENT U.S. DOCTRINE FOR THE  
DEFENSE OF RIVER BARRIERS

"Tactical Doctrine: that body of approved but not proven theory and ideas concerning the organization and training for, and conduct of, operations on the battlefield which have been accepted as generally valid. Acceptance can be either through official sanction by high authorities or through long and widespread usage. These standardized teachings put everyone within the military organization on a common ground, and the battlefield leader can employ this accepted theory with a reasonable assurance of success. Tactical doctrine does not, however, alleviate the requirement for sound judgement -- for the best solution to every critical decision is not always found in doctrine." [7]

The commander of U.S. forces in Europe looking for doctrine on defenses incorporating a river barrier might reasonably begin his search in the Army's primary war-fighting manual, FM 100-5. There, in the chapter entitled "Conducting Defensive Operations", he will find:

"Defensive doctrine is not prescriptive. It describes two general forms of defense at tactical levels -- area and mobile -- but it leaves the commander great freedom in formulating and conducting his defense. He may elect to defend well forward by striking the enemy as he approaches. He may opt to fight the decisive battle within the main battle area. Or, if he does not have to hold a specified area or position, he may draw the enemy deep into the area of operations and then strike his flanks and rear. He may even choose to preempt the enemy with spoiling attacks if conditions favor such tactics. In the past, all four methods have proven effective. [8]

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[7] This definition of doctrine was developed jointly with Major Richard Seim while he and I taught together at the United States Military Academy in 1983.

[8] FM 100-5, pg 141.

The manual continues:

The defending force must exploit any aspect of the terrain that impairs enemy momentum or makes it difficult for him to mass or maneuver. . . . Controlling key terrain is vital to the defense. . . . When terrain is a decisive factor in a division or corps defense, the commander must make it the focal point of his defensive plan." [9]

While certainly valid, these observations do not provide much specific help to a commander lacking experience with a defense incorporating a river barrier. However, knowing FM 100-5 is primarily an operational manual our commander, undaunted, turns to more "tactical" publications.

Field Circular 100-15, on corps operations, states:

". . . actual methods for conducting defensive tactical operations . . . will vary with the factors of mission, enemy, terrain and weather, troops, and time available . . .

. . .

. . . planners view the terrain in terms of major features, key terrain, and avenues of approach. . . Obstacles to movement through the sector form natural lines of resistance that corps engineers can reinforce to form a framework for defense.

. . .

. . . Open country is best defended by predominantly armored forces; wooded, urbanized, marshy, or broken terrain is best defended by infantry-heavy units." [10]

A river is presumably one of those 'obstacles to movement' that can be used to form a 'framework' for defense, but exactly how it should be employed remains somewhat vague. Continuing his

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[9] FM 100-5, pg 141.

[10] FC 100-15, pgs 6-10 to 6-13.

research, a commander finds in FC 71-100, Armored and Mechanized Division and Brigade Operations, the first specific mention of rivers:

"Obstacles, such as rivers, streams, swamps, wooded areas, towns, and hills are evaluated as possible defense positions, hindrances to maneuver, or features that protect the flanks of maneuver forces.

Key and decisive terrain features are normally major landforms, route or rail intersections, river-crossing areas, or systems of defiles." [11]

Still, there is no guidance on how to evaluate the river as an obstacle, or whether to place the river in the covering force area, somewhere within the main battle area, or even in his rear area. Assuming that decision is somehow made, the following advice is provided:

"A significant obstacle IN THE MAIN BATTLE AREA [emphasis added], such as a river, favors a terrain oriented defense planned to destroy enemy forces caught astride or against the obstacle" [12]

Still searching, one discovers that Field Manual 71-2J, The Tank and Mechanized Infantry Battalion Task Force, adds little -- although it does identify a river 150 meters wide and 1.5 meters deep as a "major" obstacle. [13] Neither FM 5-100, Engineer Combat Operations, nor FM 5-102, Counter mobility, provide any doctrinal measures relative to the defense of river barriers beyond some techniques for the technical accomplishment

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[11] FC 71-100, pgs 2-16 to 2-18.

[12] FC 71-100, pg 6-28.

[13] FM 71-2J, pg D-5.

of bridge demolition. Finally, consulting FM 90-13, River Crossing Operations, a commander finds only guidance on the conduct of withdrawals across water obstacles, to include the need to establish a "strong exit bank defense" able "to mass and concentrate its firepower to allow elements in contact to withdraw/retire and complete the retrograde crossing." [14]

Unfortunately then, all currently published manuals emphasize making the best and proper use of terrain, but none of them provides any specific guidance as to how to incorporate the river as a barrier into a defensive scheme. [15] Thus, current doctrine actually provides little better guidance for defensive measures incorporating a river line in the twentieth century than that written by Carl Von Clausewitz at the beginning of the nineteenth:

"Any important river valley, together with its tributaries, constitutes a substantial natural obstacle, and as such it is generally an asset for the defense." [16]

While true, this idea alone is clearly inadequate. It is necessary, therefore, to develop the basis for a more useful tactical doctrine.

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[14] FM 90-13, River Crossing Operations, pg 4-7.

[15] A classified study, done in the 1960's, entitled "Defense of A River Line (U)", does exist. However, it does not technically meet the definition of "doctrine", being neither published nor widely available within the Army as a whole and it is largely technical in nature, dealing with the utility of amphibious mines against snorkelling tanks.

[16] Clausewitz, pg 445.

## THE "THEORETICAL" DEFENSE OF RIVERS

"Theories are aids to clear thinking. They provide structure to potential chaos, aid judgement, and assist in developing rules for action." [16]

Developing clear thinking about how best to incorporate a river into a defensive scheme was Clausewitz' purpose in chapter eighteen of On War, for he believed that rivers

". . . generally permit of more favorable, and in some cases excellent tactical possibilities for a decisive battle." [17]

Clausewitz started his discussion by stating that while rivers may reinforce a defense

". . . their peculiar characteristic is that they act like a tool made of a hard and brittle substance: they either stand the heaviest blow undented, or their defensive capacity falls to pieces and then ceases completely. . . . once . . . breached at any point . . . resistance in depth . . . does not take place. The matter is settled in this single act . . ." [18]

This seems, of course, to be mere recognition of the characteristics of a river as an obstacle (and could perhaps be said to be true of many modern artificial obstacles). Clausewitz did not stop here, however, but continued to discuss three possible methods to incorporate this "brittle tool" into an effective defense:

"1. Direct defense intended to prevent a crossing

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[16] Syllabus AY 86-87, AMSP Course 1 (Foundations of Military Theory), pg 1-2-1.

[17] Clausewitz, pg 433.

[18] Clausewitz, pg 433.



2. A more favorable form, in which the river and its valley serve only as components for a more favorable tactical development
3. An absolutely direct defense, which consists of holding an unassailable position on the enemy side of the river."[19]

With regard to his first possibility, "direct defense", Clausewitz stated the objective is "to prevent the enemy from finishing his bridge and from crossing by other means,"[20] and a successful defense is possible if the strength of each defending unit exceeds the force that the enemy can cross without use of a bridge.[21] Accordingly,

"The three governing factors are as follows:  
(1) the width of the river; (2) the means of crossing it, since both together govern the time it will take to build a bridge and the number of men that can get across while it is being built;  
(3) the strength of the defending force. The attacker's strength is not relevant at this stage."[22]

Other than width of the river and the presence of islands, Clausewitz argued that no other geographic feature has bearing on the problem of direct defense. Units should be positioned directly on the river bank, able to act quickly to oppose any force attempting to cross, and

". . . one measure that can be recommended is the strongest possible occupation of the river's islands. A serious attack on them is the safest clue to the intended point of crossing."[23]

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[19] Clausewitz, pg 434.  
[20] Clausewitz, pg 435.  
[21] Clausewitz, pg 434.  
[22] Clausewitz, pg 434.  
[23] Clausewitz, pg 437.

Clausewitz also asserted that defense is made easier by the fact that the means of crossing an enemy possesses are rarely sufficient without local supplementation,[24] and then he developed the following as advantages and disadvantages of a "direct defense":

"The deployment of an army in large units close to a river -- which we consider the best for direct defense -- assumes that the enemy cannot cross by surprise and in great strength; otherwise, the risk of being separated and beaten individually would be too great. Thus, if conditions are not sufficiently favorable to the defense of the river, if the enemy can lay his hands on too many means of crossing, if the river has too many islands or even fords, if it is not wide enough, or if our forces are too weak, this method of defense must not be considered.[25]

{direct defense} can never lead to a decisive victory: partly because its intention is not to permit an enemy to cross, but to crush the first substantial force he has landed; partly because the river itself prevents us from exploiting with an energetic counterattack, any advantages gained.

On the other hand, this type of river defense can often gain considerable time -- and time, after all, is what the defender is most likely to need.[26]

. . . even if it is overwhelmed by the enemy, {failure of direct defense} cannot be equated with a lost battle. Even less can it lead to complete defeat: only part of our troops will have been involved, and the enemy, delayed by his slow passage across the bridge, cannot immediately follow up his victory. For all these reasons, one should not underrate this method of defense." [27]

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[24] Clausewitz, pg 436.

[25] Clausewitz, pg 439.

[26] Clausewitz, pg 437.

[27] Clausewitz, pg 437.

Clausewitz described his "more indirect form" of incorporating a river into a defensive scheme in the following manner:

"The second form of defense is suited to minor rivers and deep valleys -- frequently even for insignificant ones. It consists in taking up a position farther to the rear. The distance should be such as to make it possible either to catch the enemy army in separated units if it crosses at several points, or, if it crosses at a single point, to catch it close to the stream, where it is confined to a single bridge or road. An army whose rear is up against a river or cramped in a deep valley, which is limited to a single line of retreat, is in a most disadvantageous situation for battle. The defense of all moderate-sized rivers and deep valleys consists in exploiting these circumstances.

. . . What remains to be done is to converge as rapidly as possible on the enemy's crossing point and attack him before he holds enough of the river bank to enable him to cross at several other points. In this case, the river or the valley must be watched and lightly defended by a chain of outposts, while the army, divided into several corps, takes up a position at appropriate points some distance away from the river -- normally a few hours' march away." [28]

Clausewitz clearly saw as the advantages of such a defense the opportunity to defeat the whole (or at least the better part) of the enemy's forces in one engagement, and the possibility of concentrating one's own forces before combat. He also recognized, however, certain disadvantages related to these same issues:

"This sort of defensive line cannot, of course, be extended as far as it would be in the case of the direct defense of a major river: one wants to

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[28] Clausewitz, pg 439.

fight with the total force united, and no matter how difficult the crossing points they cannot be compared to those of a major river.[29]

. . . the point on which the defender may easily go wrong, lies in the overextension of his forces. . . if one cannot fight with the army united, the whole enterprise has failed.[30]

One must remember the objective of this type of river defense can never be to resist a vastly superior force, as it might perhaps be the case of the direct defense of a major river. Usually one will have to deal with the largest part of the enemy's force and even if this happens under favorable conditions, it is easy to see that the disparity of strength must be reckoned with."[31]

Nevertheless, Clausewitz felt that this method of incorporating a river into the defense ". . . is very advantageous; this type of river defense must be counted among the best . . ."[32] and ". . . will invariably be employed where the defender aims at total victory."[33]

The third possible incorporation of a river into the defense, called the "absolutely direct defense" by Clausewitz,

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[29] Clausewitz, pg 439.

[30] Clausewitz, pg 440.

[31] Clausewitz, pg 440.

[32] Clausewitz, pg 440. Interestingly, Clausewitz' contemporary Jomini apparently agreed so strongly with this position that this form of defense is the only one he discusses in his work The Art of War. On page 228 he states: "The important thing is to have the course of the river watched by bodies of light troops, without attempting to make a defense at every point. Concentrate rapidly at the threatened point, in order to overwhelm the enemy while only a part of his army shall have passed."

[33] Clausewitz, pg 441.

he treated more briefly than the others:

"The third form of defense is by means of a strong position that one holds on the enemy's side of the river. Its effectiveness is based on the risk incurred by the enemy that the river traverses his lines of communication, once he had crossed it, and thus would limit him to one or two bridges.[34]

The position must be strongly fortified -- practically impregnable. . . . If, however, it is strong enough to deter the enemy from attack, the effect may be to tie him down to the bank. If he were to cross, he would expose his lines of communication -- though, of course, he would also threaten the defender's. Here, as in all cases where two armies pass each other by, the crucial question is whose lines of communications are the more secure -- in number, position, and other respects. . . . The river contributes nothing, except to increase the danger of any such movement for both sides, because both are confined to bridges. . . . Admittedly, it means that the army is not defended by the river, or the river by the army; but the country is defended by a combination of the two, which is what really matters."[35]

Clausewitz argued that this method provides at least one significant advantage to the defender:

"A defending army with a major river close (but no less than a normal day's march) behind it, a river on which it has secured a sufficient number of crossing points, is undoubtedly in a much stronger position than it would be without the river. . . . While concern for its crossing points may deprive it of some liberty of movement, it will gain a great deal more through the security of its strategic rear, especially of its lines of communication."[36]

Still, he was unwilling to recommend it whole-heartedly:

"We must admit, however, that this form of

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[34] Clausewitz, pg 442.

[35] Clausewitz, pg 442.

[36] Clausewitz, pg 445.

defense, in which there was no decisive blow, is like the tension set up in the atmosphere between positive and negative electric currents: it will only be able to stop a blow of minor proportions. It might suffice against a cautious, hesitant general who is not compelled to press one even when he has greatly superior strength; it might also do if the armies were already in a state of balance, with neither of them looking for more than minor advantages. But as a means of coping with superior numbers and a dashing general it is a dangerous course, leading close to disaster." [37]

To what degree do these theories aid in formulating a modern doctrine? Because Clausewitz wrote in an age of non-mechanized armies employing direct-fire-only weapons of extremely limited range, some of what he says must be questioned. However, if we recognize the continuity and change in warfare over the intervening period, we can modify Clausewitzian theory to create a "modern" one.

In Clausewitz' day, tactical strength was a measure of massed infantrymen and short-ranged direct fire weapons. Today it is a measure of many different combined-arms elements equipped with weapons of considerable range. Nevertheless, we can accept that the success of direct defense may still be a function of the defender's strength vs the enemy's ability to project his strength across the river, and therefore at least partially a function of river width and available crossing means. On the other hand, Clausewitz' assertion that armies cannot bring

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[37] Clausewitz, pg 442.

adequate crossing means with them, and that no other geographic features are significant, must be questioned.

The depth of both forces and the "tactical" battlefield have been increased significantly since Clausewitz' day by the expanding range of weapons and the vastly increased size of armies. Under such circumstances can an "indirect" defense as envisioned by Clausewitz be easily distinguished from any modern defense in depth? Even if it can, can it possibly be expected to have the type of decisive results he envisioned? Perhaps not, but the employment of massed mobile reserves for similar purposes may.

Without further detailed examination, it is possible to postulate the existence of at least the three theoretical ways to incorporate a river into a modern defensive scheme roughly corresponding to Clausewitz' three:

(1) defense at the water's edge, in which the defender occupies positions directly along the river and attempts to prevent enemy landings and eliminate successful bridgeheads. Such a defense would appear to be favored where the river obstacle is difficult to cross due to width, access, or current, or where the enemy's crossing means are limited;

(2) defense some distance behind the river, with the river screened by only light security forces and the primary defensive effort conducted by mobile counterattack forces. Such a defense would appear to be favored where the defender

possesses a significant advantage in mobile forces, and/or where destruction of enemy forces en masse is desired; and

(3) a defense predominately on the enemy side of the river, in which the defender intends to prevent enemy forces from even reaching the river line, destroy them on the enemy shore, or by the threat of envelopment restrict their forward progress. Such a defense would appear to be favored where use of the river is needed by the defender, where the defender intends to assume the offensive himself in the near future, or where the opponent's L.O.C. is particularly vulnerable.

And, in theory, one can envision other possibilities -- which are combinations of two or more of these three.

At this point, however, theory alone is insufficient to provide a foundation on which to build an adequate modern doctrine, because it is not possible to judge adequately the strengths and weaknesses of each defense. But theory does provide a beginning to test with the experience of "modern" war.

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HISTORICAL EXPERIENCES DEFENDING RIVER BARRIERS  
IN MODERN WARFARE

"Historical examples of the successful defense of rivers are fairly rare, justifying the view that they are not such formidable barriers as people used to think. . ."[38]

World War Two, and specifically the Russo-German war in Eastern Europe, provides the most relevant historical experience to this study. In the course of four years of war, the army of Nazi Germany attempted repeatedly to defend numerous riverlines against the Red Army of Soviet Russia, sometimes the same river on more than one occasion:

<u>SEASON</u>	<u>YEAR</u>	<u>RIVER DEFENDED</u>
Summer:	1941	Dniester, Bug, Dnieper
	1943	Donets, Kuban
	1944	Berezina, San, middle reaches of the Vistula, lower reaches of the Dniester
Fall :	1942	Don
	1943	Dnieper
Winter:	1941-2	Volkhov, Donetz, Kerch Straits
	1944-5	Lower Vistula, upper Oder
Spring:	1944	Ukrainian Bug, Velikaya
	1945	Lower Oder[39]

In the course of these operations the Germans employed each of the "theoretical" forms of incorporating a river into the defense.[40] Establishment of the main tactical defensive position forward of the river itself occurred, for example,

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[38] Clausewitz, pg 433.

[39] Oberst Wilhelm Williemer, Large-Scale Russian River Crossings and German Countermeasures, pg 117.

[40] Frequently, of course, due to the long length of the German operational line, different tactical units along the same river were incorporating the river into their defense in a different manner.

during Army Group Center's operations along the Dnieper in the fall of 1943, during Army Group A's operations near the Sea of Azov that same year, and as a part of the "Panther" defensive line established by Army Group North along the Velikaya River during the period March-July 1944.[41] Defense behind the river was attempted near Kiev along the Dnieper in September 1943, and along the Vistula during the winter of 1944-45.[42] By far, however, the most common tactic adopted was that of "defense at the water's edge."

To analyze individually all of these operations, some of which are only scantily documented, would be an exceedingly difficult and voluminous task. Yet to pick examples selectively, when success or failure in any single engagement may have been due to peculiar circumstances of time, place, forces engaged, or even to friction, chance, or luck, would be exceedingly risky.[43] Fortunately, immediately following WWII a comprehensive attempt to determine "lessons learned" was undertaken by high-ranking German officers intimately familiar with combat on the eastern front.[44] From their analysis it is possible to determine some of the particular strengths and

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[41] Willemer, pgs 126-132.

[42] Willemer, pgs 133-134.

[43] For a more detailed discussion of this problem see Col. Thomas E. Griess' article "A Perspective on Military History" (especially pgs 31-39), in the U.S. Army Center of Military History A Guide to the Study and Use of Military History.

[44] Under the auspices of U.S. Army Europe. See bibliography.

weaknesses of each of the theoretical ways to incorporate a river into a defense, and draw a general conclusion about which seem most suited to modern war.

To begin, regardless of which of the three possible methods of incorporating a river into the defense was chosen, combat over rivers on the Eastern front demonstrated certain factors always held true:

First,

"A preliminary condition for successful defense is the successful fighting in the air against the enemy. . . Though it may not always be possible to gain absolute control of the air, the air space above the defender must not become a domaine(sic) over which the enemy has full sway." [45]

Second,

"The success of any defense depends on the numerical strength and quality of the reserves available. Without sufficient mobile reserves modern defense is impossible." [46]

The recommended minimum is 1/3 of a unit's strength at every level of command, in order to ensure the capability to counterattack (to regain the river line or reestablish the defense forward of it) and/or annihilate enemy air landed troops in the rear. [47]

Third, a successful defense depends on a well functioning communications net. The physical transportation and message network is just as important as the electronic/cybernetic one,

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[45] Generaloberst Karl A. Hollidt, River Crossings by the Red Army in WWII, pg 119.

[46] Hollidt, pg 120.

[47] Hollidt, pg 120.

and every effort should be made to improve roads and highways.

Lateral mobility along the river is particularly vital.[48]

And, fourth,

"The backbone of the entire river defense is the artillery now as ever. Its fire must command the entire front sector without any gaps and must reach far into enemy assembly areas." [49]

The trouble with planning the main effort of the defense some distance behind the river was that the reasons for adopting it usually were offset by disadvantages. The Germans usually adopted it in order to obtain "better view, B-positions (means either: observation posts or: line of support, position of readiness), swampy ground directly on the river, shortening of the main line of resistance by leaving coils of the river unoccupied. . ."[50], or ". . . to let the enemy cross the river with isolated units, and then to attack and defeat these." [51] However, during execution the weak outpost line usually allowed the Soviets to cross the river on a broad front, create numerous bridgeheads and then build up forces within them in an attempt to expand some or all of them as bases for tactical (and eventually operational) maneuver. To eliminate these bridgeheads the Germans planned and conducted counterattacks; the difficulty in

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[48] Hollidt, pg 123.

[49] Hollidt, pg 127.

[50] MG Hans von Ahlfen, "Elimination of River Barriers by Russian Troops", River Crossings by the Red Army in World War II (Natzmer), pg 167.

[51] Hollidt, pg 130.

successfully counterattacking an enemy bridgehead being that:

"A large scale counter-attack against an attacker who has crossed the river is always very dangerous. [In order to set the preconditions] . . . the defensive has to fight for every inch of the ground, so that the attacker becomes exhausted and loses (sic) time. If it is possible for the commanders of the operation to attack the enemy in such a state of exhaustion and weakness at an effective point, the success can be great. But it will always be difficult to choose the right time for such a counter-attack, and more difficult to have troops on hand in time, so that a surprise attack can be made. On these factors the success of such an action greatly depends."[52]

Significant mobile forces are obviously necessary to conduct a defense behind the river. Unfortunately, the Germans also quickly discovered that

"Once the Russians have established themselves on the defender's bank, they are very difficult to throw out again, even with strong forces, particularly if the terrain is bad..."[53],

especially since German attempts to attack bridgeheads in the flanks were usually themselves subject to quite heavy flanking fire from across the river.[54] Even when successful, such actions exacted a heavy toll from the defenders and were rarely, if ever, decisive. An example occurred in 1943:

"The July attack of the Russians across the Mius . . . ended with a complete defeat. The soldiers of the 6th Army had gained one of their finest victories against an enemy that was several times as strong. And yet the German commanders could not rejoice."[55]

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[52] MG Peter von der Groeben, "Elimination of River Barriers by Russian Troops", River Crossings by the Red Army in World War II (Natzmer), pg 50.

[53] Ahlfen, pg 167.

[54] Willemer, pg 76.

[55] Hollidt, pg 40.

The reason for the German commanders' dismay was that their tactical success had exhausted their forces. The Russians, on the other hand, still possessed significant operational reserves prepared to begin the action anew elsewhere in the theater.

Defense at the water's edge theoretically makes maximum direct use of the river's obstacle value, and perhaps for this reason the Germans most frequently chose this form of defense. Still, several weaknesses associated with such a deployment became evident in the course of operations. First, occupation of the river bank along its entire length obviously requires large forces, which the Germans frequently lacked. To compensate, they oriented their defenses on the obvious crossing points and accepted risk elsewhere. They soon discovered that:

"one must never think that the place in question is of no importance and that the Russians could not start anything from there,"[56]

for

"In choosing a place for the crossing the Russians acted according to the requirements of local tactics. Their principle seemed to be that it was more important to gain a footing, no matter where, on the enemy bank than to reach already at the beginning of the crossing a point that was of importance for the operation. Very often they were successful, for the defenders had oriented their defense in accordance with quite different points of view. ...it was easy for the Russians to enlarge their small bridgeheads, for the defenders had to rearrange their forces. Thus it was, for

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[56] Ahlfen, pg 177.

instance, on the lower course of the Dniepr in the fall of 1943." [57]

Soviet infiltration across the water barriers and gradual buildup of strength became such a problem that eventually the Germans adopted a policy

"...not to suffer the presence of even a single man of the attacker on the defender's bank. The river bank must be fully in the hand of the defender. Therefore, immediate counterthrust, even if there is only a reconnaissance patrol of the enemy on the defender's bank. This already is a certain disadvantage compared to defense of the bank itself at all costs. [58]

The disadvantage referred to is, of course, that we are back to the need for counterattack, with all the problems that entailed. In order to restrict infiltration along the Don River in August 1942, as well as to hinder Soviet attempts at crossings in force, the Germans defending at the water's edge naturally attempted to destroy all means of crossing the river. The result, which perhaps should have been foreseen, was that "German reconnaissance activity across the river was restricted, due to the lack of boats and ferries, which proved very disadvantageous . . . ." In fact, the Soviets were able to mass significant forces and then attack across the river by surprise. [59]

This offensive, like most other Soviet offensives, was accompanied by a massive artillery preparation. And therein lies

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[57] General of Infantry Walter Hoernlein, "Preparation for Stream Crossings", River Crossings by the Red Army in World War II (Natzmer), pg 183.

[58] Ahlfen, pg 167.

[59] Hollidt, pg 23.

a major problem with defense at the water's edge. Quite simply, it is very easy for the enemy to predict almost exactly where the defenders will be and annihilate them with modern fire support. This was a continual problem for Germans attempting to defend at the water's edge throughout the war.

Considering all these problems,

". . . the German command in the war against Russia learned to desist from using rivers for {direct} defense purposes. Often a position in open terrain (uebersichtliches Gelaende) was preferred even at the expense of security against mechanized attack. Defense of the Dniepr section Orsha-Gomel in 1943/44 was not conducted from behind the river, but from a field position 20 km to the east of the river.[60]

Actually, as the Germans themselves demonstrated, it is not absolutely true that establishment of the defense on the far shore must be at the expense of security against mechanized attack. The real danger of armored forces is in their deep penetration into the defender's vulnerable rear. The location of a river barrier in the immediate rear of the defense may still contribute to security by limiting or delaying enemy penetrations and creating opportunities for counteraction by the defender. Establishment of the defense on the far shore may also allow the defender to take advantage of a "reverse slope" defense, while still being able to bring fire on the river itself. In fact, rather than recommending that defenders "desist" from taking advantage of rivers as barriers, the German analysts after the

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[60] Ahlfen, pg 120.



war clearly favored a defense based on the enemy shore:

". . . an effective defensive must, under any circumstances, have bridgeheads on the enemy bank, especially when a future offensive is planned. In this way enemy forces are kept engaged, reconnaissance becomes easier, and preparations for further attacks can be made without disturbance.[61]

The enemy river bank should not be left to the enemy without any resistance. As far as possible bridgeheads and troops should be advanced to the enemy bank and held there as long as possible. The river course itself is by no means "no man's land", but the most essential part of the defense system. An active defender will fight for the command of the river with all possible means and greatest toughness. Well prepared surprise assaults of shock troops across the river keep the troops in good form and impress the enemy."[62]

In general, while not absolutely invalidating any of the theoretical forms of defense, German experiences on the eastern front in World War Two appear to favor the adoption of a defense at or ahead of the river line itself. None of the methods of incorporating a river into the defense led to tactical success in every case, nor did any fail every time. However, defenses which attempted to hold all or part of the enemy bank of the river seem to have been most successful, and those which placed the main defensive effort some distance behind the river least successful.[63] Defense at the river is feasible only if a

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[61] Hollidt, pg 27.

[62] Hollidt, pg 128.

[63] This conclusion seems to be supported by a limited examination of relatively successful river defenses in the Western Theater of War: In the Market-Garden Operation the decisive action may have been the

strong security force/zone is maintained on the far shore;  
establishment of the main defensive zone on the far shore seems  
preferable.

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disruption of British XXX Corps advance on the south  
bank of the Rhine; Patton's initially unsuccessful  
attempts to cross the Moselle were significantly  
affected by German forces holding out on the west  
bank; at Rapido the Germans conducted active  
patrolling and replaced obstacles on the American  
shore throughout the operation.

ADVANCES IN OFFENSIVE RIVER CROSSING  
CAPABILITIES

"The rules for preventing a passage follow as a matter of course from those for effecting it, as the duty of the defenders is to counteract the efforts of the assailants"[64]

In the late 1940's, MG Peter von der Groeben, formerly of the German Wehrmacht, wrote as part of a study on World War Two Russian river crossings

". . . the Russians will be very dangerous enemies . . . when they are in possession of operational freedom and larger amounts of modern military bridge equipment than in World War II.

I doubt that the Russians have already reached the high standard of equipment with military bridge equipment that I saw on the American side in the Ruhr pocket and on the Rhine. But they will doubtless strive to attain it and they have the ability to do so."[65]

Because of their experiences in World War Two, or because of their recognition of the number of water barriers in the path of an advance farther to the west, the Soviets have placed tremendous emphasis on river-crossing capability during the decades following that conflict. In that forty year period, the Russians "have made heavy investments to provide their ground forces with high quality river crossing equipment"[66] and in the process have accomplished exactly what Groeben warned they might. Soviet units now possess a variety of modern offensive

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[64] Jomini, Baron De. The Art of War, pg 208.

[65] Groeben, pg 117.

[66] Maj Eugene D. Betit, Soviet and Warsaw Pact River Crossing: Doctrine and Capabilities, pg v.

river-crossing means:

"Amphibious capabilities have been engineered into almost all Soviet APC's, as well as new self-propelled artillery (122mm) and two mobile surface-to-air missile (SAM) systems. The Soviets have fielded several generations of tank- and truck-launched bridges. . . Soviet divisions and some non-divisional engineer units have tracked amphibians for transporting artillery and logistical elements, as well as ferries which can handle medium tanks and missile units. A significant Soviet achievement has been the development of the PMP ribbon bridge, which can be constructed at speeds up to 20 meters per minute." [67]

The implications of this improvement in Soviet capabilities for an opponent attempting to determine how to incorporate a river barrier into his defenses are significant.

First, the vast equipment of maneuver forces with amphibious vehicles must be assumed to make the rapid crossing of large forces much easier. This obviously threatens the defender's capability to conduct a defense directly on the river bank, since it has been previously determined that the success of such a defense rests primarily on the defender's ability to achieve superiority of forces at the point of crossing. Less obviously, defense behind the river line with mobile forces has also become more difficult. This is because amphibian-equipped maneuver forces can make simultaneous multiple crossings on a wide front, overwhelming the light security and observation forces of the defender. This, in turn, has two effects: (1) it is more

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[67] Maj Eugene D. Betit, Soviet and Warsaw Pact River Crossing: Doctrine and Capabilities, pg v.

difficult for the defender to determine where the enemy's main effort is actually taking place in time to launch a successful counterstroke, and (2) even if the planned main effort is defeated, the attacker may succeed in establishing minor bridgeheads in other places which he can subsequently exploit. Second, the rapidity of modern bridging also makes both defense at the water's edge and mobile defense behind the river more difficult. A Soviet PMP bridge can be erected across a 210 meter wide river in just 10 minutes under peacetime conditions, and probably in about 30 minutes during combat.[68] This is a significant reduction in the time assault forces will have to fight unreinforced against defenders in the vicinity of the river bank, as well as in the reaction time available for mobile forces. Such speed of construction, combined with the quantity of bridging available, makes mobile defense more difficult also because the enemy will not suffer as significant a maneuver restriction. No longer tied to one bridgehead, he will simply build bridges relatively rapidly at any suitable location along the bank now made easier to gain control of.

Finally, the quality and quantity of river crossing equipment now available to the Soviets increases the risk to the defender if the Soviet forces reach the water barrier itself. Vulnerability of the crossing equipment itself has been significantly reduced by technological design, and it is believed

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[68] Assuming direct fire has been suppressed. Betit, pg 8.

that most of the bridging and ferry equipment is actually least vulnerable in the water.[69] A defender will therefore need to damage or destroy the equipment before it reaches the river bank in order to have significant effect on the attacker's ability to cross the river. Again, this seems to argue for defense as far forward as possible.

From the Soviet perspective, the major effect of these improvements has been to increase the potential tempo of offensive river-crossing operations, and they have planned their offensive doctrine to capitalize on this potential:

" . . . a division will force a major water barrier with one, two, or three regiments in the first echelon on a sector 20 or more km wide. In a fast moving situation, the regiment acting as the division advance guard may conduct the assault crossing. This lead regiment would have the bulk of the division's river crossing equipment attached. . .

. . . .  
A typical regimental crossing sector would be 10 kilometers wide, with either two or three battalions crossing in the first echelon. . .

. . . .  
A typical motorized rifle battalion assault crossing as part of the main body. . . The battalion deploys in company columns some five kilometers from the water, and the APCs of the motorized rifle companies deploy on line in three separate sectors about 400-500 meters from the bank. The attached tank company and artillery support the crossing by direct fire from positions 100-200 meters from the river. . .

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[69] For a complete discussion of this issue, see the ACSI classified study Interdiction of Warsaw Pact Bridges (U) (SECRET).

. . .if the enemy defense has been neutralized by fire, or if the opposite bank has been seized by parachutists or heliborne forces (most often the latter) bridge construction will begin concurrently with the assault crossing.

. . . A division's combat elements might be able to cross a 200 meter river in approximately 5 or 6 hours, using equipment organic to the division.[70]

Two things are particularly noteworthy here. First, helicopters, while not specifically created for the purpose of crossing water obstacles, have provided an increased capability for vertical envelopment and their use "to transport ponton sections and motorized rifle troops further increases the tempo of Soviet assault crossings." [71] Second, this doctrine's emphasis on movement in column in order to gain speed, and last-minute deployment, appears to leave it most vulnerable to disruption prior to arrival at the river bank. Its employment of massive firepower at the river line, and ability quickly to mass forces on the far shore, on the other hand, appear to make defense at the water's edge or a mobile defense on the friendly shore less desirable.

The only two examples of such modern river crossing capabilities and doctrine under combat conditions occurred during the Yom Kipper War in 1973. The first was, of course, the Egyptian crossing of the Suez Canal at the beginning of the war. The Israeli' defensive plan was to adopt a mobile defense by

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[70] Betit, pgs 17-21.

[71] Betit, pg 27.

armored forces behind a strong outpost security screen at the canal itself.[72] The Egyptians, achieving both operational and tactical surprise, rapidly crossed massive forces on multiple bridges and overwhelmed the light security forces.[73] Then, switching rapidly --if temporarily -- to the tactical defensive, they succeeded in repulsing the Israeli mobile forces' counterattacks.[74] This situation thus appears to support an argument against defense behind the river, although the circumstances at the beginning of the Yom Kipper War were so peculiar that such a judgment may be hasty.

On the other hand, the Israeli crossing of the canal at the end of the war seems to provide some evidence that defense on the enemy bank may be effective. Even though some Israeli forces reached the canal without contacting Egyptian defenses and succeeded in making an unopposed crossing, heavy --even though uncoordinated-- resistance by Egyptian forces on the east bank inflicted such losses and caused such a delay in bridging reaching the canal that the Israeli high command considered abandoning the operation. Only the failure of the Egyptians to take advantage of the situation by aggressive action on either the east or west bank on the night of 15-16 October allowed the Israeli forces to reorganize and clear the east bank. Even though they lacked truly "modern" bridging equipment, once the

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[72] Avraham Adan, On the Banks of the Suez, especially pgs 42-59.

[73] Adan, pgs 16-33.

[74] Adan, pgs 91-164.



IDF controlled the east bank, they were able to build up strength on the far shore more rapidly than the Egyptians, break out, and continue the operation to the west on 18 October.[75]

On the whole, then, the advances in offensive river crossing capabilities seem to strengthen the argument for defense forward of the river.

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[75] Adan, pgs 245-323.

## CONCLUSIONS

"War history knows of very few stream crossings that have failed. Those who decide to defend a river are usually weaker than the attackers. The attacker is therefore able to decide where to make the main effort with personnel and material in order to force the river." [76]

If the defender is to succeed, he must overcome the disadvantages in strength and initial lack of the initiative. Proper utilization of terrain may assist him in doing so. Most American commanders, lacking any experience in incorporating a river into their defensive plans, will rely on doctrine for guidance. But current published doctrine provides little or no real guidance on where to position forces relative to a water barrier, or what factors to consider in deciding on that positioning. Therefore, current American doctrine for the incorporation of a river barrier into a tactical defense is inadequate.

Using theory, the experiences of the German Army on the Eastern Front in World War Two, and the implications of advances in offensive river crossing capabilities since that conflict, it is possible to develop an initial concept for the incorporation of a river into a defense on the modern battlefield. In combination, these three sources demonstrate that defense on the far shore seems to hold most promise for success in modern war.

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[76] MG Peter von der Groeben, "Elimination of River Barriers by Russian Troops", River Crossings by the Red Army in World War II, pg 115.

Accordingly, a doctrinal "straw man" can be proposed:

1. General: Commanders planning a defense incorporating a river barrier must take care not to jeopardize the chance of utilizing the water barrier to its maximum benefit. Nevertheless, they must not be misled into organizing a linear position, but must continue to plan on development of defense in depth. They must recognize that a river barrier, while it may contribute to an economy of force effort, is not an absolute substitute for adequate forces. And they must not allow the river to "protect" the enemy from friendly offensive action.

2. Location of the defense: Whenever possible commanders should seek to establish their defense on the enemy side of the river, at a distance that friendly artillery can assist from firing positions on the friendly shore. This will permit the river to act as a barrier to enemy armored penetrations, but maintain the friendly forces' ability to engage the enemy, conduct reconnaissance, and undertake limited offensive action. It will ensure maximum opportunity to disrupt the enemy's desired river crossing techniques, by forcing him to deploy and attempt to fight to the river, providing opportunities to destroy

critical bridging assets before the river is reached. It may permit friendly forces to utilize reverse slope positions.

If sufficient bridging/ferry assets are lacking to ensure logistics to a defense on the far shore, or if the terrain on the far shore is completely unsuitable for defense with the type or quantity of forces available, the defense should be established along the near bank of the river. In this case a strong security zone must still be established upon the far shore. Extreme care must be taken to prevent the enemy from establishing minor crossings via "infiltration", which he can subsequently expand into tactical bridgeheads.

Only a commander with a significant superiority in mobile forces should even consider establishing his main defensive effort any distance to the rear of the water.

This "straw man" is, however, only a beginning -- and not adequate guidance in and of itself. Additional study needs to be completed in many areas of the defense of rivers before a fully adequate doctrine could be written. Some areas worthy of deeper examination are: the psychological impact of far shore defense on both attacker and defender; logistical implications of far shore

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defense; exactly what geographic/physical features make the far shore "unsuited" for defense; the impact of precision-guided-munitions and/or improved conventional munitions on river-crossing operations; and the size, location, and composition of reserve forces.

#### RECOMMENDATIONS

A first recommendation is to study further the question of doctrine for the incorporation of rivers as barriers in the defense. This should include an examination of other military forces' doctrine on this subject. The eventual goal should be publication of adequate guidance for American commanders. One possibility would be to incorporate doctrine for the defense of rivers as additional chapters in FM 90-13 River Crossing Operations. This would help insure that any time one facet of the issue (attack or defense) was raised, the impact of change on its antithesis might also be addressed.

A second recommendation is to declassify, so as to make generally available, the 1960's study entitled "Defense of River Lines". Incorporate appropriate portions of it into doctrine. Give consideration to combining it with Chapters 6 and 7 of Large Scale Russian River Crossings and German Countermeasures, and immediate issuance as a "temporary" Field Circular until the doctrinal study can be completed.

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A final recommendation is to increase the number of training exercises in which U.S. forces are required to defend with water barriers in sector. As a part of these exercises, commanders should be encouraged to experiment with all possible forms of incorporating a river into their defenses. Such experimentation will not only provide "lessons learned" to assist in the development of doctrine, but will also increase commanders' experience -- increasing their capability to make correct judgements in situations where doctrine fails to provide the best solution.

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