Simulation Game:

The Battle for France, 1940

by James F. Dunnigan

INTRODUCTION

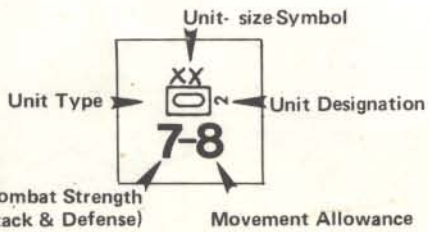
The Standard Game rules serve a dual purpose:
1. They provide Players with a fast-playing easy-to-learn game.
2. They form the foundation onto which the optional rules may be added to create a more complex and realistic simulation.

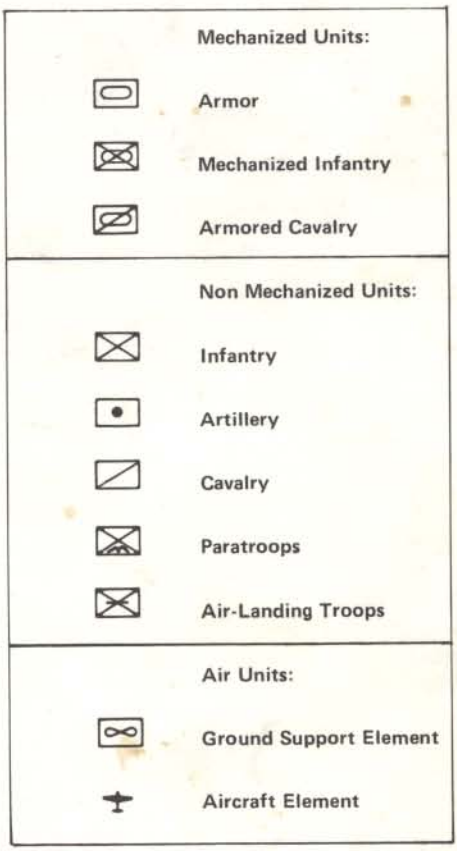
The Standard Game could more accurately be called "the game-player's game." It is designed for those who wish to emphasize "playability" without excluding simulation accuracy. The Optional rules, on the other hand, stress "simulation-in-detail" at the expense of playability. It should not be inferred from this, however, that the Standard Game is simply a watered-down variant of the Optional Game. Both are complete games in their own right, each sharing a common set of equipment and each based upon the same premises. All Players, no matter how experienced, should play the Standard Game first. If you go on to the Optional rules, don't deceive yourself into thinking that by doing so you are taking a step up, more accurately you would be taking a step "into" (into greater complexity, that is). We believe you will find both games challenging and equally valid.

GAME EQUIPMENT

The Game Map: The 22" by 24" map sheet portrays the area of Northern France, the Low countries and Western Germany in which the decisive operations of the Invasion of France (1940) took place. A hexagonal grid is superimposed upon the map in order to regularize the movement and position of the playing pieces.

The Playing Pieces: Two differently colored sets of playing pieces (henceforth known as units) are supplied. They represent the opposing armies in the campaign, that did, or could have, fought the original battles. The opposing German and Allied Forces in each of the varying Orders of Battles are composed by selecting units from those provided on the unit sheet. It is strongly recommended that the players sort their units by type and color, and keep them segregated by storing them in separate, labeled envelopes. This greatly facilitates setting up the game. The playing pieces are distinguished by type, strength, and mobility, as represented by various numbers and symbols printed on their faces.





II	*Battalion*
III	*Regiment*
X	*Brigade*
XX	*Division*
XXX	*Corps*

Game Charts and Tables: Various visual aids are provided for the player to simplify and illustrate certain game functions. These are the **Combat Results Table (CRT),** the **Turn Record Chart,** the **Terrain Effects Chart** and the **Order of Battle Alternatives Chart.** Each of these charts are fully explained where they are presented.

GENERAL COURSE OF PLAY:

France, 1940 is basically a two-player game. Each Player moves his units and executes attacks in turn with the objective being to destroy Enemy units, while minimizing Friendly unit losses. Combat is resolved by comparing the strength-numbers of adjacent opposing units and expressing the comparison as a simplified probability ratio (odds). A die is rolled and the outcome indicated on the Combat Results Table is applied to the units being attacked. (See Combat Results Table for greater detail).

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THE SEQUENCE OF PLAY:

France, 1940, is played in turns. Each **Game-Turn** is composed of two **Player-Turns.** Each Player-Turn is composed of three **Phases.** A typical Game-Turn would proceed as follows:

A. **First Player-Turn** (Germans always move first).
1. **Initial Movement Phase** – Player may move all of his units in any direction up to their full Movement Allowance, with restrictions as outlined in the Movement Rule;
2. **Combat Phase** – Player may attack those Enemy units adjacent to his units, at his discretion.
3. **Mechanized Movement Phase** – Player may move (again) those units of his which are considered "mechanized" up to their full Movement Allowance in any direction, within the restrictions as outlined in the Movement Rule. This movement is in addition to the Initial Movement Phase.
No combat occurs after this Phase.

B. **Second Player-Turn** (Allies always move second).
Repeat Phases 1 through 3 for the Second Player, who uses his own units.

C. Players indicate the passage of one Game-Turn on the Turn Record Chart. Each Game-Turn represents two days of real time.

Game-Length

The game lasts ten Game-Turns; at the end of the French Mechanized Movement Phase of the tenth Game-Turn, all movement ceases and the Player's performances are evaluated in terms of the Victory Conditions (q.v.).

MOVEMENT PHASES

General Rule:

During the Movement Phases of a Player's turn, the Player may move as many or as few of his units as he wishes. Each unit may be moved as many hexes as desired within the limits of its Movement Allowance, the Terrain Effects Chart, and the Zone of Control Rules.

Procedure: Move each unit individually, tracing the path of its movement through the hexagonal grid.

Cases:

(A) Movement is calculated in terms of hexagons. Basically each unit expends one **Movement Point** of its total **Movement (point) Allowance** for each hex entered. To enter some types of hexes, more than one Movement point is expended. See the Movement section of the Terrain Effects Chart for a full list of these different "entry costs."

(B) In any given Movement Phase of a Player-Turn, the Player may move all, some or none of his units (with the exception that only mechanized units may be moved during the Mechanized Movement Phase). Movement is never required, it is voluntary.

(C) Units are moved individually; in any direction or combination of directions. A unit may be moved as many or as few hexes as the owning-Player desires as long as its Movement Allowance is not exceeded in a single Movement Phase. Unused Movement points however, may not be accumulated from Phase-to-Phase or transferred from unit-to-unit.

(D) No Enemy ground movement is permitted during a Player's Movement Phase.

(E) No combat (Enemy or Friendly) may take place during a Movement Phase.

(F) Friendly units may pass through or onto other Friendly units as long as there are **never more than three Friendly units in the same hex at the same time.** In other words, a unit may not enter or pass through a hex containing three other Friendly units. (See Stacking Rule).

(G) Units may never enter or pass through a hex containing Enemy units.

(H) Units may move over different types of terrain-hexes in the same Movement Phase as long as they have enough Movement points to expend as they enter each hex.

STACKING (more than one unit per hex).

General Rule:

As many as three Friendly units of any type or combination of types, may occupy the same hex at the same time.

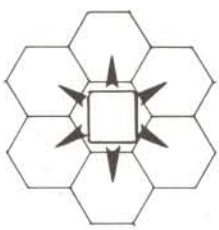
Cases:

(A) Stacking limitations apply at all times, even during the Movement Phase of a Player-Turn.

(B) Although up to three units may be stacked in a single hex, only **one corps** (or one **corps-equivalent**) may attack from or defend in that hex. A corps is any single unit having a corps-sized symbol on it ("xxx"). A corps-equivalent is considered to be any three units of smaller than corps size (divisions, regiments, brigades). Example of a corps-equivalent: one division plus two brigades.

(C) Each two-element Air unit is considered to be **one unit** for stacking purposes.

(D) Aircraft Elements flying in the air do not count against the stacking limits of ground units.



ZONE OF CONTROL

General Rule:

The six hexagons immediately surrounding a given unit (or stack of units) constitute that unit's Zone of Control. These are semi-active Zones of Control which have an inhibiting effect upon Enemy movement, but do not affect Enemy combat. Hexes upon which a unit is exerting its semi-active Zone of Control are called **controlled hexes.**

Procedure:
All units (except air units) have identical Zones of Control; they inhibit the movement, and in certain cases, the supply lines of Enemy units.

Cases:

(A) All units must expend three **additional** Movement Points (MP), above and beyond the ordinary movement cost, to enter an Enemy controlled hex from another, uncontrolled hex. They may not enter an Enemy Zone of Control (and thus be able to attack) unless they have the three extra Movement Points to expend.

(B) It costs two additional Movement Points to **leave** an Enemy controlled hex. This cost is above and beyond the ordinary movement cost for the terrain.

(C) If you move **directly** from one controlled hex of an Enemy unit to another controlled hex of the same or any other Enemy unit, it costs **five** additional Movement Points (three plus two, as outlined in Cases 1 & 2). Example: If a German Armored unit were to enter a French Zone of Control in the forest, it would expend five Movement Points in moving one hex; three for entering a Zone of Control; one for moving one hex; one additional for armor moving in the forest. If the same unit were to leave one controlled hex for another controlled hex, it would expend seven Movement Points (three plus two plus one plus one). This is the maximum any unit would be forced to expend in moving one hex.

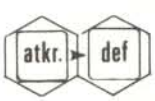
(D) If a hex is controlled by more than one unit, it still costs only three additional Movement Points to enter such hex. This is true for all movement costs, e.g., entering a hex with more than one Zone of Control **never** costs more additional Movement Points than entering a hex with one Zone of Control, including the single-hex Zone of Control exerted by an interdicting aircraft unit.

(E) For movement purposes, Enemy Zones of Control **do** extend into adjacent hexes containing Friendly units. For supply purposes or when conducting a retreat mandated by the Combat Results Table, Enemy Zones of Control **do not** extend into hexes occupied by Friendly units, nor, in the case of Allied units, do German Zones of Control extend into Maginot Line hexes for these purposes. Once a fortified hex has been destroyed, however, it no longer relieves the effect of German Zones of Control upon Allied retreats and supply lines.

COMBAT PHASE

General Rule:

Combat occurs between adjacent opposing units at the discretion of the Player whose Combat Phase it is. The Player whose Combat Phase it is, is considered to be the **Attacker**; the other Player is considered to be the **Defender**.



Procedure:

Total up the Attack Strengths of all the attacking units involved in a specific attack and compare it to the total Defense Strength of the unit in the hex under attack. State the comparison as a probability ratio: Attack Strengths-to-Defense Strengths. Round-off the ratio downward to conform to the simplified odds found on the Combat Results Table; roll the die and read the result on the appropriate line under the odds. Apply the result immediately, before going on to resolve any other attacks being made during that Combat Phase.

Cases:

(A) During the Combat Phase of his turn, a Player may only attack those Enemy units to which Friendly units are adjacent. Only those Friendly units directly adjacent to a given Enemy unit may participate in the attack upon that Enemy unit.

(B) Units adjacent to Enemy units are **not compelled to attack**, nor does the attacking Player have to utilize every adjacent unit if he does decide to attack. Attacking is completely voluntary.

(C) No unit may attack more than once per Combat Phase. No Enemy unit may **be** attacked more than once per Combat Phase.

(D) More than one Enemy-occupied hex may be attacked by a given attacking unit (or group of attacking units); that is to say, different defending units on different hexes may be treated as the objects of an attack which might be made by one hex group of attacking units if the attacking units happen to be adjacent to two or more Enemy-occupied hexes.

(E) An Enemy-occupied hex may be attacked by as many attacking units as can be brought to bear. Conceivably, as many as six corps (or corps-equivalents) could be brought to bear against an Enemy-held hex.

(F) Defending units stacked in the same hex may only employ the Defense Strength of one corps (or corps-equivalent). The Defender chooses which of his units in a given hex will be used in the defense of that hex. He does not have to reveal his decision until the Attacker announces which of his units he will use in the attack. The Defender may choose to defend with **less** than one corps per hex, but he may **never** defend with **more** than one corps per hex.

(G) Only one corps (or corps-equivalent) may **attack** from a given hex in a given Combat Phase. If a given stack of attacking units is adjacent to more than one Enemy-held hex, then separate units in the Attacker's stack may be involved in different attacks (against the different enemy hexes) as long as the total of the attacking unit does not exceed one corps. The Attacker may choose to attack with **less** than one corps, but he may **never** attack with **more** than one corps from a given hex.

(H) Combat Results apply to **all** of the Defender's units in a given hex (even those units which did not actively participate in the defense of that hex). Combat Results pertaining to the Attacker apply only to those attacking units which actually participated in the attack; those units which the Attacker could not or would not use in an attack originating from a given hex, are unaffected.

(I) Combat odds are **always** rounded off in favor of the Defender. For example: 26 Attack Points to 9 Defense Points rounds off to a "Two-to-One" odds situation.

TERRAIN EFFECTS CHART (TEC)

Type of Terrain	Effect upon Movement (MP cost per hex entered)	Effect upon Combat
Clear 	Costs one MP per hex.	Normal (No Effect).
Cities & Towns 	MP cost is that of other terrain in hex.	No Effect.
Forest & Swamp 	Costs Mechanized units and Ground Support Elements two MP per hex entered; costs other units one MP per hex.	If Defending units are in Forest or Swamp hexes, the Attacker subtracts "two" from his die roll number (regardless of the type of terrain that the Attacker is in).
River hex-side 	No Effect.	If **all** attacking units are attacking across river hex-sides, the Attacker subtracts "two" from his die roll number.
Flooded Areas 	Prohibited; units may not enter (Aircraft Elements may fly over).	Prohibited.
Borders 	Depends on other terrain in hex. Border itself has no effect except as noted in Initial Placement Rules.	No Effect.
Sea 	Prohibited.	Prohibited.
Maginot Line 	No effect on Allied Player's units. German units may not enter except as a result of combat.	Units defending against attack upon **front** of Maginot Line may add "ten" to the total Defense Strength of that hex. Units defending against attacks upon the **rear** of Line (or front/rear combination) may add "five" to their total Defense Strength.

Notes: Defensive counter-attacks ignore Terrain Effects on combat. The presence of a Close-Supporting Aircraft Element negates the die-subtracting effects of defending units in Forest or Swamp or across River hex-sides. **MP**=Movement Point.

MAGINOT LINE



Maginot Line hexes have an intrinsic Defense Strength of 10 points to their front, and 5 points to their rear. They possess this Strength independently whether or not Allied units are actually in them. This Strength may be added to by the Allied Player by placing units in the Maginot Line hex. Units obey normal stacking limits in Maginot hexes, but only one corps (or one corps-equivalent) may combine its strength with that of the Maginot hex. Maginot hexes, themselves, do not possess a Zone of Control; however, units in them exert their Zones of Control in the normal manner.

German units **may not enter** undestroyed Maginot hexes. To destroy a Maginot hex, the Germans attack it as if it were an Allied ground unit. Only a "DX" result destroys a Maginot hex. Other results have no effect upon the Maginot hex, although such results do apply to any Allied units which are in that hex (including a "CA" result, in which case the Defense Strength of the Maginot hex is **not** employed in the counter-attack).

Once a given Maginot Line hex has been destroyed, it is treated as "clear" terrain for the remainder of the game, even if it is re-taken by the Allies.

The Belgian Fortified Area is treated as Maginot Line hexes. If the Paratroop Optional Rule is not used, the Belgian Fortified Area ceases to exist after the end of the Initial Movement Phase of the first German Player-Turn.

Fortified hexes have the same effect upon Enemy Zones of Control as does the presence of a Friendly (Allied) unit, i.e., it negates the effect of the German Zone of Control upon supply lines and Allied retreats.

BELGIAN AND DUTCH NEUTRALITY

Belgian and Dutch units are not moved until (and only if) the Germans invade Belgium or the Netherlands. As soon as either country is invaded, the units of the invaded country may be moved by the Allied Player. Other Allied units may not move into either country until the Germans invade that country, although they may move onto and along the border hexes before German violation of neutrality.

OFF-MAP MOVEMENT

Units may only move off the map on the southern edge; if the Germans send any units off the south edge, the French must immedi-

ately remove the same (or more) in terms of Combat Strength; none of these units may move back onto the map. Any units forced to move off the map as a direct result of combat, such as in retreat, are eliminated instead.

SUPPLY

General Rule:

Units trace supply lines back to their respective edges of the map (Germany to the East; Allies to the South and/or West). Units not considered in supply are penalized in movement and combat.

Procedure:

Units are determined to be "in supply" at the beginning of each Friendly Movement Phase, and may move their full Movement Allowance if they are in supply at such time; for combat purposes they are determined to be in supply at the **moment of combat** i.e., if a defending unit had been in supply at the beginning of the Enemy Combat Phase, but another preceding combat had forced the retreat of the Friendly unit through which its supply line was being traced, it would be adjudged out of supply at the moment of attack. To be in supply a unit must be able to trace a clear path of connected hexes to their Friendly map-edge, no matter how devious or lengthy, as long as it is not traced through Enemy units or Zones of Control (note that for supply purposes, Enemy Zones of Control **do not** extend into hexes occupied by Friendly units).

Cases:

(A) Units out of supply have their Movement Allowance and Attack and Defense Strengths halved (losing the benefit of any fraction).

(B) Units may remain out of supply indefinitely, i.e., units are never lost through lack of supply alone.

(C) Allied units have the alternative of tracing a supply line to a Maginot Line hex. Each Maginot hex may provide supply for up to one corps of Allied units. Maginot Line hexes, themselves, do not need to trace supply lines.

(D) Any number of Friendly units may be supplied through the same path of hexes. Any number of paths may be traced in order to supply units in different locations. Supply lines may be traced through any type of negotiable terrain and through any number of Friendly units.

(E) Supply lines may be cut in any of the following ways:
1. The intervention of an Enemy unit, or units;
2. The intervention of an Enemy Zone of Control.
NOTE: Enemy Zones of Control **do not** interfere with supply lines being traced through a hex containing a Friendly unit, i.e., the presence of a Friendly unit in an Enemy controlled hex negates the effect of that Zone of Control (with respect to supply only!)

(F) Units may deliberately move into hexes which will leave them out of supply.

GERMAN ARTILLERY

General Rule:

The two German artillery units perform in two different roles: (a) They may be used defensively as regular combat units, each unit having a Defense Strength of "1" point, or (b) they may be used against fortified hexes (Maginot and Belgian) with each unit having an Attack Strength of "10" points.

Cases:

(A) When used against fortified hexes, artillery units have a range of up to two hexes, i.e., they may attack fortified hexes which are two hexes distant or which are adjacent.

(B) Artillery units attacking fortified hexes are never affected by unfavorable results (although any regular German units participating in the same attack **are** affected). In other words, artillery units can only be retreated or destroyed as a result of Allied attacks. Artillery **can** be retreated or destroyed by Allied counter-attacks if the counter-attackers are adjacent to the artillery units.

(C) Artillery units may fire over intervening Enemy or Friendly units in order to attack a Fortification hex which is two hexes distant.

AIR UNITS

General Rule:

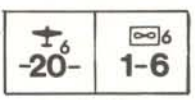
Air units, in a given Game-Turn, are capable of **either** flying aerial missions **or** changing the location of their base of operation (by moving the appropriate Ground Support Element in the same fashion as any regular non-motorized ground combat unit). Aerial missions either affect combat or Enemy movement and supply lines.

Procedure:

Aircraft units may fly aerial missions over specific hexes which may be as far away from the ground support element as the aircraft unit's Range Allowance permits. The routine of execution depends upon the specific type of mission being flown. Aircraft units are not affected by terrain considerations when in flight.

Cases:

(A) An Air unit is composed of two separate counters: the **Ground Support Element,** and the **Aircraft Element.** These two counters taken together constitute one unit for stacking purposes. There is no limit to the number of Aircraft Elements which may be flying in the "air space" over a given hex.



(B) Only one Aircraft Element may be based in a single Ground Support Element; only that Aircraft Element having the same identification number as its parent Ground Support Element may be based in that particular Ground Support Element.

(C) When the Ground Support Element is moved, it must have its Air Element in it (on

the Ground). Ground Support Elements are moved in the Initial Movement Phase only (as if they were non-mechanized units). Ground Support Elements suffer the terrain-movement costs as if they **were** mechanized units: i.e., they must pay an additional Movement Point for each forest or swamp hex which they enter.

(D) Aircraft Elements may be used to fly any one of five possible missions in a given Game-Turn (assuming of course that their parent Ground Support Element is not moved).

German aircraft may use all of the following missions; however, the Allied Player may not use **Interdiction,** except on those Order of Battle Alternatives where it is specifically permitted.

Although the Germans may receive a certain number of air units on the Order of Battle Alternative Chart, for the first Game-Turn four of the Aircraft Elements may not be used on aerial missions, nor may their Ground Support Elements move. They return to use on the second Game-Turn. .(Ignore this restriction if using the optional Paratroop rules.)

Aircraft Missions:

(1) **Close Support: (flown during the owning Player's Combat Phase).** Aircraft flys to a hex containing Enemy ground units which are to be attacked by Friendly ground units in that Combat Phase. The presence of a Close support Aircraft Element has the effect of raising the subsequent die-roll of the attacking ground force by "two," e.g., if the die-roll were "3" it would be raised to "5." If, due to terrain, the Attacker is forced to **subtract** "two" from his die-roll, then the presence of a Close Support Aircraft Element has the effect of negating that subtraction (and the face value of the die is used).

Only one Aircraft Element may fly a Close Support mission in a given Enemy-held hex. Close Support missions are landed immediately upon the resolution of the ground attack. Ground combat results **do not** affect the Close Supporting Aircraft Element.

(2) **Interdiction: (Aircraft Element takes-off at the end of the owning Player's Mechanized Movement Phase and is returned to its base at the end of the ensuing Enemy Mechanized Movement Phase: i.e., it remains "in the air" over a specific hex during the entire Enemy Player Turn.).** Aircraft Elements flying Interdiction missions over a given hex have exactly the same effect upon Enemy supply and movement as if a Friendly Ground unit were exerting a Zone of Control in that hex. Just as with ground unit Zones of Control, the presence of an Enemy unit in the interdicted hex negates the effect upon the supply lines (but not upon movement). More than one Aircraft Element may fly Interdiction in the same hex, but this does not in any way increase the interdiction effect. Interdiction missions are subject to Enemy Interception.

(3) **Combat Air Patrol (Aircraft Element takes-off at the end of the owning Player's Mechanized Movement Phase and is returned to its base at the end of the ensuing Enemy Player's Mechanized Movement Phase: i.e., it remains "in the air" over a specific hex throughout the entire Enemy Player Turn.).** Any number of Aircraft Elements may fly Combat Air Patrol in the same hex. As long as Friendly Aircraft are flying CAP over a hex, Enemy Aircraft may **not** fly Interdiction or Close Support missions in that hex. If the CAP is completely driven off by Enemy interceptors, however, then other Enemy Aircraft Elements may, in the same Player-Turn, execute a Close Support mission in that hex and/or initiate an Interdiction mission over that hex. Combat Air Patrol missions may be flown over hexes containing Friendly ground units or vacant hexes. CAP missions **may not** be initiated in hexes which already contain Enemy Aircraft units which are coming to the end of their own CAP or Interdiction missions. Combat Air Patrols do not affect movement or supply lines.

(4) **Air Superiority (Aircraft Elements Take-off at the end of the owning Player's Initial Movement Phase and return to base at the end of the owning Player's Combat Phase.).** Air Superiority missions are flown against Enemy Ground Support Elements in an effort to destroy them from the air. If there are no Enemy CAP Aircraft over the Ground Support Element then the results of the Air Superiority mission are obtained as follows: The Attacking Player rolls the die once; if one Aircraft Element is attacking a result of "six" is required to destroy the Enemy Ground Support Element; if two Aircraft Elements are attacking, then a result of "five" or "six" destroys the Enemy Ground Support Element . . . and so on (if six Aircraft Elements are attacking an undefended Enemy Ground Support Element, then it is automatically destroyed).

If there **are** Enemy Aircraft flying CAP over the Ground Support Element, however, then the number of attacking units required to obtain a "destroyed" result against a single Ground Support Element increases as per the **Air Superiority Table**.

Each Enemy Ground Support Element defends against Air Superiority attacks with a Defense Strength of "1." Each Enemy Aircraft Element on CAP over an Enemy Ground Support Element adds "1" to the Defense Strength of the Ground Support Element. Each attacking Aircraft Element has an Attack Strength of "1." Determine the odds of the attack in the usual manner (just as in land combat, rounding off the odds in the Defender's favor.). Roll the die once and determine the results in the following manner:

AIR SUPERIORITY TABLE

Die-Roll	Odds						
	1-2	1-1	2-1	3-1	4-1	5-1	6-1
1	–	X	X	X	X	X	X
2	–	–	X	X	X	X	X
3	–	–	–	X	X	X	X
4	–	–	–	–	X	X	X
5	–	–	–	–	–	X	X
6	–	–	–	–	–	–	X

X=Ground Support Element Destroyed (plus the matching Aircraft Element)

–=No Effect

Note that whatever the result of the Air Superiority attack, there is no effect upon the CAP units (unless their parent Ground Support Element is being attacked) nor upon the attacking Aircraft Elements. Aircraft Elements can only be destroyed by destroying their parent Ground Support Elements (either in land combat or through an Air Superiority attack).

If there is more than one Ground Support Element in a hex, each must be attacked **separately** using different attacking Air Elements. In such a case, the attacker first allocates which of his units will attack which Ground Support Element and then the defender may allocate his CAP Air Elements (if any) to assist in the defense. The attacker does not necessarily have to attack all the Ground Support Elements in a given hex.

Ground Support Elements stacked together do not contribute to each other's defense with respect to an Air Superiority attack. Terrain effects do not apply to Air Superiority Missions.

Friendly Aircraft Elements on CAP over Friendly Ground Support Elements **are not subject to interception.**

(5) **Interception (Aircraft Elements take-off, execute mission and return to base at the beginning of the owning Player's Initial Movement Phase, before any land movement takes place.).** Only Enemy Interdiction and/or Enemy CAP missions are subject to interception. Interception does not result in the destruction of either Player's Air Elements; rather it has the effect of forcing the Enemy Player's units to abort their mission: for each Friendly Intercepting Air Element flown against a hex containing Enemy Air Elements, one Enemy Air Element is forced to abort its mission and return to base. In effect one Interceptor negates one Enemy Air Element and causes both units to be returned to their respective bases immediately. If an interception mission is flown against a given hex containing Enemy Air Elements some of which are flying an Interdiction mission and some of which are flying a CAP, the Interceptors must first deal with the CAP Elements. After the CAP has been cleared from the hex, any remaining Interceptors may then deal with the Interdiction mission. Aircraft Elements flying CAP over a Friendly Ground Support Element, are NOT subject to interception.

(E) Ground Support Elements **do not** have a Zone of Control (whether or not their Aircraft Element is in them). **Whenever a Ground Support Element is destroyed, its Aircraft Element is also destroyed** (immediately, no matter where it is or what sort of mission it may be flying).

(F) In order to differentiate between Aircraft Elements flying Interdiction missions and those flying CAP, Players may wish to flip face-down those Aircraft Elements on CAP.

STANDARD GAME VICTORY CONDITIONS

The winner is determined on the basis of **Victory Points**, which are awarded for eliminating Enemy forces, and for capturing and holding Paris.

The Allies receive one Victory Point for each German **unit** destroyed no matter what size. The Germans receive one victory point for each French, Belgian and Dutch unit destroyed, three victory points for each U.K. (British) unit destroyed, and ten victory points if a German unit occupies any of the three hexes of Paris at the end of the tenth Game-Turn. Each side receives two points for destroying an Enemy air unit.

The German Player wins if he accumulates 25 victory points, and also has a minimum of 3:1 ratio between his victory points and those of the Allied Player. The Allied Player wins by avoiding the German victory conditions.

INITIAL SET-UP

Each side receives their forces in accordance with the **Order of Battle Chart.**

INSTRUCTIONS FOR THE USE OF THE ORDER OF BATTLE ALTERNATIVES CHART (OBAC)

General Description

Each verticle column represents a separate Order of Battle (i.e., the number and type of units which make up the army controlled by a Player). Each Player selects one Order of Battle from his chart to use in a given game. The numbers in the vertical columns give the quantities of the units available. Reading across the chart horizontally indicates the exact type of unit to be used. The Reinforcement section of each chart shows the additional units which come into play as the game progresses and the Game-Turn in which they become available.

Each of the alternatives illustrates the effect that the respective powers' pre-war options and decisions would have had upon the forces they could have fielded in May, 1940. Each of these options is briefly described in the respective OBAC .

Initial Unit Placement Procedure

The Allied Player sorts out his forces and places them on the board first. French and U.K. forces may be placed anywhere within France including neutral border hexes, but not on the border with Germany. Belgian and Dutch forces are placed in their respective countries, and may be placed on **any** border hexes.

German units are placed **after** all Allied units have been placed. They may be placed in Germany and on any **unoccupied** border hex. All units must meet stacking requirments in initial placement.

Cases:

(A) Allied reinforcements appear in any of the Paris hexes, or if Paris is at all occupied, start on the Western edge of the map. They appear at the beginning of the Player's turn as indicated on the OBAC, and may move and engage in combat on the same Player-turn.

(B) German reinforcements appear on any of the Eastern edge hexes North of the Maginot Line at the beginning of the Player-Turn. They may move and engage in combat on the same Player-turn.

ALLIED ORDER OF BATTLE ALTERNATIVES CHART

		Description Key:	1. Hist	2. A	3. B	4. C	5. D	6. E	7. A+B	8. A,B,C	9. A,B, C,E	10. A+C	11. A+E
STARTING UNITS	FRENCH	6-6	13	13	13	18	16	20	13	18	20	18	20
		3-4	3	4	3	3	4	4	4	4	4	4	4
		1-6	5	–	5	5	5	5	–	–	–	–	–
		4-6	3	3	3	3	3	3	3	3	3	3	3
		2-6	7	7	7	7	7	7	7	7	7	7	7
		5-6	–	7	–	2	2	4	7	7	7	7	7
		2-2	4	4	4	–	5	2	4	–	–	–	2
		-18-	1	1	6	1	2	2	6	6	6	1	2
		1-6	1	1	6	1	2	2	6	6	6	1	2
	BRITISH	8-8	1	1	1	1	3	3	1	1	3	1	3
		6-8	1	1	1	1	–	–	1	1	–	1	–
		4-8	1	1	1	1	–	–	1	1	–	1	–
		2-8	1	1	1	1	–	–	1	1	–	1	–
		4-6	–	1	–	–	1	1	1	1	1	–	1
		-18-	1	1	2	1	1	1	2	2	2	1	1
		1-6	1	1	2	1	1	1	2	2	2	1	1
	BELGIAN	4-6	9	9	9	9	9	9	9	9	9	9	9
		2-7	2	2	2	2	2	2	2	2	2	2	2
	DUTCH	4-6	2	2	2	2	3	3	2	2	3	2	3
REINFORCEMENTS	Turn 4	6-6	2	2	2	3	2	2	2	3	2	3	2
		4-6	1	1	1	1	–	–	1	1	1	1	1
		3-4	1	–	1	1	–	–	–	–	–	1	–
		1-8	4	4	4	4	2	2	4	4	2	4	4
	5	6-6	1	1	1	2	2	2	1	2	2	2	2
	6	6-6	1	1	1	2	2	2	1	2	2	2	2
	7	6-6	1	1	1	1	2	1	1	1	1	1	1
		4-6	–	–	–	1	–	–	–	–	–	–	–
	8	6-6	1	1	1	–	1	1	1	–	1	–	1
	9	6-6	1	1	1	–	1	–	1	–	–	–	–

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Reinforcements: GAME TURN

GERMAN ORDER OF BATTLE
ALTERNATIVES CHART

		I	II	III	IV	V	VI
STARTING UNITS	7-6	20	26	20	22	20	20
	7-8	1	1	1	–	1	1
	6-8	3	3	3	1	3	3
	5-8	1	1	1	1	1	1
	4-8	5	5	3	4	5	5
	3-8	1	2	2	2	1	1
	2-8	2	4	2	4	2	2
	1-8	2	4	2	4	2	2
	-20-	8	8	6	8	8	4
	1-6	8	8	6	8	8	4
	10-2	2	2	2	2	2	2
	1-7	–	–	–	1	–	–
1	7-6	4	4	–	4	4	4
2	7-6	4	2	–	4	4	4
	3-8	1	–	–	–	1	1
3	7-6	2	2	1	2	2	2
	1-8	2	–	–	–	2	2
4	7-6	2	2	1	2	2	2
5	7-6	1	–	1	1	1	1
6	7-6	1	–	1	1	1	1
7	4-8	–	–	1	–	–	–
	2-8	–	–	1	–	–	–
8	7-6	–	–	1	–	–	–
9	7-6	–	–	2	–	–	–
10	7-6	–	–	2	–	–	–

Reinforcements: GAME-TURN

ALTERNATIVE NUMBER AND DESCRIPTION

I – Historical 1940 situation

II – No Scandinavian invasion

III – No German-Soviet non-agression pact

IV – Less-developed mobile force doctrine

V – No modern Air Force tactical doctrine; Germans may not use Air Interdiction Rule

VI – Weak Air Force

TERNATIVE OB LETTERS AND EXPLANATIONS

development of Allied mobile forces;

development of Allied air forces; Allied air s have same capabilities as German units y interdict);

Maginot Line funds diverted to Convention- orces; treat Maginot Line hexes as clear ain;

Early Allied re-armament;

Early re-armament and no Maginot Line; Maginot Line hexes are treated as clear ain hexes.

OPTIONAL RULES

German Airborne Units

Commentary:

German airborne units were not used so much for direct combat as for the disruption of enemy installations (like fortifications) and troops. The airborne forces consisted of six battalions of paratroops (4500 men, who could also be used in gliders) and one division (12000 men) of airlanding troops (who would land on airfields secured by the paratroops). In the 1940 campaign one battalion of paratroops was used to destroy the Belgian fort (Eben-Emael) north of Liege. The other five battalions were used to secure airfields and disrupt enemy forces in the north of the Netherlands. The air-landed division came in behind these battalions. These areas were the most likely ones for the use of airborne troops, for in order to be effective they must be quickly reached by friendly conventional ground forces. The airborne units are too weak by themselves to hold out against enemy ground forces for very long. Belgium and the Netherlands were adjacent to Germany and their ground forces were weak compared to the British and French forces. Could the Germans have used their airborne units to crack the Maginot Line as they did at Eben-Emael? It was possible, but there were two factors going against it. First, the French had more conventional forces deployed about their fortifications than did the Belgians. These mobile units would have considerably lessened the ability of the airborne units to reduce the forts. Second, by breaching the Maginot Line, the Germans would not be achieving a "great victory" as they would with an advance across north France. In other words, there was nothing particularly valuable behind the Maginot Line. In addition, the terrain in that area was more suitable for defense than the terrain in northern France.

In the Standard Game, the use of airborne troops is "built in." The Netherlands and Eben-Emael fall automatically. To use this optional rule, the Germans will probably be worse off, for, unlike the Regular Game, here their opponent will be aware of the capabilities of the airborne units and will be able to take defensive measures. To simulate, use the following rules.

Cases:

(A) There are six parachute battalions, and three air-landing regiments (1-4s);

(B) When using this rule, the Germans must remove two corps (or corps-equivalents) from their OB; the choice of units is theirs;

(C) When using this rule, the Germans **do not** lose the use of four German air units, as in the Standard Game, in the first turn.

(D) When using this rule, the Belgian forts do not fall automatically, but remain intact unless taken; their capabilities are exactly the same as Maginot Line hexes, including the ability to supply up to one Allied corps each.

(E) Each paratroop and air-landing unit may be landed **once** per game.

(G) Paratroop Units have no Movement Allowance, nor do they have an Attack or Defense Strength, or a Zone of Control; if attacked alone, they are automatically destroyed; enemy units may pass through them is if it were a Zone of Control; they are **not** counted against stacking limitations.

(H) Paratroops may be dropped anywhere (except on top of an enemy unit which is not in a fortified hex) within **twenty** hexes of a German Ground Support Element which did not move in that Player-Turn; the Aircraft Element need only accompany if paradropping onto a fortified hex.

After being dropped, surviving paratroop units remain in place until they are reached by a regular German ground unit and a supply line is established, at which time they are withdrawn from the game (not counted as "lost").

(I) Upon landing, paratroops roll the die; if a "five" or "six" is rolled, the unit is immediately destroyed.

(J) Paratroops dropped onto a fortified hex, and which survive landing (see Case I), role the die: a "one" through "five" destroys the forts, a "six" destroys the paratroop unit. If the fortified hex is occupied by an Enemy unit, the paratroop **may drop onto it,** but in this case only a "one" or "two" destroys the forts and the paratroop unit is automatically destroyed no matter what the die-roll; when assaulting a fortified hex, the paratroop unit must be accompanied by an Aircraft Element (which has no effect on combat, and which returns to base at the end of the Combat Phase). This assault on a fortified hex is carried out during the Initial Movement Phase, before the Combat Phase. In no case is the defending unit affected when dropped on by paratroops in a fortified hex.

(K) If a paratroop unit survives the landing (except in assaulting a fortified hex, in which case, if it survives the **assault**) any number of air-landing regiments may be brought onto the hex immediately (remember we are still in the Movement Phase). These units **do** count for stacking and **do** have a Zone of Control. They are treated as ordinary ground units. They may **not** move in the Player-Turn of landing.

VARIABLE VICTORY CONDITIONS

Commentary:

The great German victory was purely because of its swiftness; the psychological defeat far outweighed the military. Outside of a few individuals in the Vichy government, the French people truly lay prostrate before the conquering Germans: for several years, the Germans found no necessity to maintain large garrisons, despite the impressing of laborers, as civilian opinion was neutral to the Occupation authorities and hostile to partisans, "Free French" and British.

The troops thus saved, and the security provided, made possible the eastern campaigns, and the possibility of ultimate German victory.

The players may substitute the following victory conditions.

Ratio of
German Victory Points to
Allied Victory Points . . .

Less than 1:1 – Allied victory.

1:1 to 2:1 – marginal German victory; Germans must have at least ten victory points. Allies fall back intact, Western Front operates for several months; no Balkan invasion, no Italian alliance, probable Russian intervention in 1940-41.

2:1 to 3:1 – tactical German victory; Germans must have at least 15 victory points. U.K. forces evacuated intact, Occupied France restive, with large, mobile occupation force. No Eastern campaign, possible Russian attack 1941-42.

3:1 to 4:1 – strategic German victory; Germans must have at least 25 victory points. U.K. forces crushed, small occupation force needed, Italian and possibly Spanish alliance, most of Balkans subdued, probable invasion of Russia.

Greater than 4:1 – crushing German victory; Germans must have at least 30 victory points. U.K. may make peace, or possible French alliance with Germany; United Europe attacks Russia in 1941.

Mild Winter Rule

The winter of 1939-40 was one of the most severe in Western Europe for several decades. Despite the fact the Allies had some millions of men mobilized, but inactive for the winter, the construction of field fortifications and defenses progressed slowly, if at all. The ground was hardened to a depth that prohibited digging, unless blasted first; concrete crystallized, rather than "set," and would shatter easily under armor-piercing shells. However, if the winter had not been so, the Allies would have been able to extend rudimentary fortifications to the coast, though obviously not on a Maginot Line scale. To simulate this possibility, use the following rules.

Cases:

(A) The Allies have a fortified line consisting of the French Border hexes with Belgium, and all hexes in France adjacent to these border hexes.

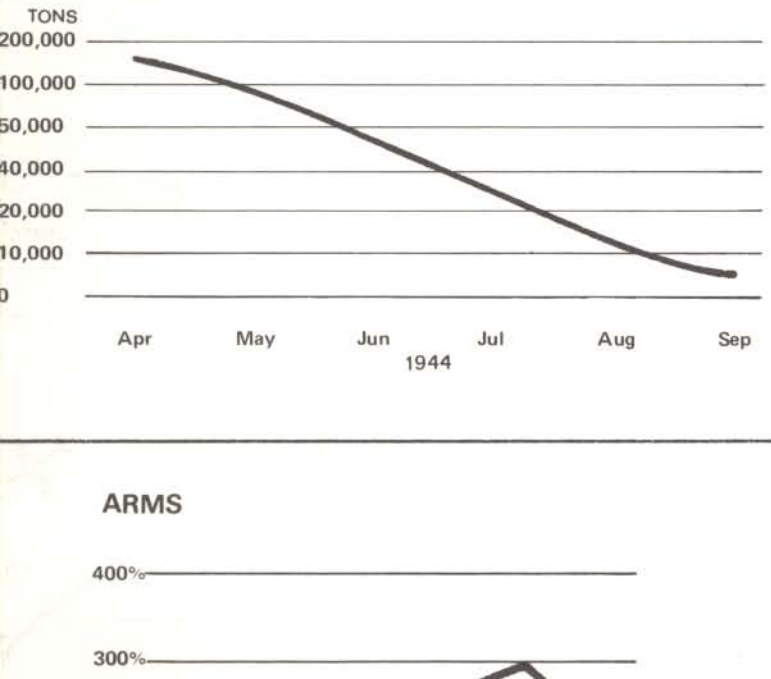
(B) These hexes have exactly the same effect on the **Germans** for movement and combat as do the forest hexes; i.e., they subtract two from the die-roll when attacking and cost one extra movement point for motorized units to enter those hexes. In those cases where forest hexes are also fortified hexes, there is only a penalty on combat of subtracting two from the die-roll, but the movement penalty on motorized units is an additional two Movement Points: one for the forest, one for the fortified hex.

ALLIED LOSSES PER MAJOR CAMPAIGN

CAMPAIGN	DURATION	LOSSES	EFFECT
Aircraft	Aug 1943 – Feb 1944	US-792, British-379	Production: effect lasted s two months; losses soon o
Oil; Transportation	May 1944 – Apr 1945	US-968, British-525	Oil: Production drop of 6
Area Bombing	July 1943 – Apr 1945	British-875	No real effect

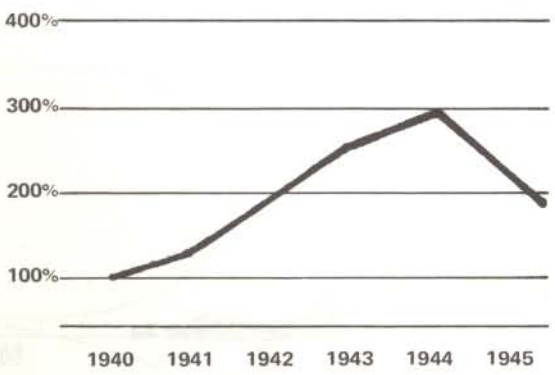
GERMAN PRODUCTION DECLINE

HIGH OCTANE FUEL

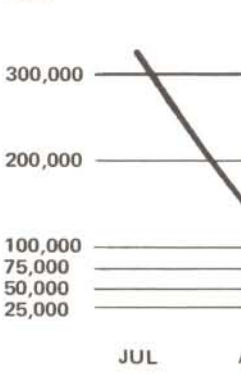


As can be seen from t bombing did have an ef production, especially drop caused the Germa available reserves by after that they were crisis, for production c with demand. This cause back on fuel allowanc motorized forces, thus less mobile role than waffe was forced to cu minimum and to hoar for one great strike w enough. This certainly the Luftwaffe as a threa

ARMS



SYNTHETIC FUEL



The Allied Bomber Offens

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*However, over 1,000 German airmen were lost; thus the raids crippled the Luf
experienced manpower.

NOTES: *The losses are given in terms of bombers only. The British devoted som
their effort to the strategic oil and transportation campaigns during the heigh
bomber offensive, even less, about 20% to the aircraft campaign; on the whole,
of their effort was in the area bombing campaign, which produced no real effe
rest of their effort was in support of the ground and naval forces. Almost a
American effort was devoted first to the aircraft campaign, then to the
transportation campaigns, save for during the Normandy invasion and the
Offensive, plus other efforts in support of the breakout from Normandy. Th
show what measurable results were gleaned from that phase of the offensive.*

ese tables, Allied
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September 1944;
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TONNAGES OF BOMBS DROPPED
British and US 8th Air Force: 1939-45

Date (% total)	Bomber Command	8th Air Force	Total (ton
1939 (negl)	31 tons	none	31
1940(.8)	13,033	none	13,033
1941(2)	31,704	none	31,704
1942(3)	45,561	1561	47,122
1943(12.8)	157,457	44,185	201,462
1944(57.9)	525,518	389,119	914,637
January	*18,428*	*10,532*	*28,960*
February	*12,054*	*16,480*	*28,534*
March	*27,698*	*19,892*	*47,590*
April	*33,496*	*22,447*	*55,943*
May	*37,252*	*32,450*	*69,702*
June	*57,267*	*54,204*	*111,471*
July	*57,615*	*40,784*	*98,399*
August	*65,855*	*44,120*	*109,975*
September	*52,587*	*36,332*	*88,919*
October	*61,204*	*38,961*	*100,165*
November	*53,022*	*36,091*	*89,113*
December	*49,040*	*36,826*	*85,866*
1945(23.5)	181,740	188,303	370,043
1939-45(total)	955,044	623,168	1,578,212

*Half of all bombs dropped were dropped after August 1944. In addition
million tons were dropped by other Allied air units. About half of this was d
by Allied air forces (mainly the US 15th) in Italy and adjacent areas. The ren
was dropped by tactical air forces. In western Europe, 41% of all US bomb
dropped by B-17's, 29% by B-24's, 11% by B-26's, 8% by B-25's, A-20's, and
7% by P-47's and 4% by other fighter-bombers.*

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ADDITIONAL NOTES ON EFFECTS: *Transportation: the bombing of German transportation succeeded in crippling the flow of traffic and tying up the transportation network. This was acutely felt when the German industries were dispersed and the parts had to be transported from all around for final assembly. Also, it prevented the smooth flow of oil, parts, replacements and other necessities, thus tying up German industries. The armies at the front had trouble receiving replacements, oil, etc. Aircraft: the air battles, not the bombings, succeeded in destroying the Luftwaffe. In the battles against the US forces, the Germans lost most of their experienced aircrew, thus leaving the Luftwaffe without the necessary core of experienced men. Galland said, "The time has come when our weapon is in sight of collapse." Oil: the RAF contributed the greater amount of tonnage on the oil system than did the US, 63,000 to 60,000, since the RAF*

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DISTRIBUTION OF BOMB TONNAGES

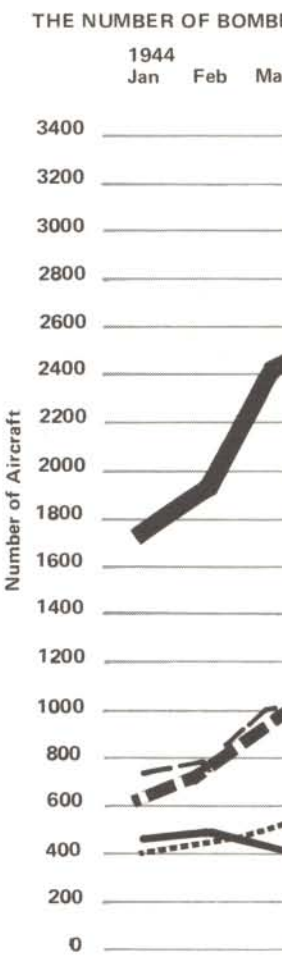
US Army Air Force	54.2%
(1,461,864 tons)	
Royal Air Force	45.8%
(1,235,609 tons)	

BY AREA

France	21.8%
Germany	50.3%
Italy & Sicily	13.7%
Austria, Hungary & Balkans	6.7%
Other	7.5%

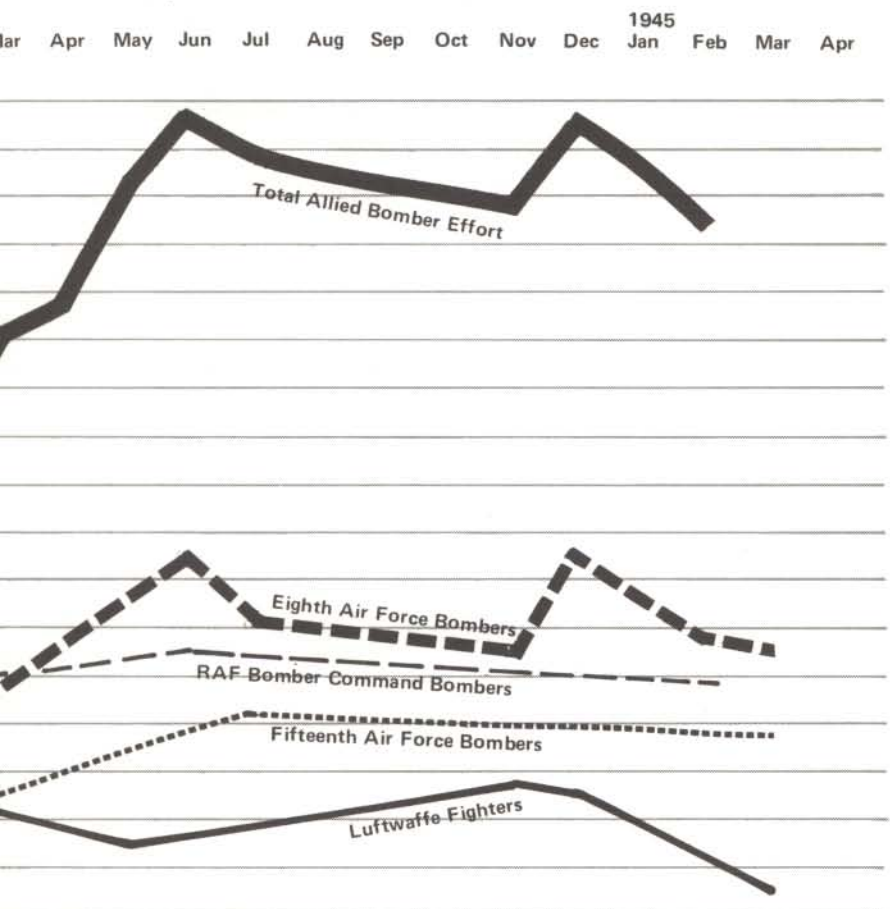
BY TARGET SYSTEMS

Land Transportation	32.1%
Industrial Areas	23.7%
Military Targets	11.1%
Oil, Chemical & Rubber	9.3%
Airfields & Air Depots	6.9%
Naval & Water Transportation	4.2%
V-1 & V-2 Launching Sites	2%
Aircraft Factories	1.8%
Miscellaneous Manufacturing	2.6%
All Other Targets	6.3%



bombers possessed greater bombloads. It has been argued that the tight US formations did not allow for an individual concentration on the target: they dropped when the group leader dropped, while the RAF allowed the pilots to make individual drops when over the target, under supervision of the Master Bomber. However, in daylight, better concentrations were possible, for on clear days the US bombers had a clear shot, while at night the RAF could only dump in the approximate area of the target, thus not getting the greater concentration.

BER AIRCRAFT OVER GERMANY COMPARED WITH LUFTWAFFE FIGHTER EFFORT



STATISTICAL SUMMARY OF THE BOMBING EFFORT	USAAF	RAF	TOTAL
Tons of Bombs Dropped	1,461,864	1,235,609	2,697,473
Bomber Sorties	757,818	687,462	1,445,280
Fighter Sorties	991,750	1,695,045	2,686,795
Claimed Enemy Aircraft Destroyed	35,783	21,622	57,405
Bomber Planes Lost	9,949	11,965	21,914
Fighter Planes Lost	8,420	10,045	18,465
Personnel Lost in Action	79,265	79,281	158,546
Bomber Planes Assigned to Combat Units (max.)	7177	6956	14,133
Fighter Planes Assigned to Combat Units (max.)	6203	7728	13,931
Personnel Assigned to Combat Units (max.)	619,020	718,628	1,337,648

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ALLIED AIR STRENGTH

Date	Britain	USA	USSR	TOTAL	Superiority over Germans
6/42	9500	–	2100	11,600	3.1:1
12/42	11,300	1300	3800	16,400	4.8:1
6/43	12,700	5000	5600	22,800	4.9:1
12/43	11,800	7500	8800	28,100	6:1
6/44	13,200	11,800	14,700	39,700	8.6:1
12/44	14,500	12,200	15,800	42,500	5:1

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GERMAN AIR STRENGTH: September 1939 to January 1945

TYPE	SEF	TEF	NF	FB	B	TOTAL	% against bombers
9/39	1125	194	–	384	1213	2916	0
6/40	1107	357	–	483	1380	3327	0
6/41	1266	210	227	410	1321	3434	7
6/42	1277	362	244	461	1381	3725	17
6/43	1849	414	554	523	1663	4643	21
9/43	1646	392	574	562	1080	4254	26
12/43	1561	290	611	601	1604	4667	26
6/44	1523	242	778	1005	1089	4637	39
1/45	2260	105	1256	892	528	5041	50
Serv:	59-77	43-86	54-84	50-83	41-83		

NOTES: *TYPE*
FW 190 and
TEF=*twin engi*
and the planes
This class failed
to be effectiv
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The Allied Bomber

MANPOWER REQUIREMENTS AND
ER MISSION MATERIEL EXPENDITURE
th AIR FORCE (B-17G's)

Unit	Air Crew	Gnd Crew	Bombs(tons)	Fuel(tons)	.50 cal Ammunition Rounds/Tons
B-17G	10	3	4	11	6380/1.26
quadron (12 ac)	120	36	48	132	76,560/15.12
Group (36 ac)	360	108	144	396	229,680/45.36
Wing (120 ac)	1200	360	480	1320	765,600/151.2
th Air Force*	21,000	6,300	8400	23,100	13,398,000/2679

Strength as of June '44: 2100 ac

As c and utili mou miss Unit to Gern men prim requ base B-24

ity ratios are subject to inter-s early as 1942 the Germans considerable qualitative super-thousands of British bombers approach Germany at night itish fighters couldn't reach all. The Russians were greatly n terms of pilot and aircraft nything, the real ratio was 1:1 favor of the Germans in 1942. 3 the proportion went against Germany, for the first time, in terms of pilot and aircraft quality. Not by much (or at all on the Russian front), but the large number of Allied aircraft made it decisive. By the end of 1943 the real ratio was 3:1 against the Germans. During 1944 the declining quality of German pilots and aircraft versus the newer Allied planes and more highly trained pilots made the real ratio more like 10:1 against the Germans. By the end of the war it was 20:1 or more.

TOTAL EFFORT OF TH
STRATEGIC AIR FORC

Total no. of men — 1,495

Total no. of combat aircra

The above totals include Strategic Air Forces, Bo their respective fighter e port troops, including loss

YPE refers to; **SEF**=*Me 109, and other fighter aircraft;* **ngine** *aircraft such as Me 110 nes that were derived from it. iled as fighters but were found tive as "bomber destroyers" attack aircraft. Even in these hey were soon replaced by lized aircraft;* **NF**=*night fight-y twin engine fighters, used ng night bombers;* **FB**=*fighter d ground attack aircraft, in-7 "Stukas" but later FW 190 ecialized aircraft;* **B**=*bombers, ore than any other.*

inst bombers" *rose, naturally, o of the bombing increased. of aircraft shown above is the number rather than the "serv- "authorized" number. The gures show the lowest and entage of the "on hand" air-were "serviceable" for action. tage fluctuated according to of operations and climatic conditions. The lowest figure usually occured during the early spring (the "mud" season) after active winter operations. For example, the low figure for twin engine fighters, night fighters and fighter bombers occured during the late winter of 1941/'42. The third, and least reliable, method of counting aircraft was the "authorized" number. This was the number of aircraft all the active units were supposed to have. This number, if nothing else, shows what the high command was trying to do. For single engine fighters (SEF) the "establishment" at the beginning of the war was 1174 planes. This stayed fairly constant until 12/40 when it was raised to 1375. From there it grew steadily until, by March '43, it was at 1712 planes. From there on enormous increases were made, from 2172 planes in June '43 to 3016 a year later. By late '44 the number was 4084, although only about half of these planes were actually "on hand." Twin engine fighters (TEF) began the war at 168 and climbed to 448 by August 1940. The Battle of Britain proved the inadequacy of this fighter and the number autho 51 by late '41. But then the ne fighter bombers and bombe saved the TEF and the es immediately went up to 466 This stayed constant until Jun better fighter bombers and range fighters eliminated any TEF. Establishment fell to 10 of the war. Night fighters didn existence until late '40, whe authorized. By late '41 this h to 406, as the British nig increased. Nine months later t to 506 and six months later to later the number was over (1046) and, by the end of th reached 1319. The night figh was the only one which sh problem in obtaining suffic "Sufficient pilots" was calcul basis of the number of service that were available. The night was often short 50 or 60 cr end of 1944 the shortage had*

r Offensive Against Germany

can be seen, the requirements in men d material needed to fly a single mission lizing the whole 8th AF, were enor- us. In spite of this, three or four major ssions were being flown per week. The ited States spent 43 BILLION dollars carry out its air offensive against rmany. As a comparison to the require- nts of the 8th AF (which consisted marily of B-17's) otherTable gives the uirements for the 15th AF (which was ed in Italy and which flew primarily 4J's:)

MANPOWER REQUIREMENTS AND PER MISSION MATERIEL EXPENDITURES 15th AIR FORCE (B-24J's)

Unit	Air Crew	Gnd Crew	Bombs(tons)
1 B-24J	10	3	5
Squadron (12 ac)	120	36	60
Group (36 ac)	360	108	180
Wing (120 ac)	1200	360	600
15th Air Force **	12,000	3600	6000

**Strength as of June '44: 1200 ac

HE ALLIED CES', 1945

5,000

raft – 69,000

the 8th and 15th omber Command, elements and sup- sses.

TOTAL EFFORT OF THE GERMAN REICH DEFENSE, 1945

Total no. of men – 2, 198,700

Total labor force – Approx. 2,000,000

Total no. of combat aircraft – 61,000

The total number of men includes fighter forces, flak forces and auxiliary troops. The labor forces represents the number of laborers, mostly foreign, kept at work repairing damage. Also, it must be remem- bered that of the total number of aircraft, most were immobilized by a lack of fuel. Includes losses.

ORGANIZATION

LUFTWAFFE

Geschwader (100-120 ac)

Gruppe (30-36)

Staffel (9-12)

Schwarm of Kette (4)

s aircraft as a orized fell to need for more er destroyers establishment in early '42. ne '44, when Allied long need for the 04 by the end n't come into en 195 were had increased ght bombing this had risen o 665. A year a thousand he war it had hter program nowed a real icient pilots. lated on the eable aircraft fighter force rews. By the d risen to 314

crews. Part of this was due to the high degree of skill needed for night operations. Although other types of aircraft did not have shortages, the level of skill among German fighter pilots dropped consider- ably during the war while the Allied training (with the exception of the Russians) stayed rather high. From 1939 to late '42 the Germans gave each new pilot 240 flight hours before sending him into combat. This was forty hours more than British pilots received. Starting in October '42 this changed. German pilots now received 205 hours while British pilots received 340 hours and US pilots 270. In July '43 this changed even more, German pilots now received 170 hours, British pilots 335 hours and US pilots 320. By July 1944 it was all over for the German air force. Their pilots, from that point on, received only 110 hours of flight training compared to 340 hours for British and 360 hours for US pilots. The decline in German training was due only partially to the increased need for more pilots. As the war went on the chief reason for this decline was the lack of fuel for training aircraft.

Fighter bomber establishment went up continually during the war, although the first "fighter bombers" were not actually "fighters" but rather purely ground attack aircraft. Establishment in 1939 was 420. This rose to 964 by June '44 and remained there until the end. Bomber establishment rose throughout most of the war until late '43. By then it had risen from 1188 in 1939 to 2053. At that point the Germans finally saw that they desperately needed fighters. Bomber establishment fell to 824 by the end of 1944.

The figures above include only combat aircraft in the European area for the British and Americans (this includes North Africa, the Middle East and Italy). For the Russians all aircraft are included, although about 20% of this total would be "semi- combat" types such as reconnaissance and transport craft. Although the Allies had a clear advantage over the Germans early in

Fuel(tons)	.50 cal Ammunition Rounds/Tons
11	5200/1.04
132	62,400/12.48
396	187,200/37.44
1320	624,000/124.8
13,200	6,240,000/1248

RAF	USAAF
Group (100-120)	Wing (100-120)
Wing (30-36)	Group (30-36)
Squadron (9-12)	Squadron (9-12)
Section (4)	Flight (4)

he war there was not much they could do with it. In an air war the defender has a onsiderable advantage; particularly if the efender (in this case, Germany) is urrounded by other nations which she ccupies, thus forcing an airborne attacker o fly considerable distances before reach-ng vital enemy targets. The Russian air orce was not able to achieve air superior-y until late 1943. This was primarily due o the considerable qualitative superiority he Germans held in both manpower and quipment. But by then the Soviet air orce had grown to over eight thousand ircraft while only about 30% of ermany's air force (about 1400 planes) as still in Russia. The western Allies chieved air superiority over the Germans early 1944. This was due primarily to he introduction of long range fighters to scort the heavy bombers. The Germans ad to come up and fight. Outnumbered, ney eventually lost.

Fig. 1 — **The American combat-box.** *This formation was designed to utilize the immense defensive armament of the US bombers to the fullest. The staggered formation allowed for a reasonable concentration of fire from any angle.*

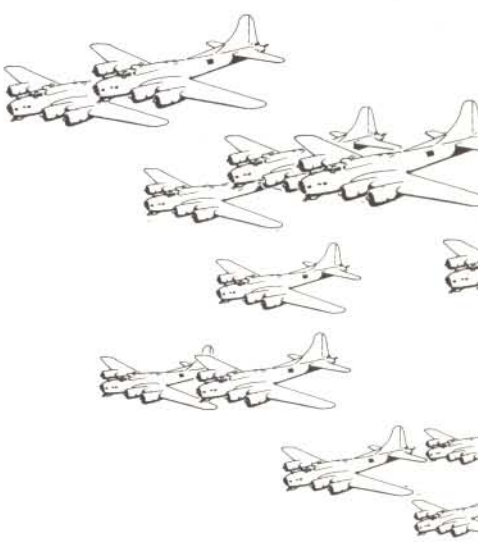


Fig. 3 — **The Head-On Attack.** *The solid arrow indicates the flight path of the German — his two options of climbing over the bomber or diving under it, and the dotted arrow indicates the direction of fire.*

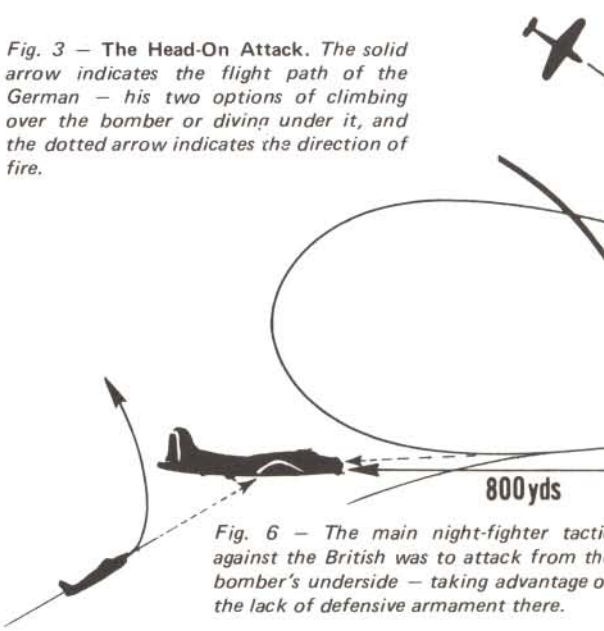


Fig. 6 — The main night-fighter tacti against the British was to attack from th bomber's underside — taking advantage o the lack of defensive armament there.

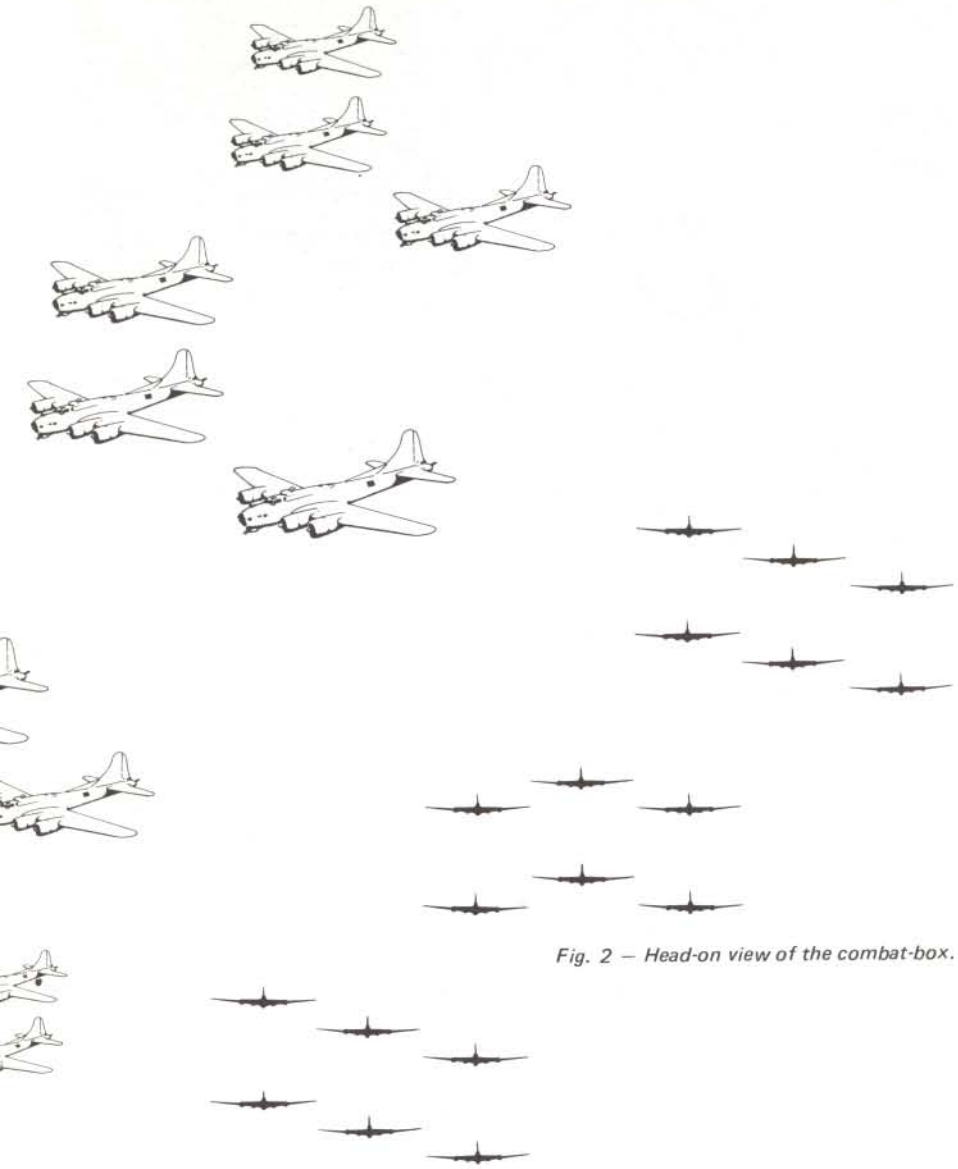
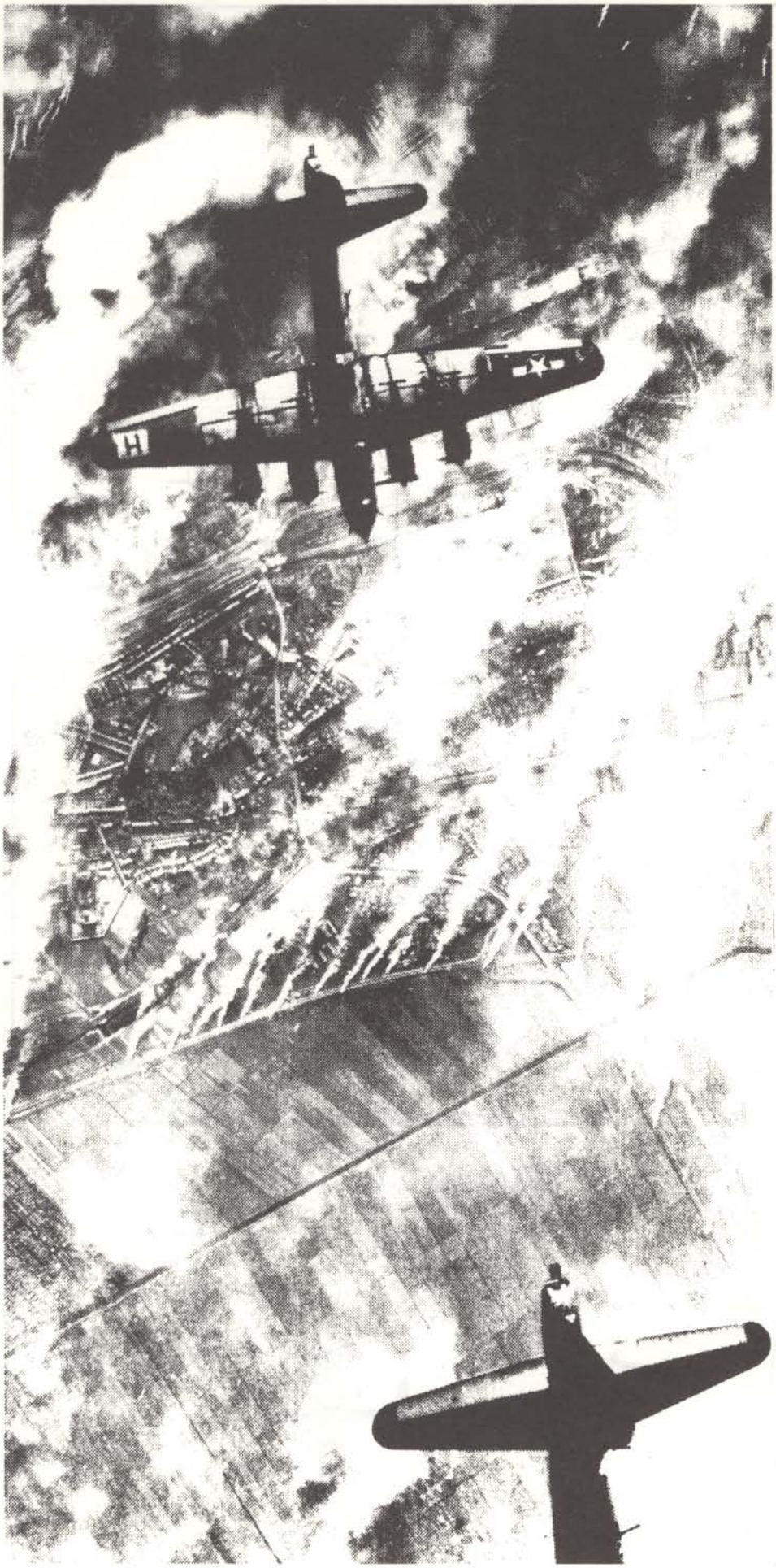


Fig. 2 — Head-on view of the combat-box.

*Fig. 4 — **The Pursuit-Curve Attack.** As in figure 3, the solid line indicates the curving pursuit, from which the tactic's name was derived, and the dotted line indicates line-of-fire.*

Fig. 5 — The tactic preferred by the twin-engine German interceptors was to use the bombers' own contrails to mask his approach, close to range and pump a salvo of rockets up the bomber's rear.

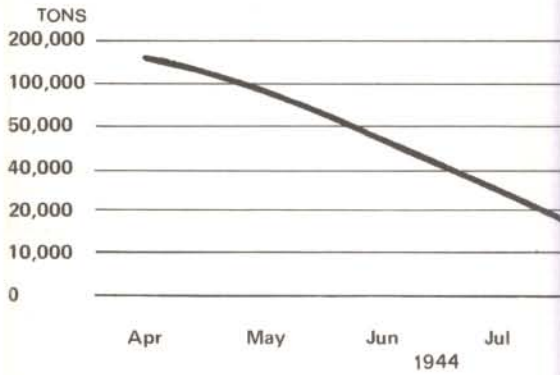


ALLIED LOSSES

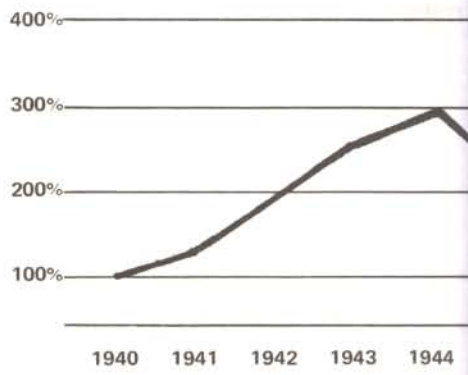
CAMPAIGN	DURATION
Aircraft	Aug 1943 – Feb 194
Oil; Transportation	May 1944 – Apr 194
Area Bombing	July 1943 – Apr 194

GERMAN PRODUCTION DECLINE

HIGH OCTANE FUEL



ARMS



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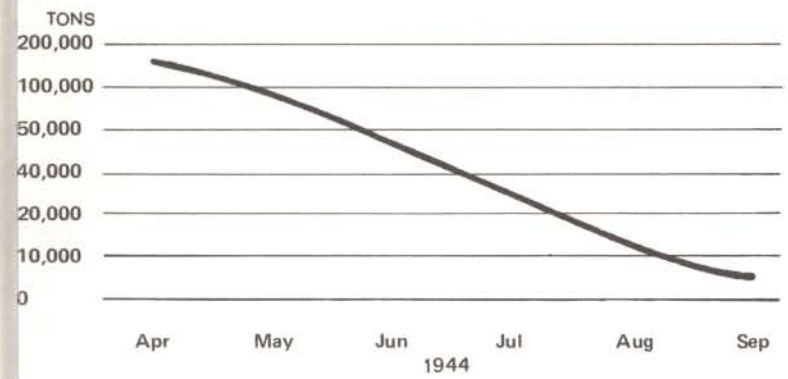
ALLIED LOSSES PER MAJOR CAMPAIGN

CAMPAIGN	DURATION	LOSSES	EFFECT
Aircraft	Aug 1943 – Feb 1944	US-792, British-379	Production: effect lasted some two months; losses soon overcome*
Oil; Transportation	May 1944 – Apr 1945	US-968, British-525	Oil: Production drop of 66%
Area Bombing	July 1943 – Apr 1945	British-875	No real effect

**However, over 1,000 experienced manpower*
NOTES: *The losses ar their effort to the str bomber offensive, ever of their effort was in rest of their effort w American effort was transportation campai Offensive, plus other show what measurable*

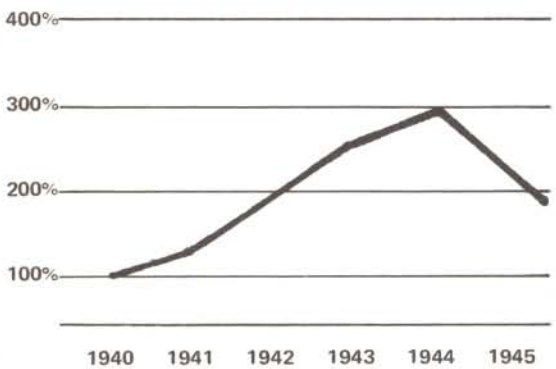
GERMAN PRODUCTION DECLINE

HIGH OCTANE FUEL

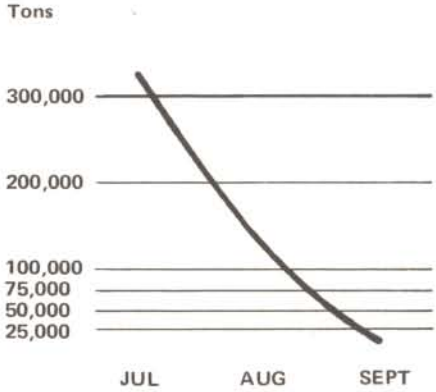


As can be seen from these tables, Allied bombing did have an effect upon German production, especially that of fuel. This drop caused the Germans to use up their available reserves by September 1944; after that they were faced with a fuel crisis, for production could not keep up with demand. This caused the Army to cut back on fuel allowances to panzer and motorized forces, thus forcing them into a less mobile role than before. The Luftwaffe was forced to cut training to a bare minimum and to hoard its available fuel for one great strike whenever they had enough. This certainly all but eliminated the Luftwaffe as a threat.

ARMS



SYNTHETIC FUEL



TONNAGES OF British and US

Date (% total)
1939 (negl)
1940(.8)
1941(2)
1942(3)
1943(12.8)
1944(57.9)
January
February
March
April
May
June
July
August
September
October
November
December
1945(23.5)
1939-45(total)

Half of all bombs million tons were d by Allied air forces was dropped by ta dropped by B-17's, 7% by P-47's and 4%

The Allied Bomber Offensive Against Ger

ed some
n overcome*
f 66%

*However, over 1,000 German airmen were lost; thus the raids crippled the Luftwaffe in experienced manpower.

NOTES: *The losses are given in terms of bombers only. The British devoted some 30% of their effort to the strategic oil and transportation campaigns during the height of the bomber offensive, even less, about 20% to the aircraft campaign; on the whole, over 50% of their effort was in the area bombing campaign, which produced no real effects. The rest of their effort was in support of the ground and naval forces. Almost all of the American effort was devoted first to the aircraft campaign, then to the oil and transportation campaigns, save for during the Normandy invasion and the Ardennes Offensive, plus other efforts in support of the breakout from Normandy. The effects show what measurable results were gleaned from that phase of the offensive.*

ADDITIONAL NOTES ON EFFE
transportation succeeded in crippling network. This was acutely felt when had to be transported from all aroun flow of oil, parts, replacements and The armies at the front had trouble battles, not the bombings, succeeded the US forces, the Germans lost m Luftwaffe without the necessary cor come when our weapon is in sight amount of tonnage on the oil system

n these tables, Allied effect upon German ly that of fuel. This rmans to use up their by September 1944; re faced with a fuel n could not keep up used the Army to cut rances to panzer and us forcing them into a an before. The Luft- cut training to a bare oard its available fuel e whenever they had nly all but eliminated reat.

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AUG SEPT

1944

TONNAGES OF BOMBS DROPPED
British and US 8th Air Force: 1939-45

Date (% total)	Bomber Command	8th Air Force	Total (tons)
1939 (negl)	31 tons	none	31
1940(.8)	13,033	none	13,033
1941(2)	31,704	none	31,704
1942(3)	45,561	1561	47,122
1943(12.8)	157,457	44,185	201,462
1944(57.9)	525,518	389,119	914,637
January	*18,428*	*10,532*	*28,960*
February	*12,054*	*16,480*	*28,534*
March	*27,698*	*19,892*	*47,590*
April	*33,496*	*22,447*	*55,943*
May	*37,252*	*32,450*	*69,702*
June	*57,267*	*54,204*	*111,471*
July	*57,615*	*40,784*	*98,399*
August	*65,855*	*44,120*	*109,975*
September	*52,587*	*36,332*	*88,919*
October	*61,204*	*38,961*	*100,165*
November	*53,022*	*36,091*	*89,113*
December	*49,040*	*36,826*	*85,866*
1945(23.5)	181,740	188,303	370,043
1939-45(total)	955,044	623,168	1,578,212

Half of all bombs dropped were dropped after August 1944. In addition 1.118 million tons were dropped by other Allied air units. About half of this was dropped by Allied air forces (mainly the US 15th) in Italy and adjacent areas. The remainder was dropped by tactical air forces. In western Europe, 41% of all US bombs were dropped by B-17's, 29% by B-24's, 11% by B-26's, 8% by B-25's, A-20's, and A-26's, 7% by P-47's and 4% by other fighter-bombers.

DISTRIBUTION OF BOMB TONN

US Army Air Force
(1,461,864 tons)

Royal Air Force
(1,235,609 tons)

BY AREA
France
Germany
Italy & Sicily
Austria, Hungary & Balkans
Other

BY TARGET SYSTEMS
Land Transportation
Industrial Areas
Military Targets
Oil, Chemical & Rubber
Airfields & Air Depots
Naval & Water Transportation
V-1 & V-2 Launching Sites
Aircraft Factories
Miscellaneous Manufacturing
All Other Targets

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the Ardennes
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ADDITIONAL NOTES ON EFFECTS: *Transportation: the bombing of German transportation succeeded in crippling the flow of traffic and tying up the transportation network. This was acutely felt when the German industries were dispersed and the parts had to be transported from all around for final assembly. Also, it prevented the smooth flow of oil, parts, replacements and other necessities, thus tying up German industries. The armies at the front had trouble receiving replacements, oil, etc. Aircraft: the air battles, not the bombings, succeeded in destroying the Luftwaffe. In the battles against the US forces, the Germans lost most of their experienced aircrew, thus leaving the Luftwaffe without the necessary core of experienced men. Galland said, "The time has come when our weapon is in sight of collapse." Oil: the RAF contributed the greater amount of tonnage on the oil system than did the US, 63,000 to 60,000, since the RAF bombers possessed greater bombloads. It has bee did not allow for an individual concentration on t leader dropped, while the RAF allowed the pilots target, under supervision of the Master Bomber. trations were possible, for on clear days the US B the RAF could only dump in the approximate greater concentration.*

al (tons)

033
704
122
,462
,637
960
534
590
043
702
,471
999
,975
019
,165
'13
166
,043
'8,212

dition 1.118
was dropped
he remainder
bombs were
, and A-26's,

DISTRIBUTION OF BOMB TONNAGES

US Army Air Force	54.2%
(1,461,864 tons)	
Royal Air Force	45.8%
(1,235,609 tons)	

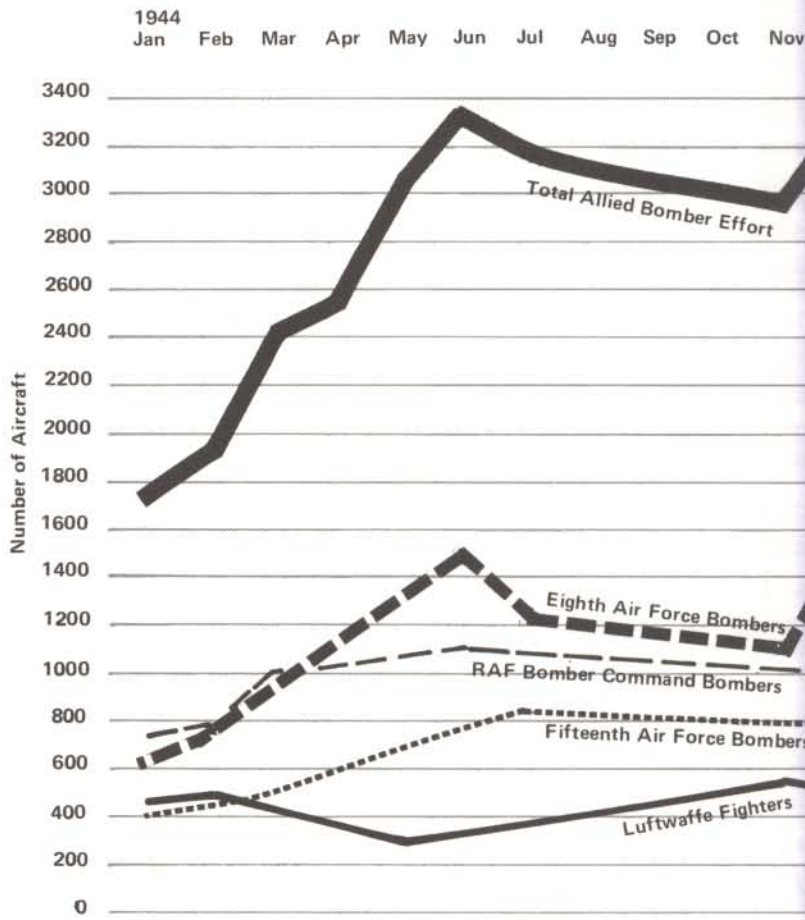
BY AREA

France	21.8%
Germany	50.3%
Italy & Sicily	13.7%
Austria, Hungary & Balkans	6.7%
Other	7.5%

BY TARGET SYSTEMS

Land Transportation	32.1%
Industrial Areas	23.7%
Military Targets	11.1%
Oil, Chemical & Rubber	9.3%
Airfields & Air Depots	6.9%
Naval & Water Transportation	4.2%
V-1 & V-2 Launching Sites	2%
Aircraft Factories	1.8%
Miscellaneous Manufacturing	2.6%
All Other Targets	6.3%

THE NUMBER OF BOMBER AIRCRAFT OVER GERMANY COMPARED WITH



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ONNAGES

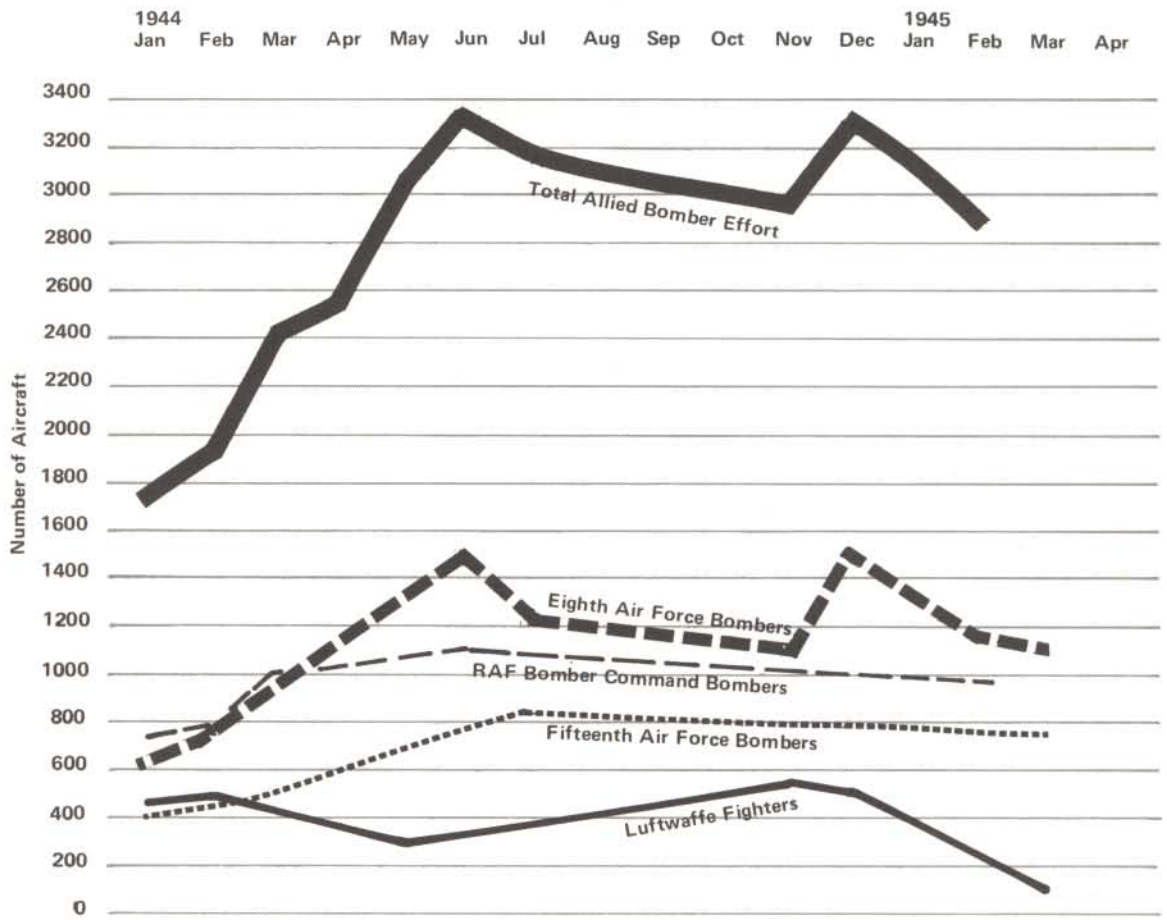
54.2%

45.8%

21.8%
50.3%
13.7%
6.7%
7.5%

32.1%
23.7%
11.1%
9.3%
6.9%
4.2%
2%
1.8%
2.6%
6.3%

THE NUMBER OF BOMBER AIRCRAFT OVER GERMANY COMPARED WITH LUFTWAFFE FIGHTER EFFORT



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STATISTICAL SUMMARY OF THE BOMBING EFFORT	USAAF	RAF	TOTAL
Tons of Bombs Dropped	1,461,864	1,235,609	2,697,473
Bomber Sorties	757,818	687,462	1,445,280
Fighter Sorties	991,750	1,695,045	2,686,795
Claimed Enemy Aircraft Destroyed	35,783	21,622	57,405
Bomber Planes Lost	9,949	11,965	21,914
Fighter Planes Lost	8,420	10,045	18,465
Personnel Lost in Action	79,265	79,281	158,546
Bomber Planes Assigned to Combat Units (max.)	7177	6956	14,133
Fighter Planes Assigned to Combat Units (max.)	6203	7728	13,931
Personnel Assigned to Combat Units (max.)	619,020	718,628	1,337,648

MANPOWER REQUIREMENTS AND
PER MISSION MATERIEL EXPENDITURE
8th AIR FORCE (B-17G's)

Unit	Air Crew	Gnd Crew	Bombs(tons)	Fu
1 B-17G	10	3	4	11
Squadron (12 ac)	120	36	48	13
Group (36 ac)	360	108	144	39
Wing (120 ac)	1200	360	480	13
8th Air Force*	21,000	6,300	8400	23,

*Strength as of June '44: 2100 ac

ALLIED AIR STRENGTH

Date	Britain	USA	USSR	TOTAL	Superiority over Germans
6/42	9500	–	2100	11,600	3.1:1
12/42	11,300	1300	3800	16,400	4.8:1
6/43	12,700	5000	5600	22,800	4.9:1
12/43	11,800	7500	8800	28,100	6:1
6/44	13,200	11,800	14,700	39,700	8.6:1
12/44	14,500	12,200	15,800	42,500	5:1

The superiority ratios are subject to interpretation. As early as 1942 the Germans still had a considerable qualitative superiority. The thousands of British bombers could only approach Germany at night and the British fighters couldn't reach Germany at all. The Russians were greatly outclassed in terms of pilot and aircraft quality. If anything, the real ratio was 1:1 or better, in favor of the Germans in 1942. During 1943 the proportion went against Germany, for the first ti pilot and aircraft quality. at all on the Russian fron number of Allied aircraft By the end of 1943 the r against the Germans. D declining quality of Ger aircraft versus the newer more highly trained pilot ratio more like 10:1 again By the end of the war it w

GERMAN AIR STRENGTH: September 1939 to January 1945

TYPE	SEF	TEF	NF	FB	B	TOTAL	% against bombers
9/39	1125	194	–	384	1213	2916	0
6/40	1107	357	–	483	1380	3327	0
6/41	1266	210	227	410	1321	3434	7
6/42	1277	362	244	461	1381	3725	17
6/43	1849	414	554	523	1663	4643	21
9/43	1646	392	574	562	1080	4254	26
12/43	1561	290	611	601	1604	4667	26
6/44	1523	242	778	1005	1089	4637	39
1/45	2260	105	1256	892	528	5041	50
Serv:	59-77	43-86	54-84	50-83	41-83		

NOTES: *TYPE refers to;* SEF=*Me 109, FW 190 and other fighter aircraft;* TEF=*twin engine aircraft such as Me 110 and the planes that were derived from it. This class failed as fighters but were found to be effective as "bomber destroyers" and ground attack aircraft. Even in these capacities they were soon replaced by more specialized aircraft;* NF=*night fighters, primarily twin engine fighters, used for destroying night bombers;* FB=*fighter bombers and ground attack aircraft, initially Ju 87 "Stukas" but later FW 190 and other specialized aircraft;* B=*bombers, the Ju 88 more than any other.*

The "% against bombers*" rose, naturally, as the tempo of the bombing increased. The number of aircraft shown above is the "on hand" number rather than the "serviceable" or "authorized" number. The* Serv. *% figures show the lowest and highest percentage of the "on hand" aircraft that were "serviceable" for action. The percentage fluctuated according to the tempo of operations and climatic conditions. The lowest occured during the ear "mud" season) after acti tions. For example, the lo engine fighters, night fig bombers occured during 1941/'42. The third, an method of counting a "authorized" number. Th ber of aircraft all the a supposed to have. This nu else, shows what the hig trying to do. For single (SEF) the "establishmen ning of the war was 1 stayed fairly constant un was raised to 1375. Fro steadily until, by March 1712 planes. From the increases were made, fro June '43 to 3016 a year the number was 4084, about half of these plan "on hand." Twin engin began the war at 168 and by August 1940. The*

The Allied Bomber Offensive Again

MANPOWER REQUIREMENTS AND PER MISSION MATERIEL EXPENDITURE 8th AIR FORCE (B-17G's)

Unit	Air Crew	Gnd Crew	Bombs(tons)	Fuel(tons)	.50 cal Ammunition Rounds/Tons
1 B-17G	10	3	4	11	6380/1.26
Squadron (12 ac)	120	36	48	132	76,560/15.12
Group (36 ac)	360	108	144	396	229,680/45.36
Wing (120 ac)	1200	360	480	1320	765,600/151.2
8th Air Force*	21,000	6,300	8400	23,100	13,398,000/2679

*Strength as of June '44: 2100 ac

As can be seen, the requirements in men and material needed to fly a single mission utilizing the whole 8th AF, were enormous. In spite of this, three or four major missions were being flown per week. The United States spent 43 BILLION dollars to carry out its air offensive against Germany. As a comparison to the requirements of the 8th AF (which consisted primarily of B-17's) otherTable gives the requirements for the 15th AF (which was based in Italy and which flew primarily B-24J's:)

MA
PE
15t
Uni
1 B
Squ
Gro
Wir
15t
**

riority ratios are subject to inter-. As early as 1942 the Germans a considerable qualitative super-he thousands of British bombers ly approach Germany at night British fighters couldn't reach at all. The Russians were greatly d in terms of pilot and aircraft If anything, the real ratio was 1:1 , in favor of the Germans in 1942. 943 the proportion went against Germany, for the first time, in terms of pilot and aircraft quality. Not by much (or at all on the Russian front), but the large number of Allied aircraft made it decisive. By the end of 1943 the real ratio was 3:1 against the Germans. During 1944 the declining quality of German pilots and aircraft versus the newer Allied planes and more highly trained pilots made the real ratio more like 10:1 against the Germans. By the end of the war it was 20:1 or more.

TOTAL EFFORT OF THE ALLIED STRATEGIC AIR FORCES', 1945

Total no. of men — 1,495,000

Total no. of combat aircraft — 69,000

The above totals include the 8th and 15th Strategic Air Forces, Bomber Command, their respective fighter elements and support troops, including losses.

TOTAL EFFORT OF THE GER REICH DEFENSE, 1945

Total no. of men — 2, 198,700

Total labor force — Approx. 2,0

Total no. of combat aircraft — 6

The total number of men includ forces, flak forces and auxiliar The labor forces represents the laborers, mostly foreign, kept repairing damage. Also, it must b bered that of the total number most were immobilized by a lac Includes losses.

TYPE refers to; **SEF**=*Me 109, 0 and other fighter aircraft; n engine aircraft such as Me 110 planes that were derived from it. s failed as fighters but were found ffective as "bomber destroyers" nd attack aircraft. Even in these s they were soon replaced by ecialized aircraft;* **NF**=*night fight-arily twin engine fighters, used oying night bombers;* **FB**=*fighter and ground attack aircraft, in-87 "Stukas" but later FW 190 r specialized aircraft;* **B**=*bombers, more than any other.*

against bombers" *rose, naturally, empo of the bombing increased. ber of aircraft shown above is the d" number rather than the "serv-or "authorized" number. The figures show the lowest and ercentage of the "on hand" air-t were "serviceable" for action. centage fluctuated according to po of operations and climatic conditions. The lowest figure usually occured during the early spring (the "mud" season) after active winter operations. For example, the low figure for twin engine fighters, night fighters and fighter bombers occured during the late winter of 1941/'42. The third, and least reliable, method of counting aircraft was the "authorized" number. This was the number of aircraft all the active units were supposed to have. This number, if nothing else, shows what the high command was trying to do. For single engine fighters (SEF) the "establishment" at the beginning of the war was 1174 planes. This stayed fairly constant until 12/40 when it was raised to 1375. From there it grew steadily until, by March '43, it was at 1712 planes. From there on enormous increases were made, from 2172 planes in June '43 to 3016 a year later. By late '44 the number was 4084, although only about half of these planes were actually "on hand." Twin engine fighters (TEF) began the war at 168 and climbed to 448 by August 1940. The Battle of Britain proved the inadequacy of this aircraft as a fighter and the number authorized fell to 51 by late '41. But then the need for more fighter bombers and bomber destroyers saved the TEF and the establishment immediately went up to 466 in early '42. This stayed constant until June '44, when better fighter bombers and Allied long range fighters eliminated any need for the TEF. Establishment fell to 104 by the end of the war. Night fighters didn't come into existence until late '40, when 195 were authorized. By late '41 this had increased to 406, as the British night bombing increased. Nine months later this had risen to 506 and six months later to 665. A year later the number was over a thousand (1046) and, by the end of the war it had reached 1319. The night fighter program was the only one which showed a real problem in obtaining sufficient pilots. "Sufficient pilots" was calculated on the basis of the number of serviceable aircraft that were available. The night fighter force was often short 50 or 60 crews. By the end of 1944 the shortage had risen to 314 crews. Part of this was due to the hi degree of skill needed for night operatio Although other types of aircraft did n have shortages, the level of skill amo German fighter pilots dropped consid ably during the war while the Alli training (with the exception of t Russians) stayed rather high. From 19 to late '42 the Germans gave each n pilot 240 flight hours before sending h into combat. This was forty hours mo than British pilots received. Starting October '42 this changed. German pil now received 205 hours while Brit pilots received 340 hours and US pil 270. In July '43 this changed even mo German pilots now received 170 hou British pilots 335 hours and US pilots 3 By July 1944 it was all over for t German air force. Their pilots, from th point on, received only 110 hours of flig training compared to 340 hours for Brit and 360 hours for US pilots. The decl in German training was due only partia to the increased need for more pilots. the war went on the chief reason for t

er Offensive Against Germany

As can be seen, the requirements in men and material needed to fly a single mission utilizing the whole 8th AF, were enormous. In spite of this, three or four major missions were being flown per week. The United States spent 43 BILLION dollars to carry out its air offensive against Germany. As a comparison to the requirements of the 8th AF (which consisted primarily of B-17's) otherTable gives the requirements for the 15th AF (which was based in Italy and which flew primarily B-24J's:)

MANPOWER REQUIREMENTS AND PER MISSION MATERIEL EXPENDITURES 15th AIR FORCE (B-24J's)

Unit	Air Crew	Gnd Crew	Bombs(tons)	Fuel(tons)	.50 cal Ammunition Rounds/Tons
1 B-24J	10	3	5	11	5200/1.04
Squadron (12 ac)	120	36	60	132	62,400/12.48
Group (36 ac)	360	108	180	396	187,200/37.44
Wing (120 ac)	1200	360	600	1320	624,000/124.8
15th Air Force **	12,000	3600	6000	13,200	6,240,000/1248

**Strength as of June '44: 1200 ac

OF THE ALLIED FORCES', 1945

1,495,000

t aircraft – 69,000

clude the 8th and 15th es, Bomber Command, hter elements and sup- ng losses.

TOTAL EFFORT OF THE GERMAN REICH DEFENSE, 1945

Total no. of men – 2, 198,700

Total labor force – Approx. 2,000,000

Total no. of combat aircraft – 61,000

The total number of men includes fighter forces, flak forces and auxiliary troops. The labor forces represents the number of laborers, mostly foreign, kept at work repairing damage. Also, it must be remembered that of the total number of aircraft, most were immobilized by a lack of fuel. Includes losses.

ORGANIZATION

LUFTWAFFE	RAF	USAAF
Geschwader (100-120 ac)	Group (100-120)	Wing (100-120)
Gruppe (30-36)	Wing (30-36)	Group (30-36)
Staffel (9-12)	Squadron (9-12)	Squadron (9-12)
Schwarm of Kette (4)	Section (4)	Flight (4)

of this aircraft as a authorized fell to the need for more omber destroyers the establishment 466 in early '42. til June '44, when and Allied long any need for the to 104 by the end s didn't come into , when 195 were this had increased h night bombing later this had risen ter to 665. A year over a thousand of the war it had t fighter program ch showed a real sufficient pilots. calculated on the erviceable aircraft night fighter force 60 crews. By the e had risen to 314 crews. Part of this was due to the high degree of skill needed for night operations. Although other types of aircraft did not have shortages, the level of skill among German fighter pilots dropped considerably during the war while the Allied training (with the exception of the Russians) stayed rather high. From 1939 to late '42 the Germans gave each new pilot 240 flight hours before sending him into combat. This was forty hours more than British pilots received. Starting in October '42 this changed. German pilots now received 205 hours while British pilots received 340 hours and US pilots 270. In July '43 this changed even more, German pilots now received 170 hours, British pilots 335 hours and US pilots 320. By July 1944 it was all over for the German air force. Their pilots, from that point on, received only 110 hours of flight training compared to 340 hours for British and 360 hours for US pilots. The decline in German training was due only partially to the increased need for more pilots. As the war went on the chief reason for this decline was the lack of fuel for training aircraft.

Fighter bomber establishment went up continually during the war, although the first "fighter bombers" were not actually "fighters" but rather purely ground attack aircraft. Establishment in 1939 was 420. This rose to 964 by June '44 and remained there until the end. Bomber establishment rose throughout most of the war until late '43. By then it had risen from 1188 in 1939 to 2053. At that point the Germans finally saw that they desperately needed fighters. Bomber establishment fell to 824 by the end of 1944.

The figures above include only combat aircraft in the European area for the British and Americans (this includes North Africa, the Middle East and Italy). For the Russians all aircraft are included, although about 20% of this total would be "semi-combat" types such as reconnaissance and transport craft. Although the Allies had a clear advantage over the Germans early in the war there was not much they could do with it. In an air war the defender has a considerable advantage; particularly if the defender (in this case, Germany) is surrounded by other nations which she occupies, thus forcing an airborne attacker to fly considerable distances before reaching vital enemy targets. The Russian air force was not able to achieve air superiority until late 1943. This was primarily due to the considerable qualitative superiority the Germans held in both manpower and equipment. But by then the Soviet air force had grown to over eight thousand aircraft while only about 30% of Germany's air force (about 1400 planes) was still in Russia. The western Allies achieved air superiority over the Germans in early 1944. This was due primarily to the introduction of long range fighters to escort the heavy bombers. The Germans had to come up and fight. Outnumbered, they eventually lost.

Fig. arrow Germ over the fire.

	Fuel(tons)	.50 cal Ammunition Rounds/Tons
	11	5200/1.04
	132	62,400/12.48
	396	187,200/37.44
	1320	624,000/124.8
	13,200	6,240,000/1248

RAF	USAAF
Group (100-120)	Wing (100-120)
Wing (30-36)	Group (30-36)
Squadron (9-12)	Squadron (9-12)
Section (4)	Flight (4)

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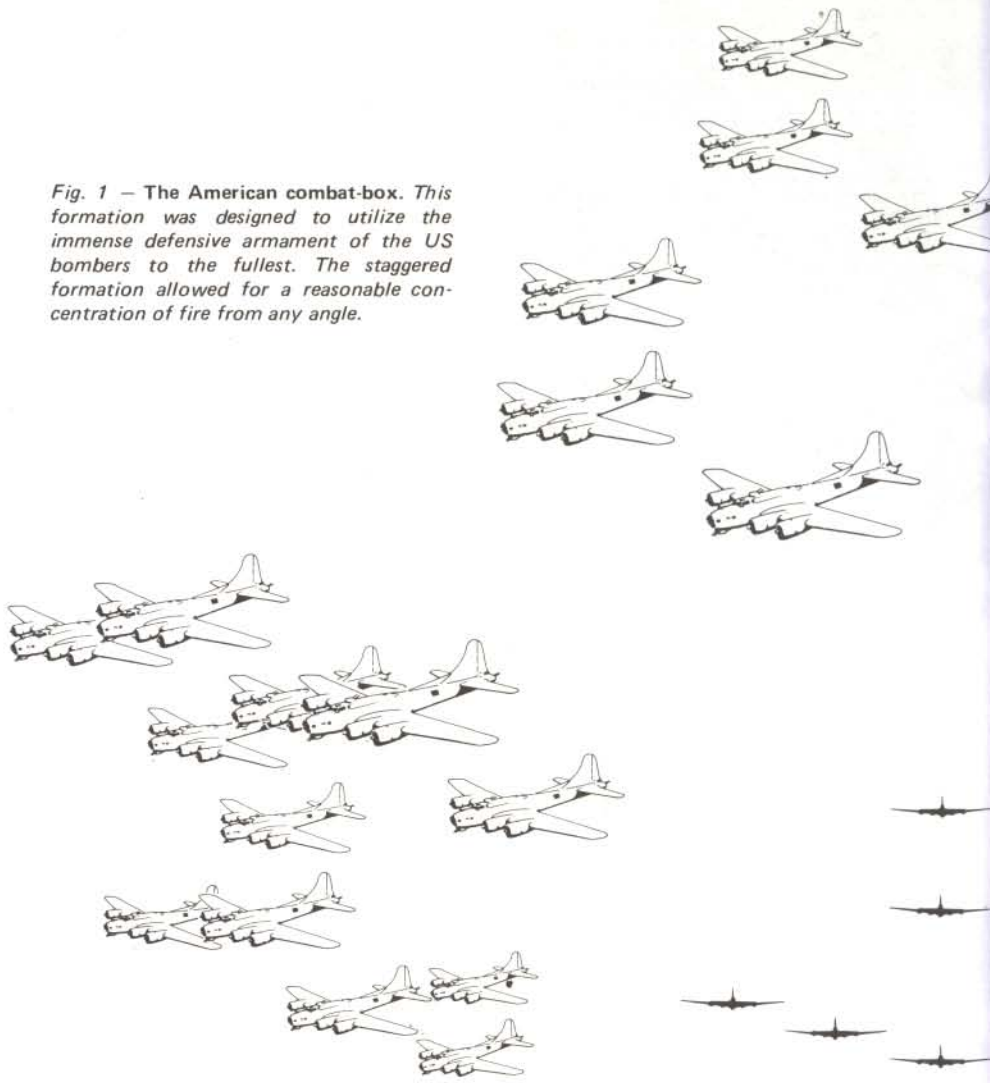

Fig. 1 — The American combat-box. This formation was designed to utilize the immense defensive armament of the US bombers to the fullest. The staggered formation allowed for a reasonable concentration of fire from any angle.

Fig. 3 — The Head-On Attack. The solid arrow indicates the flight path of the German — his two options of climbing over the bomber or diving under it, and the dotted arrow indicates the direction of fire.

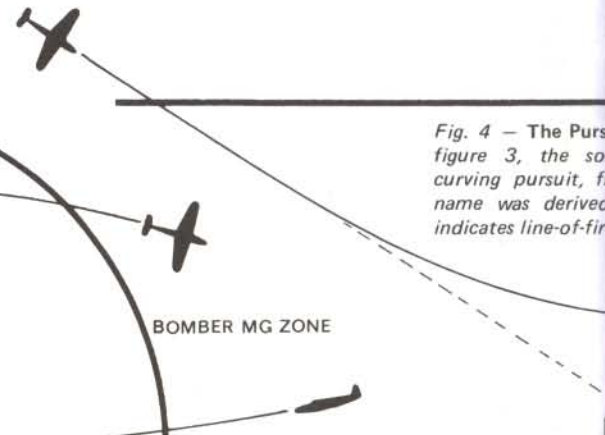

Fig. 4 — The Purs
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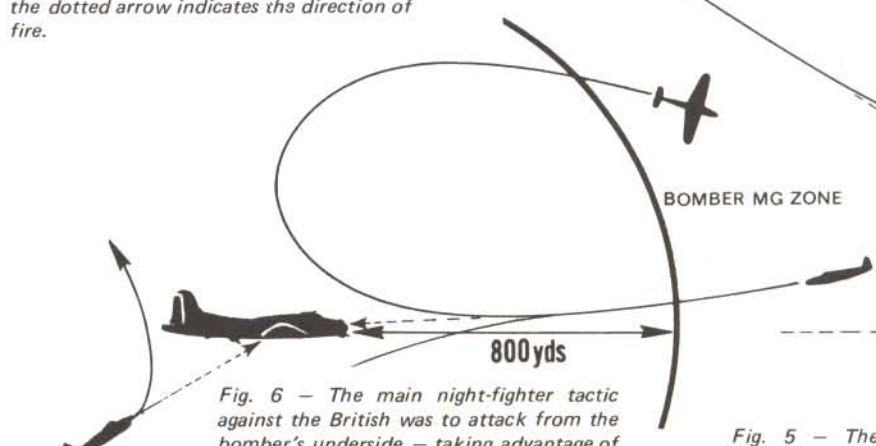

Fig. 6 — The main night-fighter tactic against the British was to attack from the bomber's underside — taking advantage of the lack of defensive armament there.

Fig. 5 — The tactic preferred by th
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the bombers' own contrails to mask hi

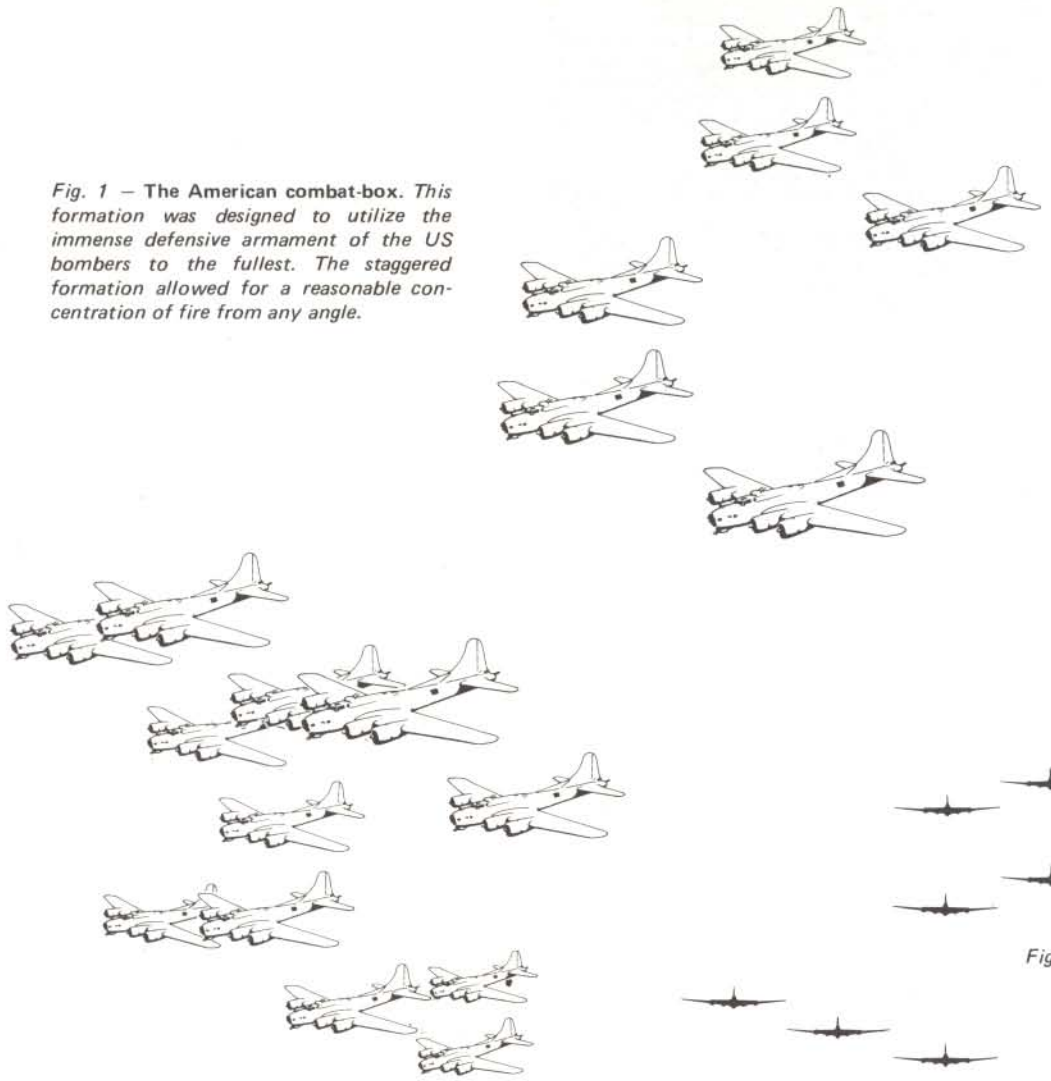


*Fig. 1 – **The American combat-box.** This formation was designed to utilize the immense defensive armament of the US bombers to the fullest. The staggered formation allowed for a reasonable concentration of fire from any angle.*





Fig. 2 – Head-on view of the combat-box.

*. 3 – **The Head-On Attack.** The solid ow indicates the flight path of the rman – his two options of climbing r the bomber or diving under it, and dotted arrow indicates the direction of*

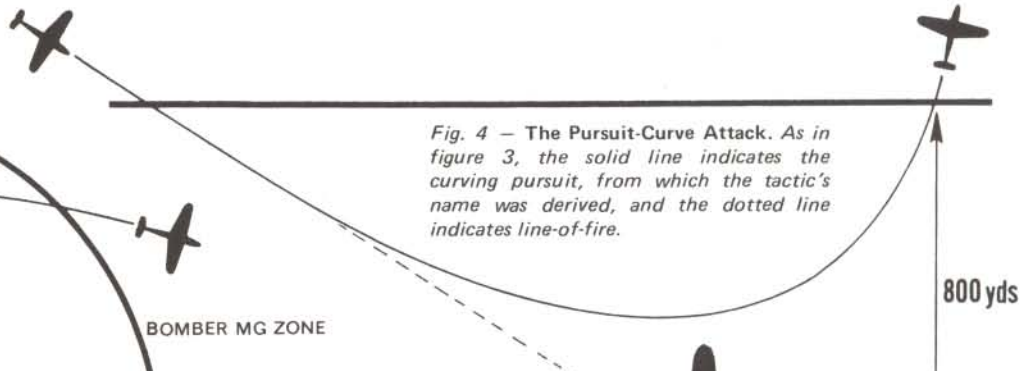


*Fig. 4 – **The Pursuit-Curve Attack.** As in figure 3, the solid line indicates the curving pursuit, from which the tactic's name was derived, and the dotted line indicates line-of-fire.*

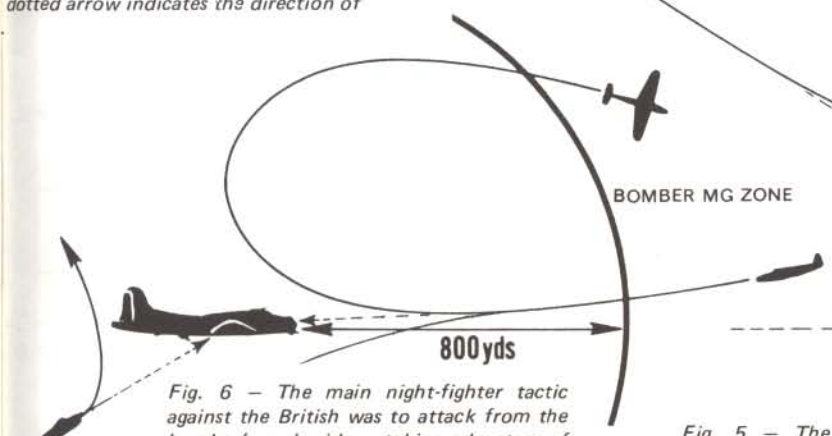


Fig. 6 – The main night-fighter tactic against the British was to attack from the bomber's underside – taking advantage of the lack of defensive armament there.

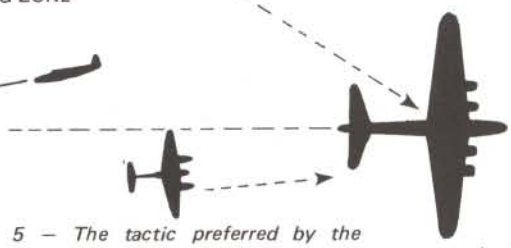
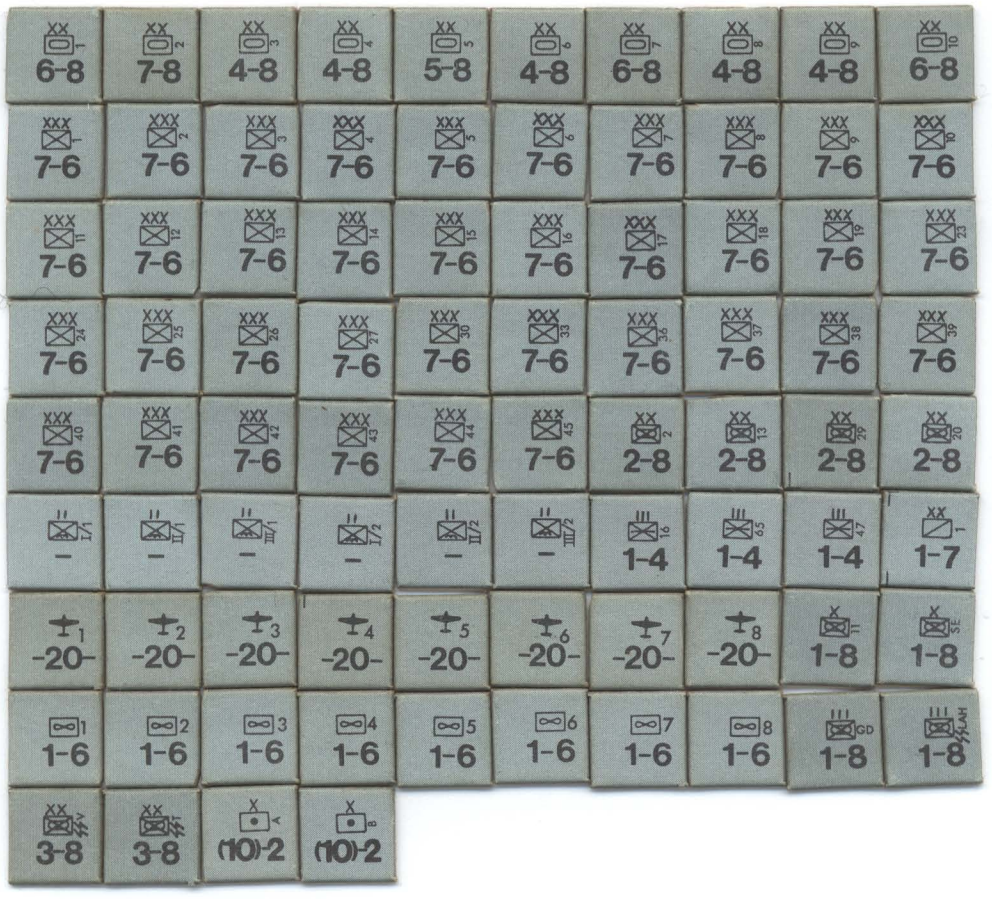


Fig. 5 – The tactic preferred by the twin-engine German interceptors was to use the bombers' own contrails to mask his approach, close to range and pump a salvo of rockets up the bomber's rear.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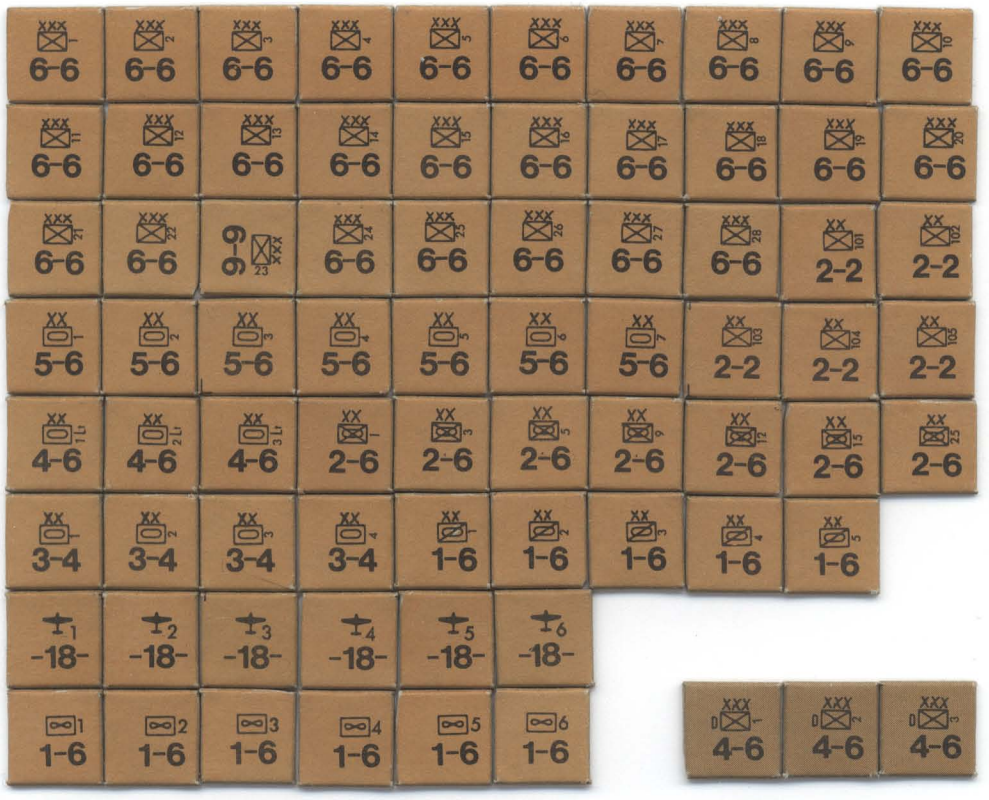
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The Battle for France, 1940

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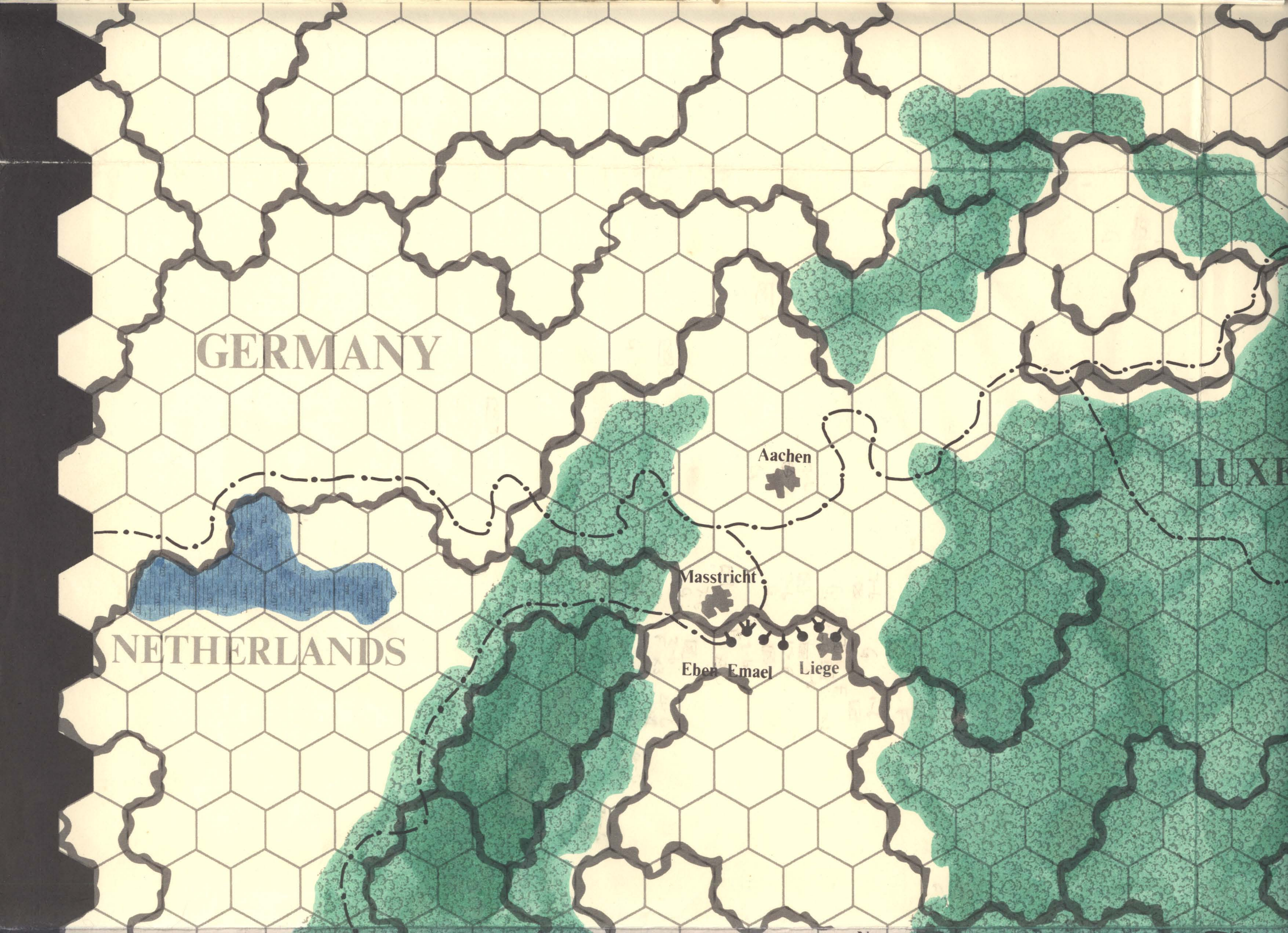
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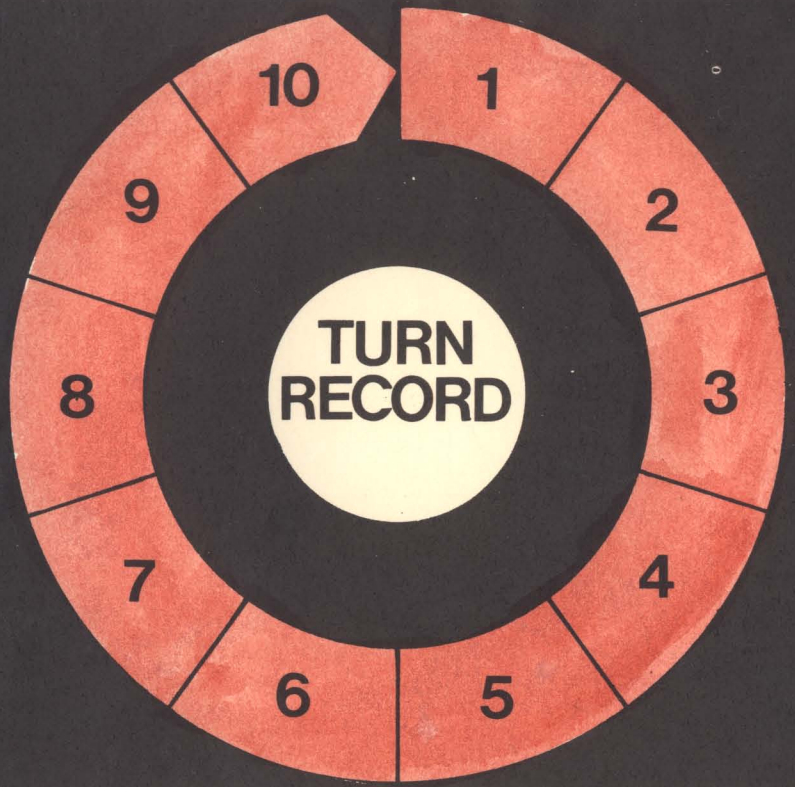

COMBAT RESULTS TABLE

	ODDS (Attacker's Strength-to-Defender's strength)												
	1-6 1-7	1-4 1-5	1-2 1-3	1-1	2-1	3-1	4-1	5-1	6-1	7-1	8-1	9-1	10-1	
-1	AX	AX	AX	AX	AX	AR	AR	AR	BR	BR	BR	CA	CA	-1
0	AX	AX	AX	AX	AR	AR	BR	BR	BR	CA	CA	CA	DX	0
1	AX	AX	AX	AX	AR	BR	BR	CA	1CA	1CA	2CA	DX	DX	1
2	AX	AX	AX	AR	AR	BR	CA	1CA	1CA	2CA	2CA	DX	DX	2
3	AX	AX	AR	AR	BR	CA	1CA	1CA	2CA	2CA	DX	DX	DX	3
4	AX	AX	AR	BR	BR	CA	1CA	2CA	2CA	DX	DX	DX	DX	4
5	AX	AR	BR	BR	CA	1CA	2CA	2CA	DX	DX	DX	DX	DX	5
6	AX	AR	BR	CA	CA	1CA	2CA	DX	DX	DX	DX	DX	DX	6
7	AR	CA	CA	CA	1CA	2CA	DX	DX	DX	DX	DX	DX	DX	7
8	AR	CA	CA	1CA	1CA	2CA	DX	DX	DX	DX	DX	DX	DX	8

Attacks at less than 1-7 are treated as 1-7; attacks at greater than 10-1 are treated as 10-1.

Explanatio

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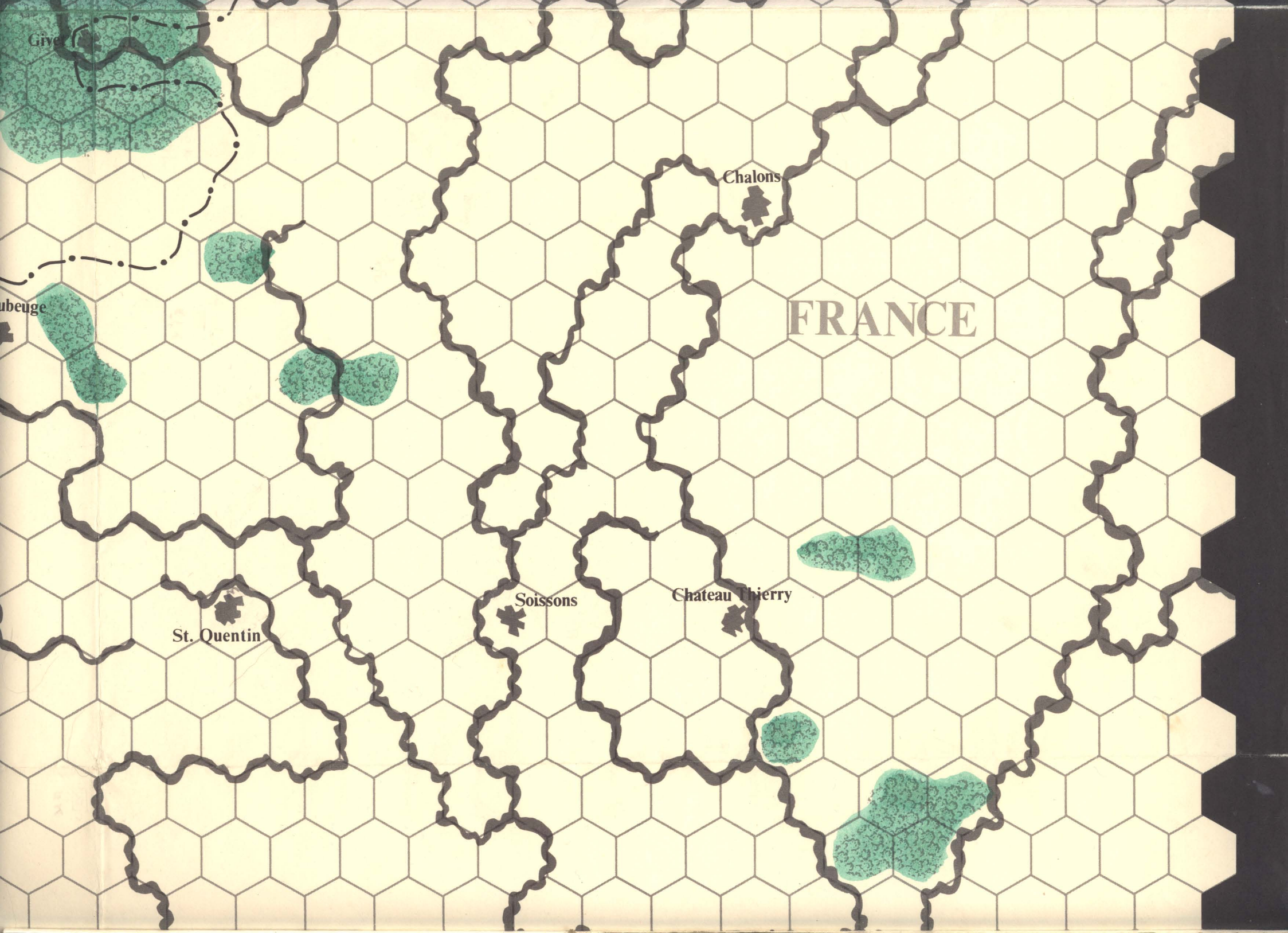
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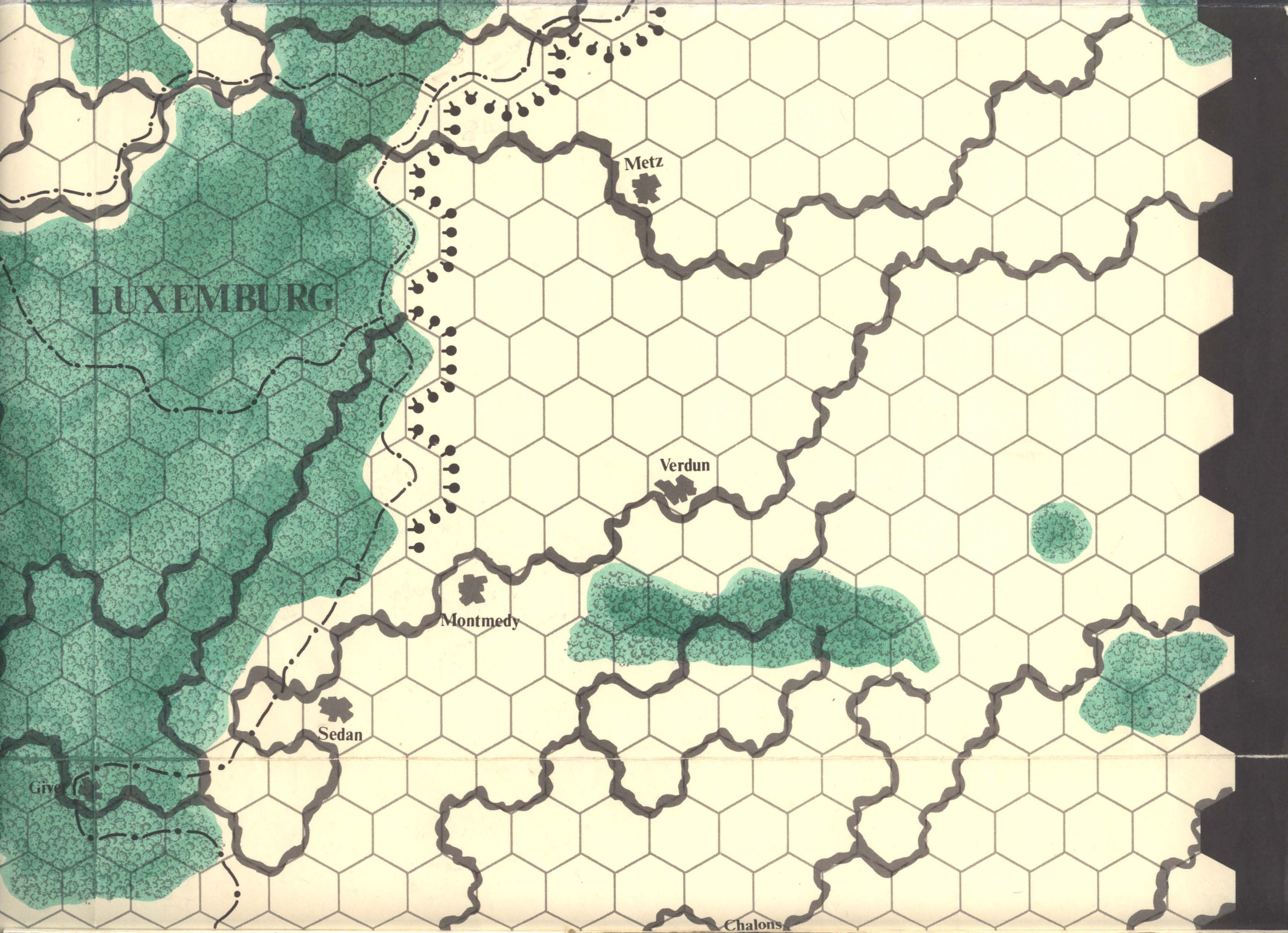
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-1	10-1	
A	CA	-1
A	DX	0
X	DX	1
X	DX	2
X	DX	3
X	DX	4
X	DX	5
X	DX	6
X	DX	7
X	DX	8

Explanation of Combat Results:

Note: In all Combat Results, the outcome affects all of the Defender's units in the hex under attack (including those which did not actively participate in the defense due to the "one corps" limitation). In results which affect the Attacker only those units **actively participating** in that attack are affected.

If, due to an "AX" or "AR" result, the Attacker's hex is vacated, then the Defender may advance those of his units which participated in the defense into the vacated hex. The Defender must exercise this option immediately after the hex has been vacated. The Attacker, however, may not advance (during the Combat Phase) into a similarly vacated Defender's hex (even in Counter-attack situations in which the original Defender has momentarily assumed the role of "attacker").

AX= All participating attacking units are destroyed (removed from the map, immediately).

AR= All participating attacking units are retreated one hex (in a direction determined by the Defender). Units are retreated individually. Units may not be retreated in violation of stacking limits; units may not retreat onto Enemy units or into Enemy Zones of Control which are not already occupied by a Friendly unit; if the only route of retreat available is in violation of stacking limits or into a vacant Enemy-controlled hex, then the retreating unit is destroyed instead. Units forced off the map (in any direction) are destroyed.

BR= All defending units are first retreated one hex by the Attacker, then the Defender retreats all of the participating attacking units one hex. The same retreat restrictions outlined in "AR" apply to both Players.

DX= All the Defender's units in that hex are destroyed (including those that did not actively participate in the defense due to the "one-corps" limitation).

CA= All of the Defender's units which **actively participated** in the defense must IMMEDIATELY attack any ONE of the actively attacking units (not necessarily **one corps** of attacking units but rather any one attacking playing piece, excluding aircraft elements). The "counter-attacking" Defender computes the odds for his counter-attack as if he were the Attacker (except that he ignores the effects of terrain). If the outcome of this counter-attack is a "CA" result, then the original Attacker must immediately repeat (exactly) his original attack. his procedure continues until one Player or the other obtains a non-"CA" result.

Offensive attack:

If the "CA" Result obtained by the original Attacker against the Defender has a number preceding it (e.g. "2 CA") then the **Defender** must subtract this number from the die-role of **his** ensuing counter-attack(s). This applies only to the original Defender's counter-attacks and never to the forced repetitions of the original Attacker's attack. If the Defender, in his counter-attack, obtains a "DX" or "BR" result against the original Attacker, the result is applied only to the original Attacker's unit which was the subject of the counter-attack, and not to those units which were not the subject of the counter-attack (a "BR" result would, however, affect all of the original Defender's units).

Under no circumstances may an Attacker or Counter-Attacker be forced to subtract more than "Two" from his die-roll (whether the subraction is due to terrain or "CA" results). In each instance in which an original Attacker is forced to repeat his attack due to the counter-attacker's obtaining a "CA" result against him, the original attack is repeated exactly (including any air support). If a Defender, in executing a counter-attack, obtains an "AX" or "AR" result, the result applies to ALL of the Defender's units in that hex.

