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THE LUFTWAFFE IN THE POLISH CAMPAIGN OF 1939.

By
General der Flieger Wilhelm SPEIDEL.

Based primarily on "Kriegsgeschichtliche Studie ueber
den Polenfeldzug", by the same author.

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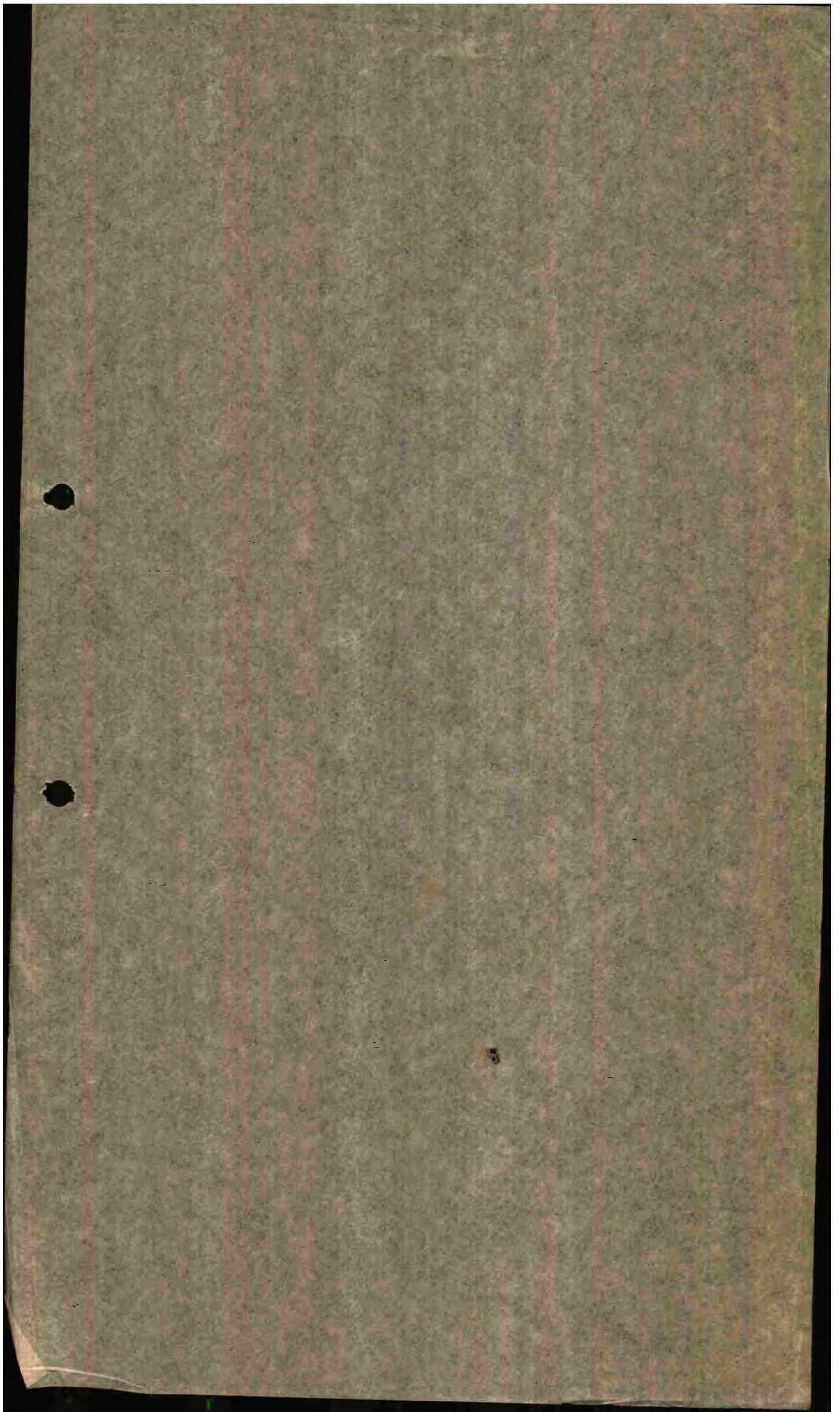
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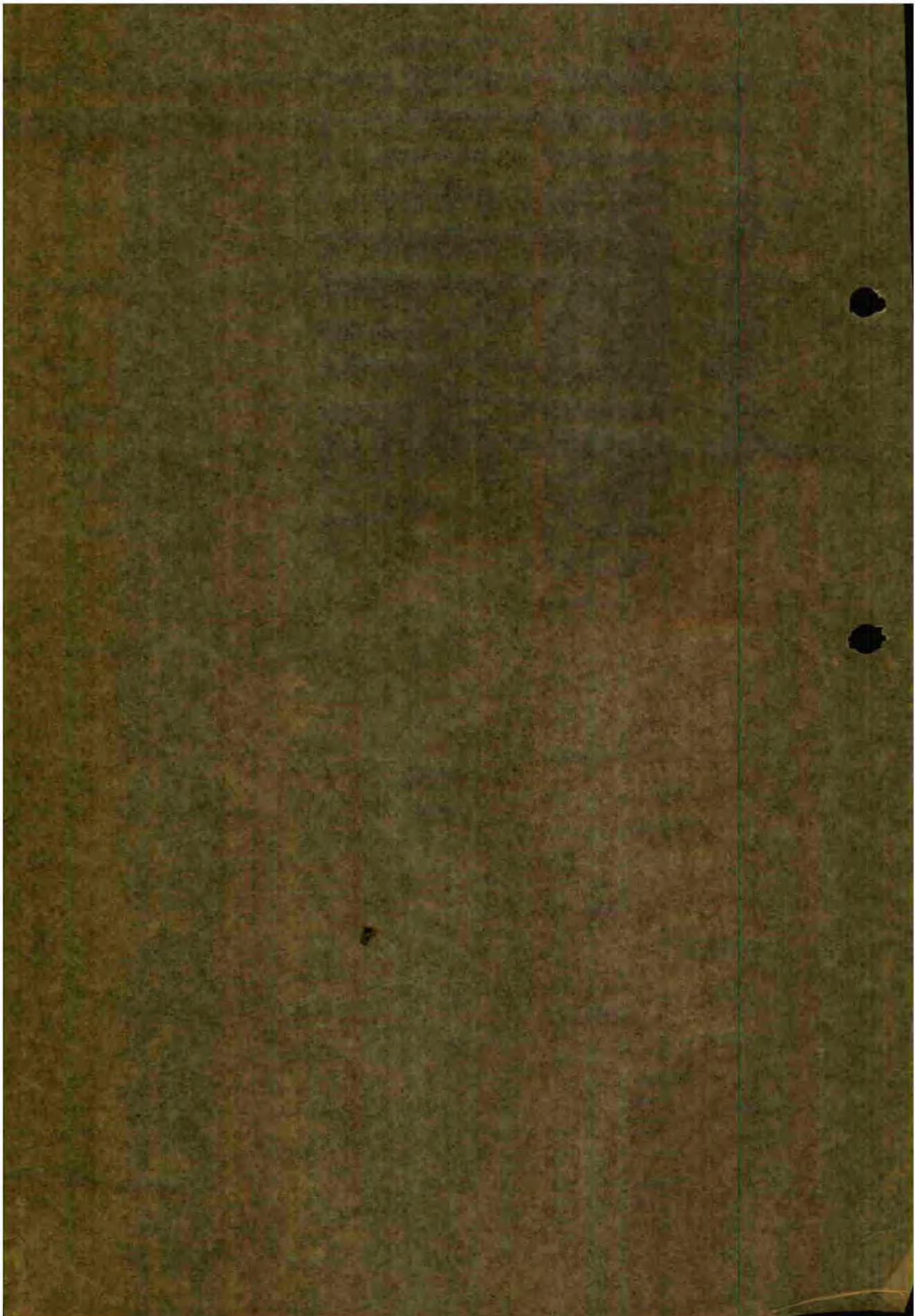
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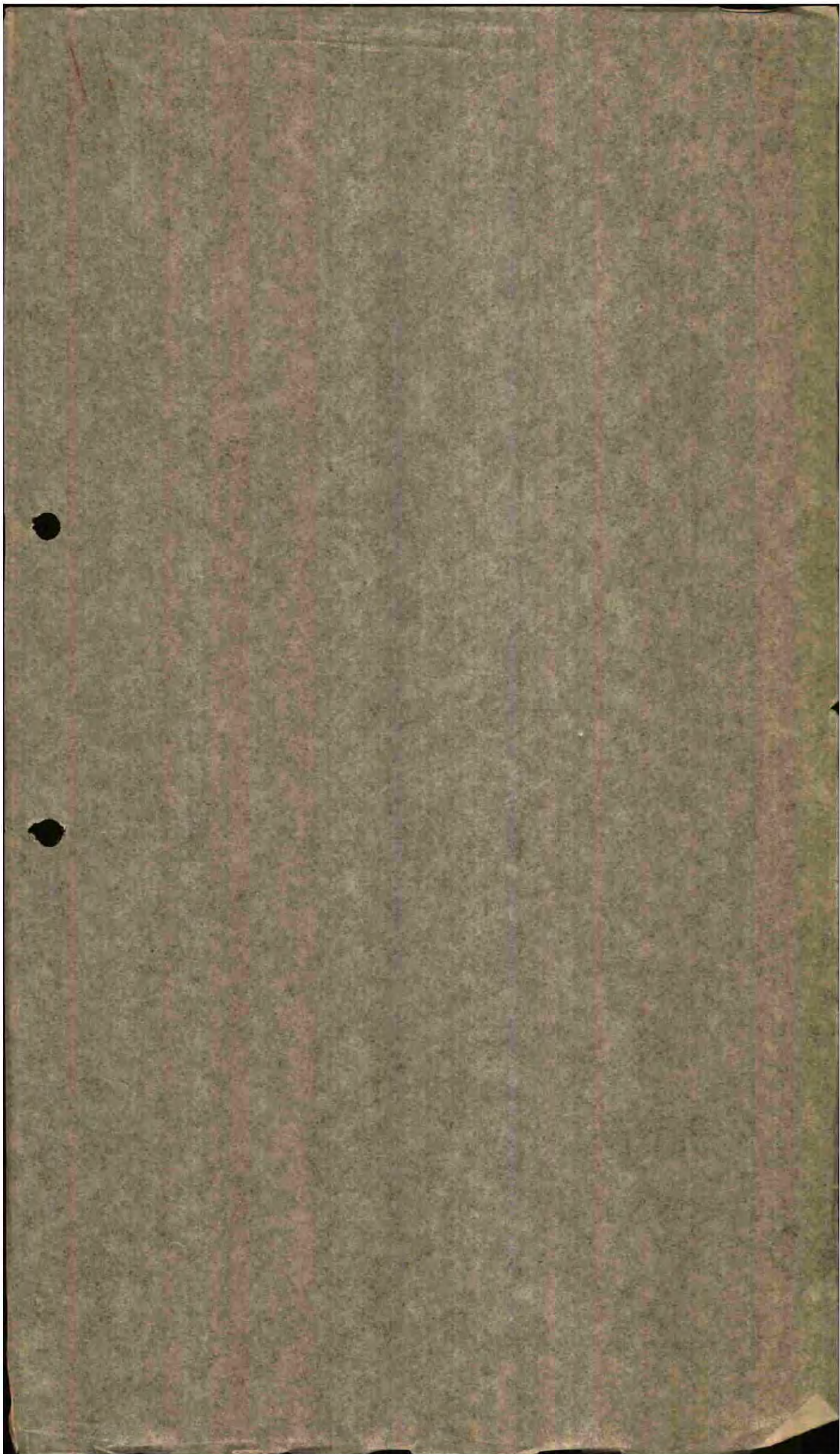
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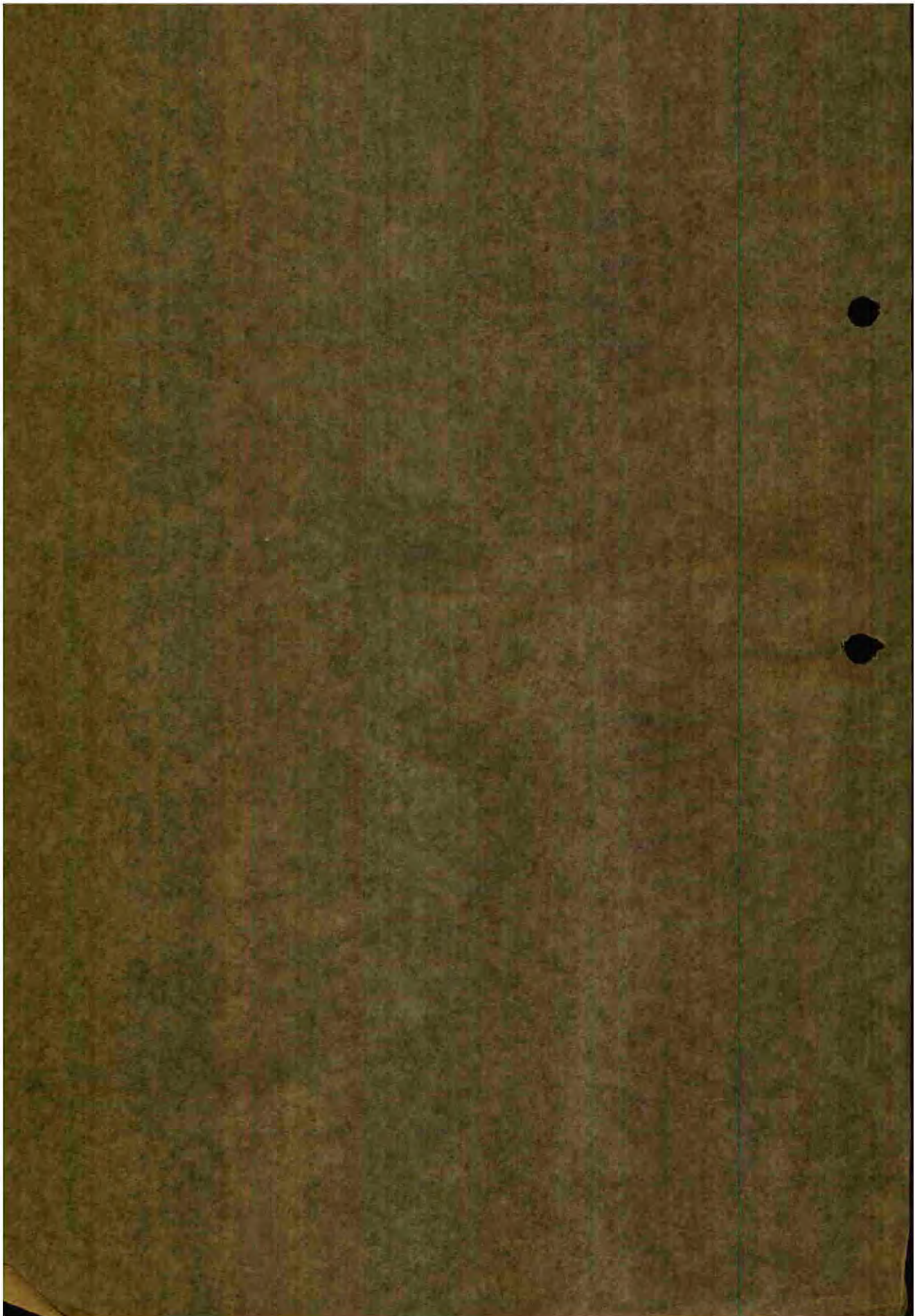
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PART 1

PREPARATIONS FOR THE CAMPAIGN

INTRODUCTION

The fundamental principles which provided the basis on which the Luftwaffe was built up, approximately fifteen years after the defeat suffered by Germany and her allies in World War I, are difficult to present and reconstruct. On the one hand, factual evidence and sources are hardly available, on the other hand the principles were developed too sporadically and at times had to be created arbitrarily.

The starting point for the establishment of command theories had to be established without organic development and without the possibility to draw on a long period of practical experience and careful experimentation, so to speak from scratch.

This unnatural development can be understood if it is borne in mind that the Luftwaffe was put to the trial by fire in the Polish campaign barely five years after its initial official establishment in 1934.

It is impossible to bring the theoretical command principles to life again exclusively from service regulations, other written records, and similar material. In most cases such evidence results solely from past experience which, in an era of rapid technical and tactical progress, is usually superseded by the time it appears in the printed form. The actual live inner development, in contrast, takes place on an entirely different plane.

Here, the development takes form in fruitful discussions, conferences in which future lines of thought and principles take shape from the scientific studies involved, General Staff training tours, command conferences, map exercises, other war games, and similar media for the formulation of intellectual views. The results take the form of orders and directives for training and operations, designed less for the higher levels than for the intermediate levels of command, which probably could reach the same conclusions but would rarely find the same formula for the doctrines deriving from those conclusions.

All of this valuable evidence of the intellectual struggle for the development of command principles is no longer in existence. Still existent fragments of the final critiques of General Staff training tours and similar documents cannot be considered without qualifications as reliable source material, because they contain only excerpts and individual statements which no longer can be verified.

Only one usable document has remained preserved: the Luftwaffe Service Manual # 16 on the Conduct of Air Warfare (Luftwaffen-Dienstvorschrift # 16 "Luftkriegführung"), which was compiled in the years following 1933 and contained the guiding principles for the command and troops

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of the entire Luftwaffe. This manual was published in 1936 and was classified "for official use only" (Nur fuer den Dienstgebrauch). It was thus not restricted by any high secrecy classification and therefore was available to all personnel of the Luftwaffe at all times. It contained in print the results of years of intellectual labor extending back to 1933.

The theoretical principles of air warfare had begun to take shape as far back as during the era of the Reichswehr, Germany's 100 000-man Army of 1923-1933, in the

1. Karlsruhe Document Collection.

air force inspectorate covertly organized and maintained in Reich Defense Ministry as Inspectorate 1 (L). However, the work done in this inspectorate had to be based almost exclusively on the interpretation of foreign theories on air warfare, and could make only conditional use of German practical experience gained during the period of "illegal" construction, most of which was carried out in Soviet Russia.

Work in the newly established Luftwaffe continued mainly on the above basis, while the manual on the conduct of air warfare was compiled for publication on the basis of knowledge gained from foreign theories and of German practical experience gained in the the short period since 1933. Above all,, the manual embodies the operational and tactical views of the new Luftwaffe Command concerning a possible future war in the air.

The responsible editor of the manual was General Wilberg, a highly qualified and experienced airman of World War I, who was killed in a crash landing prior to World War II. However, the decisively new ideas given in the manual were written by the first Chief of the new Luftwaffe, General Walter Wever, who also died an aviator's death on 3 June 1936, three years before the outbreak of World

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War II, without witnessing the trial and justification of
of his extremely valuable and logical theories on air war-
fare. The fact that the principles embodied in the manual
were not laid down as binding directives but described as
"temporary recommendations" which "required a thorough trial
by the troops" must be considered indicative of wise mode-
ration.

This deliberate moderation is proof of the monumental superiority of the authors of the manual over the tradition-bound rigid military lines of thought formerly expressed in other similar regulations. The very mutability of all principles implied is at the same time the basis for their continuous validity. This is by no means contradicted by the fact that the principles set forth necessarily underwent certain modifications when applied under actual war conditions and under the impact of the rapid progress made in aviation technology.

Apart from a modernized version of the principles propounded for cooperation between the Luftwaffe and the Army, the manual remained unchanged up to the outbreak of the war. In retrospect, it can therefore be considered as the basis for the conduct of air operations throughout the entire Polish campaign.

A thorough knowledge of Luftwaffe Service Manual # 16 therefore is absolutely essential for an understanding of all command measures of the Luftwaffe during the Polish campaign. Even a superficial reading of the manual is an aesthetic pleasure, since all thoughts it embodies are expressed in clear and classical language. All possibilities for future tactical and technical development are left

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completely open in the realization that air strategy and air tactics at the time were in their initial stages. It was assumed with absolute certainty revolutionizing developments would come in aviation technology and naturally would influence all currently valid doctrines on the

conduct of war, particularly air warfare.

To measure the appropriateness of the recognized command principles by the later course of military events and on the other hand to determine the point at which actual practice diverged from theory when the principles were first put to the test in large-scale air operations it is essential first to present the main objectives defined by the theories of air warfare in 1939. Thought in this field was ruled by three basic themes, namely,

(1) the independence of the Luftwaffe as a separate third branch of the armed forces equal in status with the Army and the Navy;

(2) the firm conviction that air support was indispensable in every type of military operation, including those conducted by the Army and the Navy; and

(3) the offensive nature of air warfare by which all thought in Luftwaffe command circles was motivated.

Care must be exercised to avoid reading into points (1) and (2) above any over-exaggeration of the independence of the Luftwaffe. Paragraph 8 of Luftwaffe Field Manual # 16 determines unequivocally that the Luftwaffe must "at all times feel itself part of the Armed Forces and must realize the indivisibility of battle by all elements of the

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Armed Forces." This fundamental principle is reiterated
unmistakably again in Paragraph 10 of the manual, where
it is formulated as follows: "The mission of the Luftwaffe

is to further this aim by conducting air warfare within the scope of the entire war effort." The aim referred to here is defined clearly and precisely in Paragraph 9 as ".....to break the enemy's will" and "to defeat the hostile military forces."

The following order of priority for missions and targets of the Luftwaffe is laid down: (1) Counter-air action; (2) Operations in support of friendly ground and naval forces; and (3) Operations against the hostile sources of military power.

All trains of thought embodied in the manual reflect the prime mission of the Luftwaffe: counter-air action, or, in other words, action to neutralize and destroy the hostile air forces. This first and main mission of the Luftwaffe is stated in a few curt sentences as follows:

Paragraph 103: "From the outset of hostilities warfare must be conducted against the enemy's air forces" and "Action will be directed primarily against the enemy's bomber forces."

Paragraph 104: "Only aggressive warfare can strike the enemy at the source of his military power....."

Paragraph 106: "Complete defeat of the enemy will be possible only in very rare cases. At least the battle will

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continue for a considerable time." (Here it becomes obvious that the command by no means over-estimated the chances of success).

Paragraph 20: "Counter-air operations will continue even then....."when it is essential to accomplish other, more urgent missions.

Paragraph 106: "Even then systematic warfare against the hostile bomber forces must continue by weaker forces" (at times when the offensive air forces are required to accomplish other, strategically or tactically more urgent missions--for example, in support of Army or naval operations).

Paragraph 119: "Thus, counter-air action will not cease throughout the war. The intensity of the attack and the forces employed for the purpose will vary in accordance with the urgency of other tasks, the forces available, the air threat to the homeland, and the countermeasures adopted by the enemy in the air."

It seems noteworthy that the concept of strategic air warfare only appears once in the entire manual and, remarkably enough, only in the redrafted version of May 1937. Furthermore, there is no trace of the rigid concept of the achievement of air supremacy, which is alluded to only once in the conditional formulation: "temporary superiority in the air" in Paragraph 18.

The second mission of the Luftwaffe, that of supporting the Army and the Navy, requires a more precise definition. Only such combat activities fall under this heading which result from independent action by the Luftwaffe as

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a third and separate branch of the military forces. Not included are the activities of Luftwaffe units allocated to the Army or the Navy under the Luftwaffe General with the Army High Command and the Luftwaffe General with the Navy High Command. Furthermore, in dealing with the subject

of air warfare in cooperation with the Army and the Navy, the manual in Paragraph 2 with special emphasis describes the bomber arm as the proponent of aggressive warfare, while the fighter forces are considered exclusively as a means of defense within the home air defense system. In view of the fact that action in the Polish campaign was restricted solely to land warfare, the principles applying to cooperation with the Army alone are of interest here and not those applying to cooperation with the Navy.

The manual recognizes air support for the Army as a fundamental necessity, but differentiates between direct and indirect support of army operations. Greater stress is placed on indirect support than on direct support operations. Only as a secondary requirement mention is made of the possibility of the commitment of "strong forces of the Luftwaffe also in decisive battles on the ground" (Paragraph 125). Finally, according to Paragraph 131 "In the crisis of battle and at the decisive moment of a campaign, however, it might become necessary to throw all available bomber, fighter, and reconnaissance units into action of this type without regard for other considerations." Here for the first time mention is made of the possibility that low-level attacks by fighters might produce good results in such situations, but only if the supporting artillery forces of the

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Army are inadequate. No specific patterns are laid down in the manual for any type of air support for the Army. The only consideration is that "the action must be such that it will produce decisive effects for the Army." (Paragraph 126).

Conversely, the manual also provides against the possibility of Army support for the Luftwaffe. Such support

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can become necessary if the base area from which the Luftwaffe is operating appears inadequately secure against enemy attack or "if the area requires protection or expansion." (Paragraph 26). In such case the Army would support the Luftwaffe through operational and tactical action, thereby creating conditions for new action by the Luftwaffe in support of the Army.

Very especial importance is attached in the manual to the third mission of the Luftwaffe: operations against the hostile sources of military power. Paragraph 22 opens with "Warfare against the sources of military power decisively influences the course of the entire war," and according to Paragraph 143 the sources of hostile military power include ".....all installations and facilities of the enemy which serve to strengthen and reinforce the fighting forces." These installations and facilities include particularly, factories; other producing and working premises; granaries; storage facilities, etc; port installations; fuel dumps; ships and similar targets; electricity gas, and water works; rail and other traffic routes; caserms, labor camps, and other military replacement centers all government and administrative centers.

The manual states, however, that this type of air

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warfare must not be allowed to become a purpose to itself, but must be fitted logically into the overall pattern of operational planning. The timing and sequence of order for operations against various target categories must be in accordance with the type and significance of the individual targets. To insure the most economical use of

bombers only the most vital elements of a target system need be taken under attack. As Paragraph 148 of the manual puts it: destruction of the target system is unnecessary if the purpose of the action can be achieved "through disturbance, harassment, or neutralization."

The interdiction of rail and road traffic is of significant importance in view of the overall objectives set and in view of the effects on ground operations. Targets will be selected in the following order of priority: man-made structures (these will be taken under destructive attack), sections of the open way (railroads), railway trains en route, loading and unloading operations, important rail depots and junctions. The same principles will apply to operations designed to interdict road traffic, although only a small measure of success can be expected here.

The manual makes only brief mention of night attacks, admitting their influence on troop morale but describing the possibility of execution as problematical. Night fighters had not been developed as yet when the manual was published; nevertheless such operations are mentioned, with a view to the future, in Paragraph 253. It is only natural that all thoughts and principles concerning air defense operations take second place in the manual to the overall

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agressive tendency of the ruling command theories. Aggres-
sive operations against the hostile air forces on the
ground and airborne over hostile territory are considered
as the most effective method of home defense.

The clarity and logic of the doctrines and principles
expounded in the manual are the expression of a clear

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understanding of existing facts and actual circumstances, and of wise vision concerning future developments. They are the result of the logically sober general staff work of the highest order expended on the compilations of this manual, which has been subjected to unjustifiable criticism by various circles. In the manual the principles thus developed were given their first valid formulation in the history of the Luftwaffe.

CHAPTER 1

OPERATIONAL AND TACTICAL PREPARATIONS
OF THE LUFTWAFFEI. OPERATIONAL STUDY 1939 (OPERATION WEISS)²

All preparations for the Polish campaign were based on the 1939 Concentration and Combat Directives for the Luftwaffe (Aufmarsch-und Kampfanweisungen der Luftwaffe 1939). They were given the code designation of Planstudie 1939 (Planstudie Weiss) and will be referred to in this study as Operation Weiss. The version issued in early February 1939 provided the first basis for all operational preparations in the mobilization year of 1939-40 and therefore in practice for the Polish campaign. They became effective on 1 March 1939 and were divided into three parts, as follows:

(1) General Instructions. These deal with preparations for attack and reconnaissance activities, the tactical principles of air defense, signal communications, ground service organization and supply problems, road and rail transport movements, employment of the air units assigned to the Army and Navy, weather services, and command authority;

(2) Directives Governing Operations against the East.

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These include intelligence reports, directives for the offensive air forces, the air defense forces, the signal communications services, the supply services, the air units assigned to the Army and the Navy (regulating their employment), and for other preparations in the east.

2. Karlsruhe Document Collection G. The abbreviated designation "Planstudie Weiss" was in general use at the time in referring to the study on operations in the east.

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(3) Directives Governing Operations against the West.

In their arrangement these corresponded to the directives for operations in the east, and were given the code designations of Operation (Fall) Rot and Blau. (Rot for operations against France, blau for operations against Britain).

The study was modified a number of times later, and the last authentic version available is dated 1 May 1939. Even this late version by no means corresponds to the strategic concentration of forces in the east as it actually took place later. The reasons are to be sought in actual disposition of forces in the west and the east as it existed at the outbreak of war. The original intention was to leave considerably weaker forces in the west than those actually deployed there later. Air power was about evenly divided between the west and the east. Out of what were called the "offensive air forces" slightly more bomber units were deployed against the west, while the main concentration of dive-bombers was clearly in the east. In detail the operational plan, according to the version of 1 May 1939, provided for the following disposition of forces:

For Operations in the East.

	Bomber Groups	Dive-Bomber Groups	Twin-Engine Groups (Fighter)	Reconnais- sance Groups
First Air Fleet	8	3	3	4
Fourth Air Fleet	5	5 plus 1*	2	3
	13	8 plus 1*	5	7

* Ground-Attack Group

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For Operations in the West.

	Bomber Groups	Dive-Bomber Groups	Twin-Engine Groups (Fighter)	Reconnais- sance Squadrons
Second Air Fleet	12	-	3	2
Third Air Fleet	5	1	2	2
	17	1	5	4

The command organization for the east provided for the allocation of Air Command Eastern Prussia, the 1st Air Division, and the Luftwaffe Training Division to the First Air Fleet, whereas the Fourth Air Fleet was assigned only the 2d Air Division. The headquarters known as the Special Purposes Air Command, at that time still non-existent, was established later to control the tactical air support units operating in the command zone of the Fourth Air Fleet.

The almost equal distribution of forces between the west and the east is all the more surprising in view of the current estimate of the political situation which, as is obvious repeatedly in the directives for the strategic concentration, constantly revealed anxiety concerning the future behavior of the Soviet Union. It was assumed at all times that, in the event of armed conflict between Germany and Poland, Soviet Russia might take the side of Poland and then would direct its air attacks primarily against Eastern Prussia and in the first place against Koenigsberg. At no time was serious thought given to the

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possibility of Soviet neutrality, far less to the possibility of a German-Soviet Russian pact, such as that which was concluded later. On the contrary, the Luftwaffe initially always provided for security measures against Soviet Russia.

On the other hand, the preparations for a strategic concentration in the west were described as merely "security measures," and the declared intention of the political leadership was to attempt to restrict any war which might occur to Poland. From all these obvious contradictions and confusing circumstances the military conclusion, so far as the Luftwaffe was concerned at the time, can be drawn that the possible course of political developments and their military results were unknown to the Luftwaffe command. The probable behavior of the Soviet Union was judged negatively and constituted a factor of increased uncertainty. From the almost even distribution of forces it is impossible to discern any specific power concentration or, in particular, any plans for an attack in any specific direction.

The situation estimate as revealed by the preparatory directives issued in the spring of 1939 appears to have changed fundamentally in the following four months which

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preceded the outbreak of the war. Documentary evidence on the causes and also the orders are lacking which, immediately prior to the war, resulted in the changed strategic concentration against Poland. In retrospect it can be assumed, perhaps with a high degree of probability, as follows: It appears that the German military leadership decided to seek a military solution of the Polish problem at a relatively late juncture, probably immediately after the peaceful occupation of Czecho-Slovakia by German troops and thus in early April 1939. There can be no doubt, however, that the final detail decisions made by the German military command were influenced decisively by the results of General Staff Maneuver Schlesien, which was conducted in Bad Salzbrunn in May 1939 with all three branches of the Wehrmacht participating. During this General Staff training trip the concentration and operations against Poland were discussed and examined in all detail, with special emphasis on extremely close cooperation between the Luftwaffe and the Army. In all problems taken under consideration at the time, tactical cooperation between these two branches of the armed forces already took first place.

During this "theoretical dress rehearsal" for Operation Weiss requirements were compared with capabilities and the tactical principles of the Luftwaffe and the Army were coordinated. There can be no doubt whatever that the results of this General Staff training trip decisively influenced the final version of "Operational Study 1939 (Planstudie 1939).

This first theoretical maneuver was followed already in June by a Luftwaffe General Staff maneuver (Generalstabareise der Luftwaffe) at the Rhine River. Under direction by the new Chief of the Luftwaffe General Staff, Colonel Jeschonnek, all details of air operations against Poland were played through as part of a map maneuver and explained by means of talks on the fundamental details of the conduct of operations. On this occasion first information was also given out concerning the Special Purpose Air Command, the organization of which had been ordered in the meantime. At the same time the mission of the new command, as a tactical support air division headquarters, was clearly defined for the first time.³ The ruling factor here was the experience gained in the Spanish Civil War and, concurrently, the authoritative personality of General von Richthofen.

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3. The "Tactical Principles" formulated personally by Chief of the Luftwaffe General Staff Jeschonnek on the occasion of the Luftwaffe General Staff maneuver are contained in a document of the 8th (Military Science) Division of the Luftwaffe General Staff. See Appendix 1.

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The experience gained in General Staff training trips was a valuable aid in the theoretical preparations for the Polish campaign and for all work done by the various command staffs. Another valuable aid was available in the secretly results obtained through air photography conducted at extreme altitudes over the entire Polish area, with special emphasis on Polish air bases and fortification work in progress in the Polish Corridor.⁴

II. DIRECTIVES FOR THE ATTACK FORCES (DIRECTIVES WEISS)

1. Intelligence (This subject will be dealt with consecutively in Chapter 2).

2. Mission. The mission of the Wehrmacht is to annihilate the Polish military forces. The campaign will be opened with sudden, heavy blows to achieve speedy successes.

Army. Without waiting for a systematic build-up, the Army plans to open the attack with units readied for immediate movement and secretly concentrated. The main drive will be from Silesia. Army Group South will advance from Silesia in a drive on Warsaw, with main effort in the center by the Tenth Army. Army Group North will advance from Pomerania and Eastern

⁴. For details see page 26.

Prussia to establish communications between these two areas and at the same will also drive on Warsaw.

Navy. The main mission of the Navy will be to neutralize the Polish Navy, cut Polish sea routes, interdict Polish seaborne merchant shipping, and protect German sea routes. Two hours before dawn on the day of attack the ports of Gdynia and of the Hel Peninsula will be closed by minefields. The Gulf of Danzig will be blockaded.

3. Air Mission. The mission of the Luftwaffe will be to prevent effective participation by Polish air forces in ground action, and to prevent Polish air attacks against German territories. Concurrently, the Luftwaffe will facilitate the advance of the German ground forces through direct and indirect air support. This support will take the form of participation in battle on the ground and of attacks against Polish mobilization centers. The latter are designed to cause serious interference with the Polish mobilization, and to delay an orderly Polish strategic concentration of forces and prevent the forward movement of Polish reinforcements through long-lasting destruction of strategic Polish rail routes. Concurrently

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preparations will be made for a concentrated attack by all bomber forces against Warsaw, where the targets of attack will be military installations and armament factories.

Under the Commander in Chief of the Luftwaffe, the Chiefs of Staff of the First and Fourth Air Fleets are responsible for the preparation and execution of the operations involved.

Combat and Reconnaissance Area: Polish territory to a line including the towns of Stryj, Lvov, Kamionka, Strumilowa, Wlodzimierz, Kovel, Brest, Slonim, Lida, and Vilna. Reconnaissance east of this line will be

directed by the Commander in Chief of the Luftwaffe.

Boundary Line Between the First and Fourth Air Fleets:

Wollstein-Kosten-Pyzdry-Kutno-railroad extending from Kutno through Lovicz to Skierniewice-Grojec-confluence of Pilica and Vistula Rivers- Radzyn-Matoryta (24 miles southeast of Brest), with all towns named falling within the zone of the First Air Fleet.

The main reconnaissance missions will be: (1) to discover the whereabouts of and keep under observation the Polish air forces and antiaircraft forces; (2) to secure information concerning the density of traffic on troop assembly and supply transportation routes and concerning the movements of Polish ground forces, particularly motorized units; (3) to ascertain whether Soviet-Russian air units appeared at Polish air bases. Reconnaissance activities to commence simultaneously with the crossing of the Polish frontier by German ground forces.

Execution of the Attack. The order to open the attack will be given by the Commander in Chief of the Luftwaffe in the form of the code word "Ostmarkflug" followed by the date and time of the first attack. The bulk of all forces will be concentrated for

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the initial attack which will be directed against the Polish air forces. After that main emphasis will be on operations supporting the Army. Details will be given later on targets to be attacked in rail interdiction missions. Adequate forces will be made available from the outset for direct participation in ground combat, particularly in the zone of the Tenth Army. It is to be assumed that the Commander in Chief of the Luftwaffe will order a concentrated attack on Warsaw by all forces of both air fleets on the afternoon of the first day of the campaign.

During the phase of "operational and tactical preparations of the Luftwaffe" the Luftwaffe command considered all preparatory measures against the eventuality of armed

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conflict with Poland as part of the normal and logical preparations for defensive and offensive action in all directions, the normal mission of a general staff in any country. No serious thought was entertained in intermediate or high levels of the Luftwaffe command that war with Poland was imminent. This was all the more the case because the existing weaknesses and inadequacies in the training, equipment, and operability of the field forces were too well known and were dutifully reported repeatedly to higher levels of command.

It was only at the command conference on the Obersalzberg on 23 August 1939, which came as a complete surprise to all who were ordered to attend, that the true situation suddenly became apparent. The participants in this conference, including the present author, left the Obersalzberg in undisguised consternation.

CHAPTER 2

INTELLIGENCE ESTIMATE

The operations staff of the Commander in Chief of the Luftwaffe had only very incomplete data available in the spring of 1939 on which to base its intelligence estimate of Poland. Little target data was available and was in the initial processing stages. In line with the order issued by the Chief of the Luftwaffe General Staff to the Chief, Branch 5 (See Chapter 1, pp. 13-21) on 1 April 1939 it was considered necessary to procure the necessary intelligence data within the short period of only four months and, within the same period, to process it, develop from it a detailed intelligence interpretation, and furnish all command staffs and troops, down to the individual aircraft crews, with usable and reliable combat and target data. This decisively important mission was accomplished within the prescribed time. The results produced by all these activities were as follows:

(1) An orientation bulletin on Polish air and antiaircraft artillery forces (Orientierungsheft Polen--Fliegertruppe und Flakartillerie) issued by the operations staff of the Commander in Chief of the Luftwaffe;

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(2) The Intelligence Annex (Poland) (Feindbeurteilung Polen) as part of the Operational Study Weiss (See p. 13, Par. 1, above);

(3) A "Military-Geographical Description of Poland (Militärgeografische Beschreibung Polens);

(4) Aircraft Identification Plates (Flugzeugerkennungsstafeln) on the Polish Air Forces, illustrating the various Polish aircraft types with data on their technical capabilities.

Of all these intelligence documents, which were so eminently important for the preparation and execution of the Polish campaign, only the Intelligence Annex (Poland),
Item (2) above, is still available.⁵

5. Karlsruhe Document Collection G.

I. THE POLISH THEATER OF OPERATIONS.

1. General Information. Seen from the German operational base line extending from Slovakia through Silesia and Pomerania to Eastern Prussia, Poland presents the appearance of a rectangular triangle, the two equal sides of which each measure approximately 540 miles. The tip of this triangle protrudes far west. The base extends from the border of Romania along the western borders of the Soviet Union to Lithuania and as far as the Dvina River at the Latvian border. The cities of Poznan, Lvov, and Vilna are approximately in the three corners of the triangle. Slovakia in the south and Eastern Prussia, then still German territory, represented a threat to the Polish heartlands along the Vistula River, in which area the capital, Warsaw, is situated.

2. Strategic Considerations. Frontier conditions in the west are fundamentally different from those in the east, where the border with the Soviet Union follows an almost straight north to south line. In the west the most significant feature is the Polish Corridor, which gave Poland access to the Baltic Sea. However, the very fact of Poland's expansion beyond its heartlands in the Vistula River bend produced for the Polish State extremely grave

political tensions and strategic dangers. In the event of war there was hardly any possibility to hold the Polish Corridor which was hemmed in by Pomerania and Eastern Prussia. The newly developed fortifications at Hel and Gdynia were completely isolated from all important areas in which all major battles in Polish history had been fought. In any future war these areas will be the natural scene of battles. The result of the completely unnatural borders established in 1919 was that all Polish forces committed west of the Vistula River and south of Thorn had to be written off as lost from the very outset in any war. With a strongly defended Eastern Prussia on its flank and rear, Poland had no chance whatever of launching any major military offensive.

3. Geographical and Topographical Features. The entire area of Poland is characterized by the large plains, which are an extension of the plains of Russia. These plains stretch from the Carpathian and Beskid mountain ranges in the south to Eastern Prussia and the western border areas of Poland. The approaches to the Carpathians and the Podolian Plateau, which protrudes from Ukrainia in the east, form a raised hilly plain, the highest point of which is

6. From records of the 8th (Military Science) Division of the Luftwaffe General Staff based on the Luftgeografische Beschreibung Polens of 1 July 1939; Karlsruhe Document Collection.

the Lysa Gora, roughly 2 000 feet high, immediately east of Kielce. The north is taken up by a large area of rivers, swamps, and dense forests, which is difficult for traffic. The catchment area of the Vistula River in its wide bend between its source in the western Beskid mountains and its lower reaches downstream from Thorn -- the area in which German settlers had founded their cities -- is the real heartland of the Polish State.

The direction and power of all military operations on the ground and in the air are determined by the Vistula River. Any opponent attacking from east or west had to penetrate into the large Vistula River bend. This is and will remain the area of all battles of historic importance in these regions. At Warsaw, the heart of Poland, the Vistula bends west to make its final turn, this time north, at Thorn. It empties into the Baltic Sea at the ancient German city of Danzig. In its upper reaches, downstream from Sandomierz, the river is a serious obstacle, even under modern conditions, for military operations from east or west. The main bridges are at Sandomierz, Dehlin, Warsaw, Plock, Wloclawek, Thorn, Kulm, Graudenz, Dirschau, and Danzig. Bridges in the large Vistula bend were approximately

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180 miles distant from the nearest German air bases. One of the important missions of the Luftwaffe was to close these bridges. For the Poles the possibility existed to establish a defense line along the Warthe River, west of the Vistula. East of the Vistula the Polish forces, if they retired in time and while still capable of combat action would find favorable conditions for defense positions in the south along the Dunajec and San Rivers, in the center along the Pripet marshes and the western reaches of the Bug River, and in the northeast along the Narev and Bobr Rivers.

Road conditions at least somewhat similar to those existing in Germany and Western Europe in general existed only in the territories formerly a part of Germany, until 1918. The Pripet marshes and the areas northwest of the Warsaw-Grodno line to as far as the borders of Eastern Prussia are practically impassable for traffic. The actual Pripet marshes are a serious hindrance to military operations and divide Poland into two distinctly separate parts. Only

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4 percent of the roads in the entire area are hard-surfaced, the rest are all merely dirt tracks. In the autumn months road conditions are extremely unfavorable in practically all parts. However, difficulties are rarely encountered, particularly for motor traffic, even as late in September. Air reconnaissance and air action against troop movements are prevented in many parts by dense forests. In contrast, the vast, treeless plains offer no protection or cover whatever for troops against bombing attacks of any type.

The numerous bridges, many of which would undoubtedly be destroyed in case of war, presented serious bottlenecks for rail and road traffic. This was particularly so all along the Vistula River, in the south along the Dunajec and San Rivers, in the center along the Warthe and Pilica Rivers, and along the Brahe and Drewenz Rivers in the north.

In comparison with German conditions the rail system, with a total length of 12 000 miles, was sparsely developed. However, it was of significant importance for Polish strategic troop movements parallel with the front, which were to be expected to develop, and also for east to west movements. The same applied for German supply and

replacement movements during later stages of a campaign if the German armies advanced into Polish territory. Polish rail communications can be considered to consist of the following systems:

(1) the Bromberg-Poznan-Kalisch-Warsaw-Kutno-Mlawa-Thorn system;

(2) the Warsaw-Lo dz-Kalisch-Kattowitz-Krakau-Przemysl-Sandomierz-Lublin-Deblin-Warsaw system;

(3) the Warsaw-Deblin-Lvov-Kovno-Sarny-Lunienz-Baranovichi-Lida-Vilna system; and

(4) the Lvov-Vilna route to the Soviet Union, Latvia, and Lithuania; and the "escape" route from Lvov to Romania.

The Poznan-Warsaw main line was of particular significance for any retrograde movement of the forces deployed in the Poznan and Polish Corridor areas. The Krakow-Lvov main line was the lifeline of the southern Polish groupment of forces. The rail network between these two main routes would always be of vital importance for the Polish command if circumstances forced it to regroup its forces in the center or against the German flanks.

East of the Vistula River lateral communications of this type existed in the Warsaw-Lvov-Vilna area, although the routes here were widely spaced and of low capacity.

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Here, the German command would have to endeavor, particularly through air action, to prevent any reestablishment of Polish lines of resistance supported by the rail network. What would be even more important would be to prevent the escape of the Polish Army to foreign soil. One requirement of Blitz warfare would be to neutralize this rail network completely in order to rob the enemy of maneuverability. Then the enemy would be forced to accept battle and it would be comparatively easy to pocket his forces.

For this reason the Luftwaffe at an early stage was to shift main emphasis in the operations of its long-range forces to action against the Polish rail routes, primarily those west of the Vistula, and later those east of the river.

The weather conditions which the Luftwaffe probably would encounter in the Polish theater in general would not cause any exceptional difficulties if the campaign could be brought to an end before winter set in. Meteorological conditions were similar to those of Germany. Fog and rain were to be expected in September. Difficulties might be encountered in the Beskid and Carpathian regions, but it would be easy to detour these areas in operations from the west.

Economically, Poland is primarily an agrarian state. Its industries all depend heavily on foreign support. The main industrial centers are in Polish Upper Silesia and in Galicia. The industries in the Sandmierz-Tarnow-Przemysl area were just developing in 1939. The weapons manufacturing area is in Ostriwice-Kamienna, south of Deblin. The entire Polish economy is dependent upon coals mined in Upper Silesia. The main aircraft factories are all situated around Warsaw, with a few works at Deblin, Lublin, and Mielec. Although possessing large construction capacities, the aircraft industry cannot be adapted readily to large scale serial production. Fuel supplies represent a serious economic bottleneck.

4. Vulnerability to Air Attack. Poland was highly vulnerable to air attack from Germany. By air, the distances from German air bases to the most important Polish targets were as follows:

From Silesia, the base area of the German Fourth Air Fleet to the various target areas from the various airfields: Breslau-Lvov 306 miles; Breslau-Brest Litowsk 262 miles; Breslau to Warsaw 180 miles;

From air bases in Pomerania and Eastern Prussia, the base areas of the First Air Fleet, as follows: from Stolp

to Warsaw 210 miles; from Stolp to Brest Litowsk 306 miles; from Stolp to Vilna 360 miles; from Koenigsberg to Warsaw only 162 miles.

This meant that tactical support dive-bomber units operating from bases at Breslau, Stolp, Koenigsberg, Allenstein, Elbing, Insterburg were within striking range of the areas of Krakau, Kielce, Lodz, Poznan, Bromberg, Graudenz, Mlawa, Warsaw, and Grodno. Long range units could easily reach as far as a line from Lvov through Brest to Vilna and even farther east, although the real operational areas for German Do-17 units were west of this line. Operating from their current bases there was no possibility to concentrate all German long-range bomber units against the Lvov or Vilna areas. It would have been necessary for such operations to move the units to more advanced bases. It was also necessary to move the tactical support units at an early stage from their bases in Silesia to airfields inside Poland. Nevertheless, the most important targets for air attack in Poland were definitely within striking range of the Luftwaffe.

5. Warsaw, the Capital of Poland. Warsaw was within striking range of almost all German air forces, and since it would most probably play an important role in any cam-

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campaign against Poland this was a highly significant factor. Warsaw was the intellectual, cultural, political, and military center of Poland. The rail and road routes to and from west, southwest, and northwest all traverse and the suburb of Praga situated the city districts/east of the Vistula, and it was evident that Warsaw must be a main target for the Luftwaffe. This circumstance could change only if the Polish Government were to take the unexpected measure of evacuating all military installations from the city and detouring the city in all military march and transportation movements.

II. INTELLIGENCE ESTIMATE OF POLAND ⁷

1. The Polish Armed Forces.

a. Air and Antiaircraft Artillery Forces. The Polish air and antiaircraft artillery forces were considerably inferior to the German in numbers, materiel, organization, personnel, and command. The ground service organization had only twelve well equipped air bases, which during peacetimes were occupied by excessively large air forces (up to an entire air regiment with 120 aircraft). It was to be assumed, therefore, that the airfields at Poznan, Thorn, Bromberg, and Graudenz would be completely or partly cleared of Polish air units even before the

7. See Planstudie 1939, Vol II, May 1939 version: Weisungen fuer den Einsatz gegen Osten, Karlsruhe Document Collection.

outbreak of a war in times of political tension. All other Polish airfields, of which there were another 75, could be compared only with German forward tactical fields. They were very evenly distributed throughout Polish territory. In this category only the airfields at Kattowitz, Lodz, Lublin, Rahmel, and Terespol/Malszewice had makeshift equipment to accommodate bomber units in operation. Bomb and fuel depots were restricted almost exclusively to main air bases, and aircraft repair hangars were available only at regimental headquarters airfields (see page 35). Even under peacetime conditions all major repairs had to be carried out in aircraft fuselage and engine factories. Owing to the primitive means of communication available, the supply installations were completely inadequate to service large size air units. The most important personnel and equipment replacement center was the Central Depot at Deblin.

Judging by normal standards, it was therefore considered impossible for large Soviet-Russian air forces to operate against western targets from Polish territory.

It was to be assumed that the Polish air forces would be committed in direct support of the Polish ground forces, and for this purpose would be assigned by squadrons and

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groups to army commands. To a limited extent it was expected that small Polish air units also would attack German concentration movements and possibly towns and military installations near the German-Polish border, particularly in Eastern Prussia and Silesia. It was probable that the Polish air forces would endeavor to escape attack by superior German air forces by transferring from their normal peacetime bases to tactical airfields.

Polish air defense activities with fighters and anti-aircraft artillery were expected only in front areas to protect the troops. Furthermore, it was assumed with certainty that at least parts of Warsaw, Gdynia, and the industrial regions of Upper Silesia would have fighter and anti-aircraft artillery defenses. It was certain that adequate air defenses could not be provided for targets distributed widely throughout the country. In contrast, at least weak air defenses were to be expected in the Dablin-Radom-Lublin area.

b. Army. By M plus 6 the Polish Army probably would have a strength of 45 divisions, 15 cavalry brigades, and other units with a total manpower of 800 000. In general, weapons were modern, but there was a lack of heavy artillery and armored vehicles of all types. The

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troops were well disciplined, trained for attack, easily inspired to enthusiasm--similarly to the French, but at the same time subject to depressions. There could be no doubt whatever that the officers, in all ranks, could not be compared with German officer personnel.

Facing west (Germany) were the following fortresses and other fortified defense installations: a line of modern bunkers in Upper Silesia; an outdated line of fortifications taken over from the Russians along the Narev River; and, most important of all, the former German fortresses of Thorn, Poznan, Graudenz, and Kulm. Other fortifications were still under construction and had no defense value.

It appeared at the time that the Poles had abandoned their plans for offensive operations and, instead, were counting on heavy German attacks, particularly from Eastern Prussia. It was considered almost certain that the Poles would fight delaying actions while falling back on the Narev-Ostrolenka-Soldau-Thorn-Bromberg-Kalisch-the fortifications in Upper Silesia-Teschen after an immediate evacuation of the Polish Corridor and the establishment of a bridgehead at Gdynia. It was known that the Polish operational plans at the time were being modified.

2. The Polish Economy. The Polish peacetime economy was predicated upon possession of Upper Silesia, the former German industrial region. At the time the centrally located industrial region around Sandomierz was under development. The old Polish armament industry triangle of Kielce-Ostrowiec-Kamienna was at the time the most important center for the production of Poland's weapons. The only item which could not be manufactured in the country was heavy artillery. Power supplies are a difficult problem. The various electric power stations in existence for the most part were aligned only for local circuits. The destruction of a few power stations could paralyze the industries at Warsaw, Kielce, and Sandomierz completely.

High capacity rail routes existed only in the west, to Germany, and in the east, to the Soviet Union. The maintenance of large-scale rail transportation movements of any duration was complicated by the different width of the rail tracks, the Russian tracks being wider than normal European gauge. In the Polish interior, and particularly in the eastern parts, there are few rail routes and in Congress Poland all routes in existence are centered on Warsaw. If taken under systematic air attack there could be small doubt that the rail system could not meet war time requirements.

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III. THE POLISH AIR FORCES.

Poland had no operational air force as a separate service. The bulk of all air units were incorporated in the army, with a smaller number of units consolidated as what might be called a naval air arm. The peacetime organization differed radically from the planned wartime organization.

Peacetime Organization. Prior to the campaign the Polish air forces were consolidated in three air groups of each three regiments:

Air Group 1, with headquarters at Warsaw, consisted of

	<u>Base Area</u>
1st Air Regiment	Warsaw
5th " "	Lidz and Vilna
6th " "	Lvov

Air Group 2, in process of activation, was to have⁹

7th Air Regiment
8th Air Regiment.

Air Group 3, with headquarters at Warsaw, consisted of

2d Air Regiment	Krakau
3d " "	Poznan
4th " "	Thorn.

The naval air forces were consolidated in Naval Air Group Putzig, which consisted of seven squadrons: 1

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fighter, 1 bomber, 2 reconnaissance, and 1 combined anti-aircraft and air photography squadron .

Wartime Organization. Wartime plans provided for the discontinuance of large unit headquarters and for the assignment of all air forces by squadrons to Army and Navy commands, primarily to those of the Army. However, all bomber and reconnaissance squadrons, a total strength of 130 bombers and 30 reconnaissance aircraft, were under direct control by the Army High Command.

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8. Der Polenfeldzug, 1939, by the 8th (Military Science) Division of the Luftwaffe General Staff; Karlsruhe Document Collection G.
 9. Ibid : according to this source Air Group 2 was to contain only 2 organically assigned air regiments, were still in process of activation.

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Each Polish army was to be assigned 1 fighter group, 1 reconnaissance group, and 1 balloon company, consolidated under the command of an air unit commander. Altogether, the Army and Navy air forces had available 165 fighters, 265 reconnaissance aircraft, 100 liaison planes, 16 naval bombers, 30 naval reconnaissance, and 10 naval defense planes.

The other half of the fighters, totalling 150, were organized in four groups assigned for home defense, as follows: 60 in the general area of Warsaw, 40 in the various industrial regions, 20 around Dablin, and 30 around Gdynia.

All air units were under the command of the Chief of Air Forces, attached to General Headquarters. Air units allocated for direct control by the Army High Command were under his personal command. According to the above figures Poland had a total force of 130 bombers, 315 fighters, 295 reconnaissance aircraft, and 56 naval aircraft. Counting in the liaison planes mentioned above, the total first line strength thus was estimated at 900 aircraft.

So far as equipment was concerned, the Polish air forces were characterized by the fact that almost all aircraft in use were multi-purpose types. Thus, it was said that the PZL-23, PZL-43, and Potez-25 types could be used

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as light bombers, fighters, or reconnaissance planes. It was known also that PZL-23 and PZL-43 aircraft even could serve as dive-bombers.

Most of the Polish aircraft were powered by British and French type engines constructed in Poland under license. The main types were Wright, Bristol, Pegasus, Gnome, and Rhone. A large percentage of the power units in use were completely outdated so that the performances of Polish aircraft on the whole were inadequate. In the last few years preceding World War II efforts were obvious to reequip all units with Polish-manufactured aircraft of the latest types, but only small numbers of the WIK, LES, and SUE aircraft types, developed in 1938, had been delivered to field units when the war broke out. Of these types the WIK was intended as a pursuit fighter.

The Poles made no clear cut difference between strategic and tactical reconnaissance aircraft, both of which had a subsidiary mission, that of ground attack.

For bombing attack 4.4-pound electron, and 110-pound, 220-pound, and 2200-pound high explosive bombs were available.

The development of a Polish parachute force had not progressed beyond the very first stages when the war broke

out.

The Polish ground service organization prior to the war operated approximately 90 airfields, of which twelve were larger than 3 300 feet square. The other fields thus were completely useless for operations by fast bomber units. Forty of them were only between 1 600 and 3 300 feet in length and breadth, thirtyeight were even smaller than 1 650 feet square. Only twentytwo airfields were equipped with adequate modern facilities. However, since the terrain is level in most parts of Poland, the speedy construction of emergency and alternate airfields would have been possible almost anywhere. All in all the Polish ground service organization appeared cumbersome and unmaneuverable because it was hampered by the organization of the air forces in groups and by the fact that it had to rely on poor traffic and signal communications facilities.

The Polish air forces had no signal troops of their own. In other words, there was no Polish air signal corps. Air and antiaircraft artillery units were assigned army signal personnel. Ten Army-Air Force radio stations were available in times of peace to handle the radio communications of the air forces.

It was known that in war the Polish air forces would

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have 14 radio broadcasting stations available for purposes of navigation and for the transmission of communications and orders.

The Polish antiaircraft artillery arm was organic to the Army and had more than 64 static and 72 self-propelled heavy, and 88 light antiaircraft guns besides 172 antiaircraft machine guns. Completely automatic data computing instruments were lacking. The antiaircraft artillery defense on the whole could be considered weak in numbers and capabilities.

IV. THE PROCUREMENT AND DEVELOPMENT OF INTELLIGENCE DATA.

Following the order issued approximately on 1 April 1939 Branch 5 of the Luftwaffe General Staff--the branch responsible for the procurement of intelligence information--had taken following general measures:

(1) All available personnel had been transferred to Intelligence Group East, where work continued day and night in three shifts;

(2) The branch had set up a printing shop of its own and also had arranged to employ two commercial printing houses;

(3) The branch organized its own photo interpretation section, staffed by a total of four officers and

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and one hundred noncommissioned officer and enlisted personnel;

(4) Extremely close contact was maintained with The Wehrmacht High Command Counterintelligence Office on matters concerning the procurement of information from Poland;

(5) The German air attaché in Warsaw, who was under the command of the Luftwaffe General Staff, was assigned appropriate and comprehensive missions, to cope with which his staff was increased;

(6) The evaluation of press reports was stepped up;

(7) The Oranienburg Experimental Station for High Altitude Aviation was instructed to conduct high altitude reconnaissance over Polish territory. For this purpose the air units were to operate from Silesia and Eastern Prussia.

The results obtained from the various sources were as follows:

(1) Counter-Intelligence Office. Many items of information were received from this source dealing with the disposition of the Polish air forces and anti-aircraft artillery. The information came from members of the German minority living in Poland and served as a basis for reconnaissance planning. Roughly ten percent of the reports

received were usable;

(2) The Air Attaché at Warsaw. The reports received from this source were comprehensive and on the whole reliable. Interpretation produced a clear picture of the organization, disposition, and training of the Polish air forces, as well as details on Polish aircraft of the first line and their capabilities, and on the Polish military economy in general and the aircraft manufacturing industry in particular, and the existing Polish operational plans;

(3) The evaluation of press reports produced only meager results;

(4) Air Reconnaissance produced almost complete data on the Polish ground service organization, including information on supply depots, military industrial installations, as well as on all major towns, port installations, and frontier fortifications. Air reconnaissance units also managed to keep track of the current movements of Polish air forces throughout the period from May to the opening of hostilities on 1 September.

From mid-April 1939 on operational planning against Poland progressed at an increasingly rapid pace. At the end of July 1939 all intelligence information available had been processed for an evaluation of the situation. The

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immense task of processing target data and furnishing this data to the troops continued up to the end of August. Once this work was done, however, each tactical airfield intended for use in the Polish campaign had the following material available:

100	copies of the	Aircraft Identification Tables
12	" " "	Intelligence Pamphlet on Poland (Orientierungsheft Polen)
12	" " "	Military-Geographical Description of Poland
12	" " "	Airfield Atlas on Poland.

Target data was available in the form of air photo reprints, target interpretations and descriptions, and air panorama photos covering larger target areas and the frontier fortifications. The targets and areas thus covered were as follows:

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All Polish airfields with the exception of three;
All supply depots of the Polish ground service organization;

All major cities (air photo panorama);

The Hel Peninsula and the port of Gdynia.

One hundred copies of the above data were available at each airfield. In addition, copies were furnished to each command staff and tactical unit earmarked for commitment in the east; to all tactical units earmarked for commitment in the west against the eventuality that they might be transferred later to the east; and to all air bases in Eastern Prussia, Pomerania, Silesia, and in Bohemia and Moravia. Antiaircraft artillery units were furnished only copies of the Aircraft Identification Tables.

CHAPTER 3

THE STRATEGIC CONCENTRATION OF THE LUFTWAFFE

I. TOP LEVEL COMMAND, CHAINS OF COMMAND, AND EFFECTIVE STRENGTHS OF THE FORCES CONCENTRATED AGAINST POLAND--
STATUS 1 SEPTEMBER 1939.¹⁰

The concentration of the forces of the Luftwaffe against Poland provided the starting point for the military operations which opened on 1 September 1939. It is impossible to consider this concentration alone, because it represented only a segment of the overall strategic concept, in which one of the main requirements was to decide between two fronts, or better between two theaters of operations. Since the interplay of repercussions between the western and eastern theater no longer were influenced by the theoretical planning of Operational Plan 1939 but rather by actual political and strategic developments not clearly discernible prior to 1 September 1939 so far as the Luftwaffe Command was concerned, the concentration against Poland must be appreciated as a part of the overall strategic air concentration.

10. The appendixes to be found in the Appendix Volume were used, in the order in which they are filed, in the preparation of this chapter.

Contrary to original plans, roughly two-thirds of all operable forces available to the Luftwaffe were deployed against the east and only one-third against the west. The term "operable units" is used here to mean only the flying forces of the Luftwaffe. They included (1) the operational air forces of the Luftwaffe; (2) the air units allocated to the Army and the Navy; and (3) the fighter forces assigned for home defense.

Of the three arms and services composing the Luftwaffe, namely, the air arm, the antisircraft artillery arm, and the Air Signal Corps, only the air arm-- the air forces as the proponents of war in and from the air, will be dealt with here.

The starting point for all examinations and considerations is the top-level command of the Luftwaffe, to include the chain of command at the higher and intermediate levels as it actually existed on 1 September 1939. This command organization is shown in Chart 1.

The organization as shown in the chart includes the entire operational air force and all territorial organizations required for its control in the east and west. It shows the division of forces between the east and west

Appendix 2.

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and the subdivisions of command in the operational air force and the territorial organizations. The two headquarters controlling all naval air forces are included under the designations Air Command East and Air Command West (Fuehrer der Luft Ost and West). In contrast, the air units allocated by the Commander in Chief of the Luftwaffe to the Commander in Chief of the Army at the time of mobilization are not shown. The strengths they represent are included

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in Tables 8 and 10.

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Tables 2-6 show the air concentration against Poland in full detail. The left half of Table 1, with the heading Eastern Theater (First and Fourth Air Fleets) thus is taken up by the individual command headquarters and the tactical units they controlled.

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Chart 7 shows in a summary on maps the entire air concentration against Poland.

In addition, details are offered on the strengths of the following forces: (1) the units under direct control by the Commander in Chief of the Luftwaffe; (2) the units allocated to the Commander in Chief of the Army; and (3) the fighter units allocated for home defense.

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Table 9 shows a compilation of the air forces left

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in the western areas, intentionally restricted to a presentation of numerical strengths.

12. Appendixes 8-10.

13. Appendixes 3-7.

14. Appendix 8

15. Appendix 9.

16. Appendix 9, see also Footnote...

17. Appendix 10.

18.
Chart 10 shows the effective strength of the entire Luftwaffe, deployed in the west and east.

It seems advisable at this early juncture to offer an explanation of the various chains of command for the following reasons:

(1) to show the influences of the build-up of the Luftwaffe, which took place in the 1933-39 period but left only barely four years for the organizational work;

(2) the existing initial situation must be shown on which the Luftwaffe command based its plans for the Polish campaign;

(3) to serve as a basis on which to assess the interplay of repercussions in a two-front war;

(4) to enable the reader to judge the demands made upon the Luftwaffe in the campaigns of 1940.

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Charts 2-6. These charts give details on the organization and concentration of the units of the operational air force, the First and Fourth Air Fleets, committed against Poland:

18. Appendix 11.

19. The Luftwaffe top-level command is shown in Table 1, see Appendix Volume, Appendix 2.

First Air Fleet

Air Command Eastern Prussia, controlling the Luftwaffe Training Division (Chart 2) and the 1st Air Division (Chart 3).

Fourth Air Fleet

2d Air Division (Chart 4), and Special Purposes Air Command (Chart 5).

Consolidated figures showing strength of both air fleets together (Chart 6).

The chief source used in preparing these charts was the compilation: Der Polenfeldzug 1939, Study by the 8th (Military Science) Division of the Luftwaffe General Staff. ²⁰

The information offered in this source was examined critically and supplemented by details taken from situation maps, unit reports, and statements by unit commanders in the field at the time.

Chart 6 ²¹ offers a complete compilation of all German air forces of the operational air force employed against Poland together with their effective strengths, as follows:

The total number of units committed against Poland, arranged by command and category; the number of aircraft in the units, in detail and in total; the relation between aircraft strength and actual bomber strengths. The

²⁰. Karlsruhe Document Collection.

²¹. Appendix 7.

computations are based on the following standard unit strengths for bomber, dive-bomber, ground-attack, fighter, twin-engine fighter, reconnaissance, and weather service air forces:

Squadron: 9 aircraft; Group (including headquarters flight): 30 aircraft; Wing headquarters: command flight of three and headquarters squadron of 19 aircraft, making a total of 12; Bomber or Dive-Bomber Wing headquarters: controlled a force of 3 groups of each 30 aircraft plus 12 (see above) making a total of 102 aircraft.

Only bombers, dive-bombers, and ground-attack groups of the first line will be considered here as actual bombing forces. The aircraft assigned to bomber and dive-bomber wing headquarters will not be considered actual bomber aircraft. Aircraft in unit reserves are also not included in the compilations offered, since no crews were available for the reserve planes. Other items not included in the compilations are the headquarters and liaison planes available to the various command staffs; unit reserves in excess of authorized strengths; headquarters and unit transportation aircraft; aircraft held in reserve by the supply services, and aircraft in zone of interior training establishments.

Appendix 9.

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Chart 8 shows the strengths of the other units of the Luftwaffe, namely, independent units and the 7th Air Division--all under direct control by the Commander in Chief of the Luftwaffe, the reconnaissance and liaison units allocated to the Commander in Chief of the Army and committed in Poland, and the fighter forces allocated for home defense in the eastern administrative areas. These strengths are consolidated with those of the operational air force to present an overall picture. This overall figure does not include the naval air units deployed on the northern flank of the entire German concentration because those units were controlled solely by Navy headquarters and were committed only for specific purposes.

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Charts 9 and 10 show a consolidated compilation of Luftwaffe units remaining in the west and those concentrated in the east, and thus an overall picture of the overall effective strength on 1 September 1939, including naval air units.

II. EXAMINATION AND INTERPRETATION OF STATISTICAL DATA.

The total strength of the Luftwaffe at the outbreak of war was 2 955 operable aircraft, of which 1 182, or

22. Appendix 9.

23. Appendixes 10 and 11.

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two-fifths were actual bombing planes. Two further conclusions can be drawn from these figures: (1) the actual overall strength of the Luftwaffe was considerably smaller than it has been made to appear in German and foreign publications in the past, and (2) the Luftwaffe cannot be considered under any circumstances as a purely offensive force since only two-fifths of its aircraft were bombers. At that time the Luftwaffe was a weapon fashioned specifically for continental warfare restricted to one front and with limited objectives: a short blitz-type war, and it was suitable for such purposes.

III AIR CONCENTRATION AGAINST POLAND.

The air units deployed against Poland at the outbreak of war had a strength of 1 929 aircraft, of which 897, or 46.5 percent, were bombers. Comparison will show that approximately two-thirds of the entire Luftwaffe was committed against Poland, with only one-third remaining in the west. This numerical ratio of 2:1 is misleading however, since the true strength ratio results less through numbers than through the combat capabilities of the aircraft types involved. A comparison of effective bomber strengths shows that the main concentration of bomber forces was clearly in the east. This preponderance becomes even more evident

if the comparison is restricted to the bomber forces committed in each of the two theaters, since three-quarters of all bombers available were in the east. In addition, two bomber groups of the 55th Bomber Wing were transferred in the first few days of the campaign from the Second Air Fleet, in the west, to the Fourth Air Fleet, in the east. This constituted an increase of 60 bombers for the east.

III. DEVELOPMENT OF AREAS OF MAIN EFFORT IN THE POLISH CAMPAIGN.

The deployment of the operational air forces against Poland shows a remarkable disparity between the strengths allocated to the First and Fourth Air Fleets. It is clearly obvious that in the initial strategic concentration and during the initial phases of the campaign main emphasis was in the northern areas, the zone of the First Air Fleet. The Fourth Air Fleet, in the south, had less than two-thirds of the strength of the First Air Fleet. This seems all the more remarkable in view of the fact that main emphasis in the army concentration and intended operations on the ground was in the southern areas of the theater. However, in reviewing the entire campaign, it will be seen how main emphasis in air operations logically and systematically shifted southward at a very early stage, a change that was reflected

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in the transfer of tactical units from the First Air Fleet to the zone of the Fourth Air Fleet. Simultaneously, it will be noted that the forces remaining with the First Air Fleet were shifted to Eastern Prussia, so that two ex-centric main effort flanks developed soon in the operations of the Luftwaffe in the east.

IV. SUMMARY.

The following points are clearly evident:

- (1) Approximately two-thirds of the numerical strength of the Luftwaffe was deployed against Poland. In actually effective strength the ratio was considerably higher;
- (2) Relatively weak air forces remained in the west;
- (3) Contrary to the intentions of Operational Plan 1939, the concentration against Poland clearly reveals the development of a main effort in the east;
- (4) Within the strategic air concentration against Poland, emphasis was clearly in the north, while emphasis in Army operations on the ground was in the south.

CHAPTER 4

PERSONNEL AND MATERIEL STRENGTH OF THE
FLYING FORCES OF THE LUFTWAFFE ON 1 SEPTEMBER 1939

The actual effective strength of the air units deployed against Poland was determined by such factors as the number of aircraft they contained, the training standards achieved by unit personnel, and the technical capabilities of their aircraft. Anything like a reliable picture of the actual combat value of the Luftwaffe can be calculated only from the sum of these three factors: the numerical strength in aircraft, personnel quality, technical quality of the aircraft.

I. PERSONNEL.

It would exceed the scope of this study to examine the reasons for the difficulties arising from the quick and one might say precipitant development and build-up of the Luftwaffe. Only the actual status of training at the beginning of the campaign is to be examined here, a problem which had been a source of grave concern to the higher level and intermediate levels of command in 1939. Numbers and quality seemed irreconcilable factors. The actual training status of personnel cannot be computed from existing training doctrines, training programs, experience reports, or

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statistics, from which it is impossible to develop a true picture of an actual situation. The only possibility to judge the status of training in 1939 is to reconstruct a picture from actual practice, pieced together from statements by numerous field commanders of the time. A cross-section view of the actual status of training in general can be obtained especially from an examination of the bomber units, which were the actual carriers of the intent and power to attack.

Of the forces committed against Poland two large units were considerably ahead of the bulk of Luftwaffe forces in the field of training and therefore also in point of combat capability. These were the Luftwaffe Training Division and the Special Purposes Air Command. The training division, under General Foberster, had particularly well qualified personnel and excellent materiel. The special purposes command was a new force, established on 1 July 1939, under General Freiherr von Richthofen, a certified engineer who, in common with a large number of his sub-commanders, had gained wide combat experience in the Spanish Civil War, particularly in the field of direct army support operations.

Another advantage of the special purposes command was

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that some of the units it controlled were from the training division while the others had already achieved a certain degree of integrated stability and appreciable training standards. Furthermore, the command had been afforded the opportunity prior to the campaign to practice bombing with live ammunition in numerous maneuvers closely integrated with an army command, which later became the Tenth Army, under conditions closely approximating those of actual warfare.

In 1939 great emphasis was placed throughout the Luftwaffe on bombing maneuvers of this type, the scope of which increased steadily. Thus, as late as in August 1939 the Second Air Fleet planned and conducted air maneuvers in which all forces of the Northwest Command participated. On this occasion exercises were carried out in the commitment of large size units at wing and division level, including the transfer of tactical airports and advance airfields under simulated wartime conditions. A concurrent purpose was to improve the training standards of ground service personnel. Although the results of this maneuver did not produce proof of all units being completely ready for combat action, it nevertheless did much to improve the state of unit readiness over former conditions. Similar maneuvers

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were carried out by all forces of the Luftwaffe, but at the same time the separation of existing units to form two units and the establishment of completely new units seriously hampered systematic training.

The training standards achieved in the bomber forces can be regarded as valid for the entire Luftwaffe, because the bomber units were drawn from the command areas of all four air fleets. The subjects of training will be submitted here to a critical examination and evaluation, in which the most important features of peacetime training will be applied. These main subjects were:

(1) Formation Flight. Here main emphasis in the entire training program was on unit integration. The verdicts offered on the standards achieved vary between "very poor owing to inadequate training," and "training in group formation completed." The overall picture lacks uniformity.

(2) Navigation. Here the general verdict offered was good to satisfactory, even for long-distance flight. Particular care was devoted to the training of units stationed in the west, which had to operate at sea.

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(3) Blind or Instrument Flight. In a few units all crews were "completely capable of blind flight." Here again the overall results were very uneven.

(4) Bomb Aiming. In this most important field of training, the results do not seem to have been completely satisfactory. Some of the newly established units had not practiced at all with live bombs. Judging by wartime requirements, the bomb-aiming results achieved by the other units in many cases were unsatisfactory. Too few bomb practice areas were available, bombing from normal wartime altitudes of over 10 000 feet was rare, and the aiming devices in use in many cases were unsatisfactory.

(5) High-Altitude Aviation. Training here was inadequate. Most units avoided normal wartime altitudes.

(6) Ground Service Personnel. One result of the inadequate training given aircraft crews in bombing with live ammunition was that ground personnel lacked familiarity with live ammunition.

The standards achieved in overall training were thus uneven. Nevertheless it can be said that the targets set for peacetime training were not achieved in all fields and that wartime requirements were met in practically no case. Some aircraft crews were very inexperienced and only very

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few or no units at all gave evidence of having mastered all subjects of the training program.

Training inadequacies were due primarily to the following facts: In 1939 existing units were being split to form new units; the integration achieved in the old units thus was lost and well trained personnel were spread out among untrained or inadequately trained personnel. At this stage neither the old nor the new units could be considered fully trained or combat efficient. Weakness were noticeable in unit commanders and all officers, because most of them lacked theoretical and practical experience. Inadequacies became apparent everywhere due to the too speedy build up, in which emphasis was on numbers rather than on quality. The reasons for training inadequacies at this juncture thus were due to factors outside of the troops themselves. However, they affected the quality of troop units because of the lack of consistency, the lack of time, and the excessive demands made on the troops.

II. MATERIEL.

So far as equipment was concerned, the forces of the Luftwaffe were in the middle of a period of reorganization and rearmament which was projected to end in 1942. Standard equipment in aircraft at the beginning of the war

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was as follows:

(1) Bomber Forces. 18 groups and thus the majority of all bomber groups had He-111-E and F aircraft, the rest had Do-17- M and Z models. One group is said to have still had Ju-86 planes. The Ju-88 model was just being introduced so that it was not used in the Polish campaign;

(2) Dive-Bomber Forces. All were equipped with Ju-87-B aircraft;

(3) Ground-Attack Forces. The only ground-attack group in existence had He-123 aircraft;

(4) Twin-Engine Fighters. Most of the groups, namely seven, were not yet reequipped with the genuine twin-engine fighter model, the Me-110-C, but were ready for action with Me-109-D fighter planes. Only three groups already had received Me-110-C planes;

(5) Fighters. All groups had Me-109-E planes;

(6) Strategic Reconnaissance Units. All had Do-17-F and F aircraft;

(7) Tactical Reconnaissance Units had He-45, He-46 and He-126 models;

(8) Air Transportation Units. The only plane in use here was the Ju-52;

(9) Naval Air Units. Coastal units had He-59, He-60

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and He-115 planes; two carrier-based squadrons were equipped with Ju-87 and Me-109 aircraft.

At the beginning of the conflict with Poland both the German command and the German troops fully realized the discrepancy between the theoretical and actual performances of all of the above types of aircraft. It is not possible to reconstruct the performance standards achieved in actual combat missions in Poland. Only the theoretical performance factors assumed in operational planning in 1939 are available to evaluate the capabilities and limitations of the operational Luftwaffe as it existed at that time. However, it will not be enough to merely accept the theoretical figures stated officially for any given aircraft type in respect to its range and the time it could stay in the air. An endeavor must be made to exclude all possible sources of error and to apply all security factors recognized as necessary under circumstances as they existed at that time in calculating the useful penetration range of each aircraft type.

The best source of information for this purpose would appear to be the Table of First Line Aircraft (Liste der Frontflugzeuge). This table was included in Luftwaffe Service Manual L.Dv. 90/2 of 1939. It contained details on the crew, weapons, technical performances, and equipment with oxygen containers or otherwise for each type of aircraft. Originally it was intended as a uniform basis for use in map and field maneuvers, but then had to serve as the basis for all computations for actual combat commitments²⁴. Without exception the performance data given in the list are exaggerated and required a critical evaluation for practical application. The first factor to be taken into consideration is that the performances listed were achieved under the most favorable conditions by highly qualified aviators and therefore represent maximum performances which definitely could not be achieved in flight formation and when the planes were operated by inadequately trained crews. Furthermore, the performances listed were achieved under peacetime conditions and it is only natural that the effects and circumstances of war would reduce them.

Although these factors place a limiting factor on the

24. Appendix

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reliability of the performance figures shown in the list, those figures nevertheless are being retained unchanged here in order to obtain at least some basis for computations. Using these figures it is necessary to compute the penetration range for each aircraft type, using the rules applied by the troops in actual practice in 1939 for the purpose. According to these rules, the distance which the plane could cover without landing was taken as a basis. From this figure regulations required deduction of 10 percent and one-half of the stated time the plane could remain airborne. These were the so-called security or safety factors to allow for unforeseen circumstances, such as detours which might become necessary because of weather conditions or enemy action. One-half of the remainder was considered as the effective penetration range.

In the tables offered here, the performances have been computed uniformly at an altitude of 13 500 feet. Furthermore, the computations are based on the stated cruising speed and not on the stated maximum speed, and allowances have been made for the weight of the bombs to be carried.

The following list shows the penetration ranges of the aircraft committed at the beginning of the Polish

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campaign, computed as described above:

Aircraft Type	Bomb load (in pounds)	Penetration range (miles)	Remarks
He-111-E	2 200	195	without body tanks
He-111-P	1 100	741	
Do-17-M	2 200	210	
Do-17-Z	2 200	264	
Ju-87-B	1 100	117	
He-123	440	78	
Me-110-C		300	(at an al- titude of 20 000 feet)
Me-109-D		174	
Me-109-E		108	
Do-17-F		492	
Do-17-P		341	
Do-17-E			

The effective penetrations thus computed are shown entered on a map of Poland²⁵ to facilitate the evaluation of the existing attack capabilities. Take-off areas for the entries on the map were assumed as follows:

For bomber forces centrally situated airfields in the individual concentration areas, namely, Breslau, Frankfurt on Oder, Stolp, and Koenigsberg; for dive-bomber and fighter forces tactical and advance airfields close to the frontier in the individual concentration areas.

25. Appendix 13.

CHAPTER 5

ANTIAIRCRAFT ARTILLERY AND AIR SIGNAL FORCES²⁶
PREPARATIONS AND CONCENTRATION

In the Polish campaign the German antiaircraft arm was relegated to the role of an onlooker, since the Poles remained completely inactive in air warfare.²⁷ For this reason treatment of the deployment of antiaircraft artillery forces here can be restricted to a numerical presentation.

The Air Signal Corps, in contrast, requires more detailed treatment. The deployment and operations of the signal forces was related directly to the operational plans of the Luftwaffe command and to the actual operations of the flying forces. It was the Air Signal Corps which created, through its organizational and technical preparations, the conditions which made operational air warfare possible at all.

26. See Darstellung und Beurteilung der Kampfanweisung und des Aufmarsches 1939--Der Aufmarsch der deutschen Luftwaffe gegen Polen und die Sicherung des Westens, a study by the 8th (Military Science) Division of the Luftwaffe General Staff; Karlsruhe Document Collection.

27. The AAA units allocated to the Army under the Luftwaffe General with the Commander in Chief of the Army, which were employed primarily in ground combat, will be dealt with later. See pp. 88-93, Part 3.

I. THE ANTI-AIRCRAFT ARTILLERY.

On 31 August 1939, the following anti-aircraft artillery forces were deployed for action in the eastern air administrative command areas:

First Air Fleet (North), comprising Berlin, Brandenburg, Pomerania, Saxony, and Eastern Prussia.

Administrative Area Command III, Berlin	79 heavy and 33 light AAA batteries, 23 searchlight batteries, 2 aircraft reporting companies.
Administrative Area Command IV, Brandenburg	72 heavy and 52 light AAA batteries, 25 searchlight batteries, 1 aircraft reporting company.
Administrative Area Command I, Koenigsberg	33 heavy and 24 light AAA batteries, 6 searchlight batteries, 2 aircraft reporting companies.

Fourth Air Fleet (South), comprising Silesia, Czechoslovakia, and Austria (including Vienna).

Administrative Area Command VIII, Breslau	24 heavy and 27 light AAA batteries, 6 searchlight batteries, 3 aircraft reporting companies.
Administrative Area Command XVII, Vienna	22 heavy and 25 light AAA batteries, 5 searchlight batteries aircraft reporting companies (number unknown).

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agencies were incorporated in the various Luftwaffe command headquarters. These were known at air fleet level and in the Air Command Eastern Prussia as Senior Signal Officers (Hoehere Nachrichtenfuhrer), at the level of air administrative area commands, defense area commands, base airfield commands, and special air administrative area commands, as Chief Signal Officers, and at the level of air division as well as in the staffs of the tactical air support commands attached to army field units as air signal officer.

Preparatory Measures. To insure proper signal communication for the higher levels of command, Operational Study 1939 established that all command post premises for higher level staffs, once their locality was decided, were to be thoroughly prepared for occupancy; signal communications facilities were to be installed in such a manner that they could be ready to function at short notice, together with all necessary local connections. Planned alternate command

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According to the above compilation, the antiaircraft forces committed in defense of the eastern territories comprised altogether 230 heavy and 161 light AAA batteries, 65 searchlight batteries, and at least 8 but probably 13 aircraft reporting companies. To these forces must be added the fighter forces allocated to the eastern air administrative area commands. As part of a general reduction of the air defenses in the east, some of these fighter units were to be committed to reinforce the antiaircraft defenses in the west (Hamburg). As part of the eastern home air defense system, balloon barriers were maintained in the Oder River line east of Frankfurt on Oder to as far as Stettin until 3 September, inclusive.

II. THE AIR SIGNAL CORPS.²⁸

Development and Organization. As the third branch of the Luftwaffe the Air Signal Corps was responsible for all Luftwaffe signal operations. The branch was under the command of the Chief of Luftwaffe Signal Communications, Martini, later promoted to the rank of lieutenant general of signal forces (General der Luftnachrichtentruppe). In the 1933-39 period the service had already reached a personnel strength of 60 000 (at the beginning of 1939) and had the

28. This section is based primarily on a study by Captain Karl Klee.

most up-to-date signal communication equipment procurable. This equipment included such items as secret teletype instruments for the transmission of secret orders, and radio transmitters, among them heavy long-wave 1.5 kilowatt and heavy short-wave 1 kilowatt stations besides 100 watt instruments for short distances, 5 watt instruments for the aircraft reporting service, and voice radio instruments for communication with fighter and dive-bomber units while airborne.

Radar was still in the experimental and development stages and no such instruments were used in the aircraft reporting system during the Polish campaign.²⁹ To insure better exploitation of existing facilities, radio transmitting centers were established in the Zone of Interior, in each of which a number of heavy shortwave and longwave instruments were consolidated. The air traffic control and radio intercept services had both longwave and shortwave DF instruments.

The mission of the Air Signal Corps was to provide signal communication channels for the Luftwaffe operational and tactical commands and ground service organization in peace and war. In the summer of 1939 signal control agen-

²⁹. Information furnished in written communications by General der Luftnachrichtentruppe Fahnert on 7 May 54 and Lieutenant Colonel Hentz, GSC, on 6 May 54; Karlsruhe Document Collection.

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posts were to be so reconnoitered and prepared that they could be used immediately for the control of tactical units through the assignment of motorized air signal teams. Any intended change in the location of a command post was to be reported immediately to the 1st Division (Operations) of the Luftwaffe General Staff and required prior approval by the Commander in Chief of the Luftwaffe. Certain lines between the field command network and the peacetime premises were placed in operation prior to the war. The Chief of Wehrmacht Signals had made the necessary preparations to insure that all lines of this network would be available for use as soon as military operations commenced. During the first day of attack all wire and radio lines of the entire field command network were to be ready for communications with the various command posts.³⁰

To execute their directives for the development of signal communications the First and Fourth Air Fleets initially had only the air signal forces stationed in their command zones available, with the exception of the air signal regiment organic to the Luftwaffe High Command, the Air Signal Experimental Regiment, the Air Signal Training Battalion, the Air Signal Battalion for Special Purposes, and the Air Signal School at Halle, all of which were at

³⁰. Outline map of wire signal communications, Appendix 14.

the direct disposal of the Commander in Chief of the Luft-
³¹
 waffe.

As part of the 1939 Unit Activation Exercise, a sufficient number of units were activated by 15 August 1939 to handle all requirements for the conduct of the Polish campaign. However, the measures provided for in the mobilization plans for the command zones of the First and Fourth Air Fleets were inadequate for the intended signal operations in the Polish campaign; for this reason additional air signal units were moved into the zones from other air fleet zones and assigned to the First and Fourth Air Fleets. In addition, air signal staffs were organized at the special air administrative area commands and were assigned telephone operating, field telephone construction, telephone construction, and in some cases air craft reporting companies with which to accomplish their missions.

Such air signal staffs were intended for the following establishments:

Zone of Third Army	: 1st Air Admin Area Command (Spec
Zone of Fourth Army	: 3d " " " " "
Zone of Tenth Army	: 8th " " " " "
Zone of Fourteenth Army	: 17th " " " " "
Zone of Eighth Army	: 13th " " " " "

31. Operational Study 1939, Part I, D, Par. 1 and 2.

32. In order of sequence under: Major Wichmann, Colonel Jakobi, Colonel Aschenbrenner, Lieutenant Colonel Saul, Lieutenant Colonel Klemme.

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During the 1939 Unit Activation Exercise motorized army-air signal battalions were activated for the Luftwaffe units allocated to the Army; on 18 August these battalions were assigned to the Luftwaffe General with the Commander in Chief of the Army.

On 21 August 1939 orders were issued to link up the various Luftwaffe signal communications networks and to use code designations in all telephone and teletype communications.

The listening stations of the radio intercept service were assigned specific intercept areas prior to the war, and in July and August 1939 the radio intercept stations of the First Air Fleet received instructions to concentrate on intercepting Polish radio communications. The Fourth Air Fleet was assigned responsibility for the interception of radio traffic in Southern Poland, for which purpose the air fleet assigned a number of stations, including those at Budapest, Szegedin, Debrecen, and Szolywa. Intercept teams operating in Slovakia produced no appreciable results because of the inadequate transmission facilities. A total of 54 radio receivers and 20 medium and shortwave DF instruments were employed against Poland.

On 23 August 1939 intercept operations were extended to the Polish radio broadcasting services, and on 26 August to British, French, Italian, Slovakian, Czech, and Soviet-Russian transmitters. A marked increase was noticed in Polish radio traffic from 29 August on. Messages included new code designations and a higher percentage of coded messages, and the sound intensity of all sending stations was decreased. From 30 August on amateur stations were used for army purposes, and unit station reports were transmitted in ground-air traffic according to a grid map

system as yet unidentified.

Missions, Signal Operations Planning, and Deployment. In plans for the aggressive conduct of operations against Poland the Air Signal Corps was assigned the mission of establishing the necessary signal communication networks in hostile territory to insure a speedy and smooth conduct of air operations and secure close contact between the Luftwaffe and the Army. This task had to be performed in addition to the task of developing and maintaining signal communications in the Zone of Interior and in the west. All planning by the signal forces had to be based on the fact that the peacetime telephone network of the German Post and Telegraph Service was not as well developed in the less densely populated territories of Eastern Germany as it was in the western parts. In particular, there was a lack of underground cables. Lines existed to carry signal traffic to the Luftwaffe switch centers at Oppeln, Breslau, Liegnitz, Guben, Treuenbrietzen, Stettin, and Koenigsberg. Farther east the existing line had to be supplemented by new lines constructed by the military and postal services. Above all, the communication network in Eastern Prussia was definitely inadequate and barely sufficed for the smooth handling of peacetime signal communications. All this in-

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entailed an enormous work in addition to that of equipping the planned command posts, but it was completed prior to the commencement of operations.

To develop a basic Luftwaffe communications network in Poland and to insure the establishment of proper operational and command communications systems, the plan was that the air signal construction battalions under the signal officers attached to the special air administrative area commands were to construct a trunk line in the wake of each advancing army. Air units transferred to Poland during the campaign, and the air units assigned to the tactical air support commands with army headquarters were to base their networks on these trunk lines, and the construction units just referred to were required also to establish the lines from the trunk lines to the various Luftwaffe headquarters and tactical units. The trunk lines were constructed to points in the immediate vicinity of the German-Polish frontier prior to the campaign, during the preceding period of tension.

Special construction units were held ready to construct the necessary AC telegraph lines for the teletype net along the established trunk lines, and plans provided

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for appropriate radio channels to supplement the wire communications network.³³

In the event of mobilization the DF control stations of the Federal Air Traffic Control System and the Luftwaffe main and field air traffic control stations of the air signal service were to be consolidated with the Home Air Traffic Control Service. Plans provided for the establishment of additional radio and light beacon lines as well as special lanes for blind navigation to insure air traffic control in the front areas. The air administrative area commands were responsible in home territory for air defense and aircraft reporting activities. It was possible to establish an adequately dense air observation service through calling up the aircraft reporting reserve companies. The mobilization and operational directives for the Luftwaffe

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provided that, apart from the deployment of their aircraft reporting companies in specific areas of main effort by the air administrative area commands, the aircraft reporting companies assigned to the air fleets at mobilization were to be employed to secure as complete a coverage of the eastern and western frontier areas as possible. Eight motorized aircraft reporting companies were concentrated for

³³. Appendix 15

³⁴. Operational Study 1939, Volume II, C; Karlsruhe Document Collection F/I/I.

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deployment in Poland, and in the radio intercept service plans provided for the establishment of additional advance radio direction finders.

The concentration of the air signal forces proceeded smoothly during the period of tension. At the opening of the campaign in Poland the following air signal staffs were at headquarters of the participating air fleets and air administrative area commands.

ORGANIZATION OF THE AIR SIGNAL FORCES DEPLOYED

IN THE CONCENTRATION AGAINST POLAND: 1 SEPTEMBER 1939.

Headquarters, First Air Fleet, Senior Signal Officer:
under General der Flieger Kesselring
Colonel Kuehne

Headquarters, Fourth Air Fleet, Senior Signal Officer:
under General der Flieger Loehr
Colonel Haenschke

Luftwaffe Command Eastern P Senior Signal Officer:
Prussia, under General der Flieger Wimmer
Colonel Settler

Air Admin Area Comd I	Signal Officer: Lieutenant Colonel Duerr
" " " " III	Signal Officer: Lieutenant Colonel Schuetzck
" " " " IV	Signal Officer: Lieutenant Colonel Schuetze
" " " " VIII	Signal Officer: Major Thoenisen
" " " " XVII	Signal Officer: Lieutenant Colonel Afheldt.

apart from newly activated units and units moved in

from the command zones of other air fleets, the following

35.
35. For list of air signal units transferred from other air fleets to the First and Fourth Air Fleets before and during the campaign see Appendix 16.

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major air signal units were available for the conduct of the Polish campaign:

Under the Commander in Chief of the Luftwaffe

GHQ Air Signal Regiment
Air Signal Supply "
" " Training
Battalion Greifswald

Under the First and Fourth Air Fleets and Luftwaffe Command Eastern Prussia.

1st and 4th Air Signal Regiments.
6th Air Signal Bn (with Luftwaffe Comd Eastern Prussia)
1st, 3d, 4th, 8th, 17th Air Signal Regiments

Altogether 9 air signal and air administrative area command signal regiments were deployed during the Polish campaign in the command zones of the First Air Fleet (including Luftwaffe Command Eastern Prussia) and of the Fourth Air Fleet, in addition to 11 independent air signal battalions. All in all, these units controlled

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24 air sig telephone construction companies	5 admin command HQ telephone companies
10 field trunk cable construction companies	5 admin command air sig operating companies (for permanent installations)
15 signal operating companies	28 reserve aircraft reporting companies
8 HQ signal companies	8 replacement companies
7 radio operating companies	17 equipment companies
9 air traffic control companies	33 air base signal platoons
4 radio intercept companies	66 air base signal teams
8 motorized aircraft reporting companies	61 motorized air signal teams for

According to a compilation by the Military Science Division of the Luftwaffe General Staff ³⁶ the total personnel strength of the air signal forces employed in the conduct of air operations in Poland was as follows: 2 070 officers and 68 000 noncommissioned officers and men. The total number of motor vehicles employed was 10 000.

36. Karlsruhe Document Collection.

CHAPTER 6

THE TERRITORIAL ORGANIZATION OF THE LUFTWAFFE³⁷
GROUND SERVICE AND SUPPLY ORGANIZATION

With intentional brevity, the chapter which now follows deals with fundamental matters of the command organization, the scope and organization of the ground service organization, and the more important measures adopted in the field of supplies.

I. COMMAND ORGANIZATION.

Within the overall command structure of the Luftwaffe, the control of the tactical air units and of the ground service organization were clearly separated. The lowest level of joint control over air forces (air divisions) and territorial commands (air administrative area commands) was that of the air fleet. The organization and chains of command of the ten air administrative area commands assigned to the First and Fourth Air Fleets has been presented in tabular form in the third chapter of this present volume or part.³⁸ For the specific front areas in the east the chains of command and areas of responsibility of the five most easterly area administrative commands are presented again below in a summarized form:³⁸

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<u>Air Admin</u> <u>Area Comd</u>	<u>Headquar-</u> <u>ters at</u>	<u>Command</u> <u>Area</u>	<u>Assigned</u> <u>to</u>
I	Koenigsberg	Eastern Prussia	First Air Fleet
III	Berlin	Berlin, Branden- burg, Pomerania	
IV	Dresden	Saxony (State and Province)	
VIII	Breslau	Silesia and Czechoslovakia	Fourth Air Fleet
XVII	Vienna	Austria	

37. The statistical data offered here is from a study by the 8th (Military Science) Division of the Luftwaffe General Staff: Versorgung der Luftwaffe im Polnischen Feldzug. The text is based on unit diaries and other authentic documents, as is the entire study, available in the Karlsruhe Document Collection.

38. Table 1, p. 33, above.

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The peacetime missions of the air administrative area commands of significant importance for the initial situation in respect to the impending wartime missions were as follows:

(1) The preparation, development, and operation of the necessary ground organization, meaning airfields of all types, for the operational air units;

(2) The procurement, maintenance, and operation of the necessary technical facilities, such as repair hangars, air port operation companies, etc., for the operational air forces, and the training of personnel for these services;

(3) The training and control of air administrative area command signal forces; the development of the signal communications networks within their respective command areas;

(4) The training and control of antiaircraft artillery forces, and the organization of air defenses within their respective command areas;

(5) The maintenance of supplies in such items as fuel, ammunition, spare parts for the operational air units, and the preparation of a resupply organization against the eventuality of war;

(6) The storage and administration of target data for the operational air forces (maps, target photos, aircraft identification tables)³⁹

II. THE GROUND SERVICE ORGANIZATION.

At the opening of the campaign, the First and Fourth Air Fleets had available in the air administrative area commands assigned to them the following ground service organization:

1. First Air Fleet, in the zone of Army Group North, comprising Berlin, Brandenburg, Pomerania, and Eastern Prussia (Third and Fourth Armies):
 - Air Administrative Area Command I, Königsberg, for the Luftwaffe forces deployed in Eastern Prussia
 - 4 air base command areas
 - 23 airfields and tactical airfields
 - 7 air port operating companies;
 - Air Administrative Area Command III, Berlin, for the units of the 1st Air Division, deployed in Pomerania,
 - 6 air base command areas
 - 29 air ports and airfields
 - 20 air port operating companies;
 - Air Administrative Area Command IV, Dresden, for certain elements of the 1st Air Division and the Fourth Air Fleet,
 - 9 air base command areas
 - 50 air ports and airfields
 - 14 air port operating companies.

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2. Fourth Air Fleet (Eighth, Tenth, and Fourteenth Armies) in the zone of Army Group South, comprising Silesia, Bohemia, and Slovakia:

Air Administrative Area Command VIII, Breslau, for the forces of the 2d Air Division and of the Special Purposes Air Command,

4 air base command areas

53 air ports and airfields

11 air port operating companies;

Air Administrative Area Command XVII, Vienna, for the rear echelon elements of the Fourth Air Fleet--including those in Slovakia,

3 air base command areas

21 airfields

8 air port operating companies.⁴⁰

40. For map of ground service organization see Appendix 17.

CHAPTER 7

STRATEGIC CONCENTRATION OF ARMY FORCES INCLUDING
ASSIGNED LUFTWAFFE UNITS⁴¹I. ASSEMBLY, ORDER OF BATTLE, AND OPERATIONAL PLANS OF
GERMAN ARMY OF THE EAST.⁴²

On 1 September the German Army of the East was assembled in the following order of battle and with the following missions for the campaign against Poland:

1. Army Group South. Under the command of Generaloberst von Rundstedt and controlling the Fourteenth, Tenth, and Eighth Armies,⁴³ the army group was to attack from Silesia and the western part of Slovakia, with main concentration in the zone of the Tenth Army; advancing in the general direction of Warsaw, the army group was to scatter opposing Polish forces and, as speedily as possible was to seize the Vistula River areas on either side of Warsaw with as strong forces as possible with the objective of destroying, in concerted action with Army Group North, all Polish forces still offering resistance in Western Poland. On the south flank the Fourteenth Army, under Generaloberst List, had the initial mission of

41. This chapter is based on information from General der Flieger Karl Drum; Karlsruhe Document Collection.

42. Appendix 18.

43. In order of sequence from the right flank.

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destroying Polish army elements in eastern Upper Silesia; without pause it then was to advance on Krakau and farther and dispatch mobile units to seize the Dunajec bridges as speedily as possible. To support this drive, another force from the Fourteenth Army from Slovakian territory was to attack across the Beskide mountains. The Slovakian Army, farther right, was under the command of the German Fourteenth Army. The Tenth Army, under Generaloberst von Reichenau, had the bulk of the panzer and other mobile forces, and was to carry the main attack in the direction of Warsaw, with its north flank covered by the forces of the Eighth Army, under Generaloberst Elaskowitz. For this purpose, the Eighth Army was to advance as speedily as possible on Lodz.

2. Army Group North. Under Generaloberst von Bock and controlling the Fourth and Third Armies, Army Group North had the mission of establishing communications between Eastern Prussia and the rest of Germany in integrated action by forces operating from Eastern Prussia and from Germany proper. Later, the army was to bring all its forces to bear in action to defeat Polish forces resisting north of the Vistula River and then, in concerted action with Army Group South was to destroy the Polish forces

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still holding ground in Western Poland. Only token forces were to be dispatched from the Oder-Warthe River bend area to deceive and contain Polish forces in the area. The mission of the Fourth Army, under Generaloberst von Kluge, was to advance from Eastern Prussia and gain the eastern banks of the Vistula River up- and downstream from Kulm with support from elements of the Third Army. Without loss of time it was to drive southeast toward the Drewenz River. The Third Army, under Generaloberst von Kuechler, was to detach forces to support the Fourth Army in crossing the Vistula River while concentrating the bulk of its units around Neidenburg for an attack across the frontier in order to pierce the Polish positions in front of the Narev River in a drive at Warsaw and farther east. The Vistula River bridge at Dirschau was to be taken in a surprise attack and only a minimum of forces were to be deployed to cover the eastern frontiers of Eastern Prussia against Poland and Lithuania.

The forces deployed by the Army for the campaign against Poland comprised 18 corps headquarters controlling 44 infantry, 6 panzer, and 4 motorized divisions, Panzer Command Kampf, 4 light infantry divisions, 1 cavalry brigade, Brigade Netze, units from the fortress garrisons

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of Koenigsberg and Loetzen, frontier guards and other small units, and SS units of regiment size. These forces were to be followed up by units which would be mobilized on 1 September, which, however, were not committed.⁴⁴

II. TACTICAL AIR SUPPORT FORCES ASSIGNED BY THE LUFTWAFFE TO THE GERMAN ARMY OF THE EAST.

On 1 September 1939 seven tactical air support command staff were attached to the ground forces, two of them to the two army group headquarters, and one to each of the five armies committed.

The air forces allocated to the Army and controlled by these tactical air support command staffs comprised

5 strategic air reconnaissance squadrons, one to each of the two army group headquarters and four distributed among the armies;

44. Appendix 18.

22 tactical air reconnaissance squadrons, 16 of them attached to corps, 4 to panzer divisions, 1 to one of the light infantry divisions, and 1 to Eighth Army Headquarters;

7 courier squadrons, one to each of the army group and army headquarters.

The antiaircraft artillery forces allocated to the Army and controlled by the tactical air support staffs comprised

20 composite battalions (four with the Fourteenth Army, six with the Tenth Army, three with the Eighth Army, four with the Fourth Army, and three with the Third Army);

9 light battalions (five with the panzer divisions, two with the light infantry divisions, one (motorized) with the XV Corps, and one with the Fourth Army.

III. THE SIGNIFICANCE OF THE DISPOSITION OF FORCES AND OF THE ALLOCATION OF LUFTWAFFE FORCES TO THE ARMY.

According to the tactical principles which became effective at the outbreak of a war, 1 tactical air support command staff, 1 strategic reconnaissance squadron and 1 courier squadron were to be assigned to each army

45. Cf. lists and performance tables in Appendix 19.

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group headquarters; Each army headquarters was to receive 1 tactical air support command staff, 1 strategic reconnaissance squadron, and 1 courier squadron. This principle actually was applied except in the case of the Eighth Army, which had to be given a tactical reconnaissance squadron instead of the strategic unit for operational reconnaissance, since there were only ten strategic squadrons available, so that it was not possible to give the Commander in Chief of the Army, each army group, and each army headquarters in the east and the west a strategic squadron. It was thought that the Eighth Army had the smallest need for a strategic squadron because this army would have protected flanks, had a covering mission, and would only have to carry out reconnaissance over a short distance ahead of its front.

To furnish one tactical reconnaissance squadron to each of the 18 corps, 6 panzer divisions, and 4 light infantry divisions, which would have been the ideal situation, would have called for a total of 28 of these squadrons. However, only 22 such squadrons were available for the Army of the East out of the overall total number of 30 in existence. Therefore, only 16 of the corps deployed in the east were given a tactical reconnaissance squad-

squadron. The remaining five were allocated to the panzer and light divisions.⁴⁶ The Army of the East thus had an inadequate complement of strategic and tactical air reconnaissance forces.

The same applied to the antiaircraft artillery forces assigned. According to established principles, each army corps was to be assigned an antiaircraft artillery battalion, but there were only 20 of these battalions available for allocation to the east. These were allocated as follows:

4 to the 4 corps of the Fourteenth Army

6 to the 5 corps of the Tenth Army

3 to the 2 corps of the Eighth Army

4 to the 3 corps of the Fourth Army

3 to the 3 corps of the Third Army.

0 to 1 " " Army Group South

20 battalions to the 18 corps deployed in the east.

In planning this allocation due consideration was given to the fact that the antiaircraft artillery battalions would be required to furnish protection also for the various army communications zones in accordance with the overall situation and local needs. For this specific purpose it would have been necessary to assign one battalion to each of the armies, making a desired total of 23 battalions. In these circumstances it was wise that

^{46.} Appendix 20.

that armies did not simply distribute their antiaircraft artillery forces pro rata among their corps, but instead retained some of their units in the headquarters pool. This made it possible to consolidate these forces in antiaircraft groupments which could be assigned from cases to case. At this early stage the need became obvious to provide an antiaircraft artillery staff at each army, under the attached tactical air support command staff, to direct the operations of groupments of antiaircraft battalions on the spot.

The nine light antiaircraft artillery battalions allocated to the Army of the East permitted the assignment of a battalion to each of the 6 panzer divisions and to at least 3 of the 4 light infantry divisions. It would have been desirable for each of the light divisions to have a battalion. However, the overall number of such battalions in existence was too small for this purpose.⁴⁷

47. The actual distribution of light antiaircraft artillery battalions among the light infantry divisions is shown in a chart in Appendix 21.

CHAPTER 8

SUMMARY OF PART 1

I. EXECUTION OF THE AIR CONCENTRATION MOVEMENTS

Pursuant to the warning directives,⁴⁸ the staff and troops of the Luftwaffe by August 1939 worked out plans in all detail for a properly scheduled secret mobilization and made all the necessary preparations. The practicability of the mobilization schedule thus established was tested repeatedly by means of theoretical and practical checks such as test mobilizations and alert practice. The underlying principle here was the Luftwaffe must be able to assemble for surprise action during times of crisis without the necessity of an open and general mobilization. The initiation of the various measures required was to take place on receipt of established code messages from the Commander in Chief of the Luftwaffe.

In the second half of August the general political situation became more critical, which resulted in a definite state of tension. The military measures taken

48. 1939 Operational Study and Operation Weiss, see p.

by Poland, which included large-scale maneuvers near the German borders and the concentration of a number of Polish divisions at the frontier as well as large troop movements in the Polish interior, resulted in German countermeasures.

II. SEQUENCE OF THE MOBILIZATION AND CONCENTRATION MOVEMENTS.⁴⁹

- Aug 21. The deployment of motorized aircraft reporting companies was authorized.
22. On the afternoon of this day the Luftwaffe Operations Staff moved to its command post in the labor camp Wildpark-Werder, Potsdam.
23. Hitler Conference at Obersalzberg. Air fleet chiefs of staff and air division commanders arrive at their command posts. Certain tactical elements in Eastern Prussia moved to their assembly air ports. All other forces of the Luftwaffe still remained at their peacetime stations, the flying forces at their peacetime bases.
24. Forenoon: Eastern Germany declared closed to air traffic. Afternoon: Commander in Chief of the Luftwaffe issued the code word Chain of Command Weiss (Unterstellungsverhaeltnis Weiss), whereupon the disposition of forces and the chains of command planned against the eventuality of a Polish campaign became effective. Midnight: The Commander

⁴⁹. The following information is based on two studies by the 8th (Military Science) Division of the Luftwaffe General Staff: *Der Polenfeldzug 1939*, and *Die deutsche Luftwaffe in den letzten Tagen vor Ausbruch des Krieges*, the latter prepared in 1939-40; both in Karlsruhe Document Collection.

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issued code word "Geschwadertreffen Ostmark." This put into effect orders for the concentration of flying forces on 25 August for operations against Poland, and instructions to connect circuits for the prepared command signal communications networks.

Aug 25. Chief of Meteorological Services, Office of the Commander in Chief of the Luftwaffe, reported deteriorating weather conditions on 26 August in the Tatra and Silesia-Bohemia frontier areas. Thereupon:

1200: Commander in Chief of the Luftwaffe ordered Fourth Air Fleet to transfer 76th and 77th Bomber Wings immediately to their invasion air ports;

1510: Commander in Chief of the Luftwaffe issued code order "Erdorganisation Weiss, Rot, und Blau klar," whereupon the tactical airfields for operations against east and west were readied;

1655: The Commander in Chief of the Luftwaffe ordered mobilization of entire Luftwaffe excluding air training regiments and schools;

1700: Commander in Chief of the Luftwaffe issued code order "Luftverteidigung klar" (Air Defense ready for action);

1720: Commander in Chief of the Luftwaffe issued orders (1) "Kernbewegung K-Tag: 26.8.39-Fall A (Main Movement K-Day: 26 Aug 39-Operation A); and (2) "Z-Befehl: Z gleich 26.8.39-Fall A" (Order Z: Z equals 26 Aug 39-Operation A).

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These orders meant that the reconnaissance squadrons earmarked for the first phase of defensive deployment in the west (Grenzsicherung West 1. Stufe) and the other air, antiaircraft artillery, and air signal units allocated for defense in the west were to commence moving into their assigned positions;

1720: The Commander in Chief of the Luftwaffe issued code order: "Assignments to Commander in Chief of the Army pursuant to 1939 Operational Study, Volume III will be requested by Luftwaffe General with Commander in Chief of the Army."

The First, second, Third, and Fourth Air Fleets thereupon transferred to the Army the staffs and units of all arms and services prescribed by the Mobilization Plan for allocation in the east and west;

The Luftwaffe General nominated for the purposes proceeded to headquarters of the Commander in Chief of the Army;

The tactical air support command staffs joined the army groups and armies to which they were attached;

The strategic and tactical reconnaissance and courier squadrons proceeded to the armies, corps, divisions, etc., to which they were attached;

Of the existing antiaircraft artillery battalions 29 joined the ground forces in the east and 14 those in the west;

Of the existing motorized air signal battalions 5 joined the eastern concentration and 4 the ground forces deployed in the west.

1830. The Commander in Chief of the Luftwaffe issued code word "Ostmarkflug," authorizing Luftwaffe units to cross the Polish frontier and attack at 0430 on 26 August 1939. War against Poland thus was immediately imminent.

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1940: The oral order from Hitler was transmitted:
"Hostilities will not be opened on 26 August. Con-
centration will continue." This cancelled code word
"Ostmarkflug", the war was postponed.

25-26 August: Blackout ordered.

26 August:

OOOO: Orders issued prohibiting aviation school
and training flight activities;

Commander in Chief of the Army briefs Commander
in Chief of the Luftwaffe on the Polish concen-
tration of forces and on the interpretation of
Polish plans;

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Order arrived from Commander in Chief of the Luftwaffe: "Each fighter group will maintain one squadron under constant alert. All other squadrons will be maintained ready to take off within one hour after receipt of orders."

1745: All civil aviation over German territories prohibited by order of the Commander in Chief of the Luftwaffe;

27 August: The Commander in Chief of the Luftwaffe ordered that aircraft crossing the borders with obviously hostile intentions were first to be warned by warning shots. Armed action was to be taken only if the warning shots were disregarded.

1400: Wehrmacht High Command informed the Commander in Chief of the Luftwaffe that the Reich Party Rally* would not be held.

28 August: Commander in Chief of the Luftwaffe ordered transfer of an airborne battalion to Zipser-Neudorf airfield to protect the airfield against mutinying Slovak troops.⁵⁰

29 August: Situation unchanged. Operational air reconnaissance by GHQ squadrons continued.

30 August: The Polish frontier concentration was considered practically completed.

31 August: Protest by the Polish Government against German troops entering Slovakia;
Poland publicly proclaimed General Mobilization;
Moscow: Inquiries by German military attaché produced no denial by Soviet Army that Soviet air

⁵⁰. No details are known concerning this isolated incident.

* The annual rally of the National Socialist Party at Nuremberg, which was to be cancelled in the event of war

forces had been transferred to the Polish-Russian frontier;

1255: The Commander in Chief of the Luftwaffe ordered one-third of all anti-aircraft artillery forces ready for immediate action;

1835: The commander in Chief of the Luftwaffe again issued codeword "Ostmarkflug" for 0445, 1 September. From that moment on the border again was open for a surprise air attack;

The Commander in Chief of the Luftwaffe ordered the 7th Air Division to alert airborne troops for 1 September and to commence transferring its air transportation groups to their assembly area around Liegnitz at 1200 on 1 September;

The Commander in Chief of the Luftwaffe ordered transfer of 27th Bomber Wing from Second to First Air Fleet on 1 September;

The light beacons marking air routes were extinguished;

The Commander in Chief of the Luftwaffe issued his Order of the Day to the Luftwaffe;⁵¹

Hitler issued his Directive # 1 for the Conduct of Operations.⁵²

The die was cast and the Luftwaffe entered its trial by fire.

III. CRITIQUE OF THE GERMAN AIR CONCENTRATION.

The entire period of concentration movements can be divided into three phases:

51. Appendix 22.

52. Appendix 23.

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First Phase, 21-23 August. The preparatory measures of this phase reveal no short term aggressive intentions. In every respect all measures taken could be considered as precautionary measures with a tendency toward defense. It was only at the conference with Hitler at the Obersalzberg on 23 August that the Luftwaffe command suddenly obtained a clear realization of the political and military intentions of the German Government for the near future. However, this applies only to those personally present at the conference. The commanding generals and chiefs of staff of the air fleets, the intermediate commands, and the troops remained completely ignorant.

Second Phase, 24-25 August. These are the two days of concentrated drama. In these brief two days code word followed code word of the 1939 Operational Study in rapid sequence. The Luftwaffe High Command actually issued all orders necessary for a complete concentration, and that concentration actually was completed by 25 August. The time allowed for the individual measures ordered was brief, and the various movements were not carried out in any time sequence but, in contrast, most of them took place simultaneously. Nevertheless, no serious friction or difficulties resulted.

The entire concentration was carried out according to plan within an exceedingly short time. The organizing ability of the Luftwaffe command proved satisfactory in all respects. The order by the Commander in Chief of the Luftwaffe at 1655 on 25 August calling for mobilization of the entire Luftwaffe merely confirmed an already existing circumstance and had only formal significance.

The peak of the drama was reached on 25 August, in the evening. For reasons unknown to the Luftwaffe command the code word ordering the opening of hostilities against Poland early on the following day was cancelled and postponed within an hour after issue. In this unexpected contingency the command and communications set-up of the Luftwaffe High Command again proved fully equal to the occasion: order and countermanding order reached the last troop unit in time.

Third Phase, 28-31 August. For the command and troops these four days were a period of waiting. Full advantage was taken of this time for a thorough check of all preparations and general operability. The check showed that no more basic orders were required from the Commander in Chief of the Luftwaffe; the few directives nevertheless issued were confined to details concerning air defense,

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air traffic control, and similar matters. This was indirect evidence that the measures ordered by the Commander in Chief of the Luftwaffe on 24 and 25 August were adequate and had been carried out properly. In contrast, the orders given on 31 August to the 7th Air Division and to the 27th Bomber Wing were new and must have been decided upon during the waiting period between 28 and 31 August.

On the evening of 31 August 1939 the end result of the mobilization and concentration measures and movements was as follows:

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The command staffs were installed in their previously prepared command posts; the wire and radio, command communications networks were all linked up; and the flying units of the operational air forces were at their tactical airfields ready for action;

All staffs and units of the ground service organization, from the special air administration area commands to the last of the air port operating companies, had arrived at their assigned airfields;

All antiaircraft artillery and fighter forces allocated for the defense had moved into positions or to airfields in the vicinity of the targets they were to protect and were ready for immediate action;

All Luftwaffe forces allocated to the Army, including the tactical air support commands and air, antiaircraft artillery, and air signal units were ready for the advance under the command of the appropriate army groups and armies.

The second issue of the codeword "Ostmarkflug" on 31 August finally set in motion the entire Luftwaffe thus assembled for combat action.

In considering the map of penetration ranges thus compiled, it must be borne in mind that the ranges have been calculated on the basis of the most favorable conditions possible in respect to weather, enemy action, and training. The penetration ranges actually achieved were much smaller.

III. CONSOLIDATED TABLE OF EFFECTIVE STRENGTHS IN AIRCRAFT AND PERSONNEL.

The following table shows the effective strength of flying forces of the Luftwaffe in personnel and aircraft on 2 September 1939, immediately after the opening of the Polish campaign, and on 30 September 1939, after the end of the campaign. The figures offered are taken from the official reports by the Chief of Luftwaffe Supply and Administration dated 2 and 30 September, cover the entire Luftwaffe, and can be considered authentic. The figures also include aircraft held in reserve and have been coordinated with the available personnel, namely the aircraft crews.

The figures given make it possible to draw comparisons in regard to the differences between authorized and actual strengths on the two days for which they are valid, immediately after the opening and immediately after the end of the campaign.

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The reports by the Chief of Luftwaffe Supply and Administration reflect the picture which the Luftwaffe High Command at the time had of the status of effective strengths in materiel and personnel.

In evaluating this statistical data the following facts must be taken into consideration: The compilation begins on 2 September and thus is already affected by the initial losses incurred. The difference between the figures for 2 September and those for 30 September take into account not only losses but also increments through resupply, so that they offer no basis for the calculation of the direct losses incurred in the Polish campaign. One noticeable point is the marked increase in fighters and the simultaneous decrease in twin-engine fighter strengths already during the first month of warfare.

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TABLE OF EFFECTIVE STRENGTHS OF THE FLYING
FORCES OF THE LUFTWAFFE

Date: 2 September 1939, beginning of the war;

30 September 1939, at the end of the Polish campaign.

The figures for 30 September 1939 are given in parentheses.

Type of Forces	Aircraft			Personnel Strength (in crews)		
	Author- ized	Actual	Effec- tive	Author- ized	Actual	Effec- tive
Bomber	1239 (1188)	1180 (1213)	1008 (1014)	1239 (1188)	1128 (1166)	1080 (1037)
Dive-Bomber	381 (381)	366 (347)	318 (230)	381 (381)	345 (335)	319 (322)
Fighter	811 (1174)	771 (1125)	676 (870)	811 (1005)	672 (968)	638 (898)
Twin-Engine Fighter	438 (168)	408 (194)	377 (141)	438 (168)	384 (182)	373 (168)