The duration of the training period for fighter pilots (including mastery of night and instrument flight techniques) was eighteen to twenty-four months under the new system. This comprised a total of 150 flight hours, forty of which were spent in aircraft types in use at the front.

Taking the circumstances into consideration, it must be admitted that the number of "graduate" single-engine and twin-engine fighter pilots released from 1940 through 1944 was highly satisfactory, viz:

10,527 single-engine fighter pilots,

1,811 twin-engine fighter pilots,

2,237 night fighter pilots, and

1,056 close-support pilots[91].

Despite these comparatively high figures, there continued to be vacancies in the front-line units, primarily the result of the losses suffered during the course of the war. This situation became particularly critical in 1944, when the training program proved conclusively incapable of keeping pace with the aircraft output of industry[92].

The Fighter Instructor Problem

The shortage of qualified instructors was a serious problem in all the various Luftwaffe branches; we have only to recall the difficulties with the night and instrument flight instructors!

The problem in the fighter training program was no less acute, especially in view of the fact that every fighter recalled from the front to school duty meant the loss of a qualified fighter pilot.

Neither a planned sponsorship program nor a "front-line/home-front" exchange system proved capable of solving the problem. In this connection, the rather understandable organizational "egotism" which existed on the part of certain

91 - See the report by the Luftwaffe High Command, Personnel Group B, dated 22 July 1944, Appendix 40.

92 - See Appendix 41, which provides an over-all summary of all the various Luftwaffe branches.

limited - but professionally excellent - unit leaders could hardly be considered insubordination. It was far more akin to "self-defense".

After all they, too, could do little with the raw recruits sent to them as replacements!

The inevitable result was a continual shortage of experienced fighter instructors, and this - in turn - meant a continuing lack of well-trained replacement pilots.

In view of the situation, the General of Pilot Training decided on a completely new course of action designed to recruit qualified personnel to fill the vacant instructor posts as rapidly as possible. To begin with, the position was created of assistant fighter instructor / together with the Fighter Instructor Testing Squadron (Jagdlehrer-Ueberpruefungs-Staffel). These assistant instructors were recruited from the ranks of the top graduates of the fighter training courses. Prior to assignment as instructor, the "assistant instructor" was assigned to the Fighter Instructor Testing Squadron, where experienced fighter instructor personnel prepared him for his new duties. After successful completion of this additional training, the "assistants" were assigned to the Preliminary Training Squadron (Vorschulstaffel) as instructors. Obviously these instructors were incapable of imparting to their students the highly desirable familiarity with conditions at the front, which, of course, could be based only on personal experience.

The Training of Night Fighter Pilots

Apart from a tentative beginning in the spring of 1918, no serious attempt was made to train and employ a force of night fighter pilots until World War II. Direct impetus was provided at the start of the war in 1939.

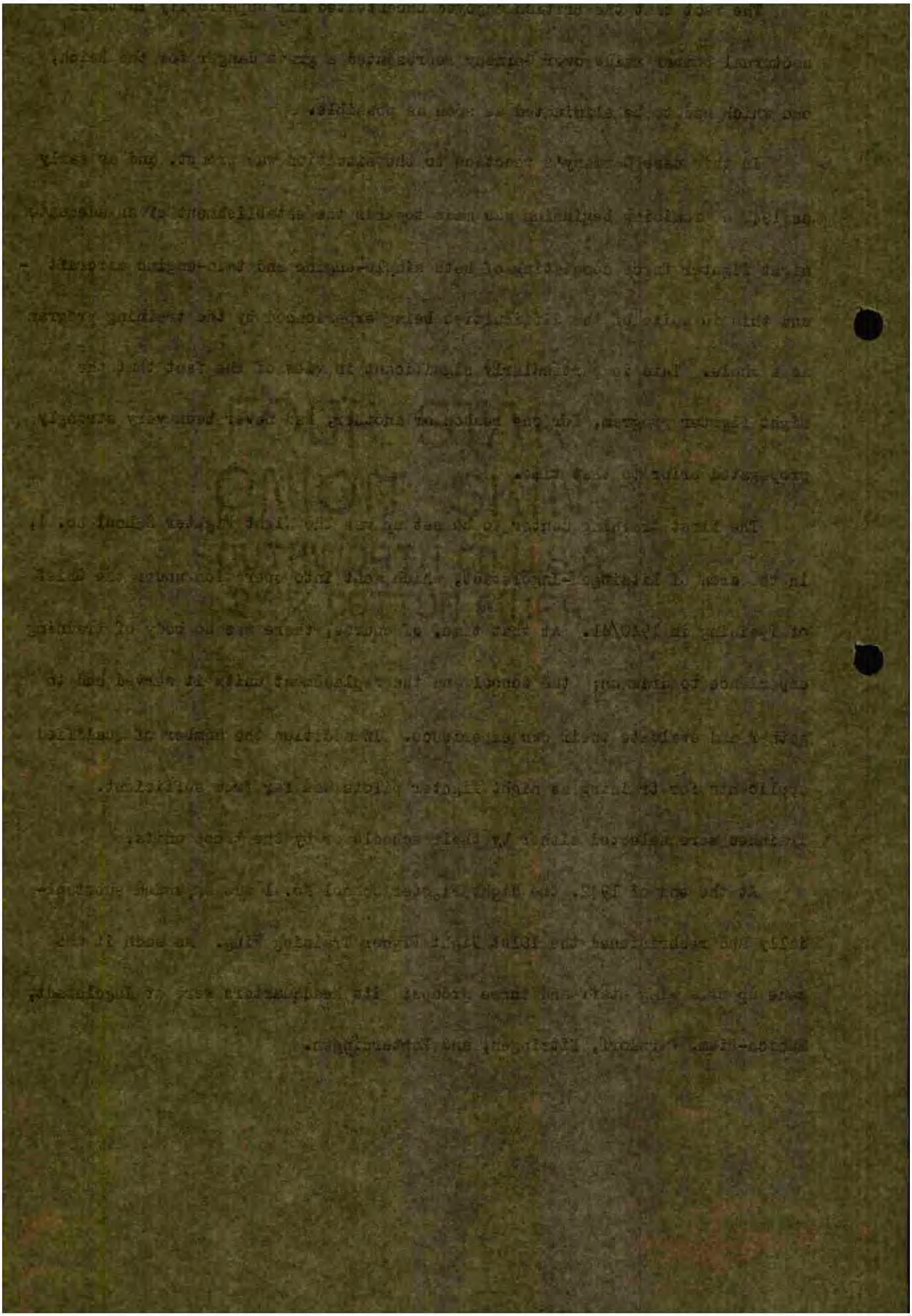
by the catastrophic consequences of the lack of such a force to protect Germany's industrial and railway centers and her capital, Berlin. These targets remained undefended (except by antiaircraft artillery) until 1940.

The fact that the British enjoyed uncontested air superiority in their nocturnal bomber raids over Germany represented a grave danger for the Reich, one which had to be eliminated as soon as possible.

In this case Germany's reaction to the situation was prompt, and as early as 1940 a promising beginning was made towards the establishment of an adequate night fighter force consisting of both single-engine and twin-engine aircraft - and this in spite of the difficulties being experienced by the training program as a whole. This is particularly significant in view of the fact that the night fighter program, for one reason or another, had never been very strongly propagated prior to that time.

The first training center to be set up was the Night Fighter School No. 1, in the area of Kitzingen-Ingolstadt, which went into operation under the Chief of Training in 1940/41. At that time, of course, there was no body of training experience to draw on; the school and the replacement units it served had to gather and evaluate their own experience. In addition the number of qualified applicants for training as night fighter pilots was far from sufficient. Trainees were selected either by their schools or by the troop units.

At the end of 1942, the Night Fighter School No. 1 was expanded substantially and rechristened the 101st Night Fighter Training Wing. As such it was made up of a wing staff and three groups; its headquarters were at Ingolstadt, Munich-Riem, Parndorf, Kitzingen, and Echterdingen.



The 110th Fighter Training Wing, stationed at Altenburg, specialized in instrument flight training for fighter pilots (single-engine aircraft). It did a great deal to speed up the training of night fighter pilots and made possible the activation of the "wild boar" ("wilde Sau") units (camouflage designation for the fighter units employed in night fighter operations on moonlit nights.)

Duration of Training

aa) night fighter techniques as applicable to the Ju-88: 5 months with the 101st Fighter Training Wing

bb) night fighter techniques as applicable to the Me-110: 5 months with the 101st Fighter Training Wing

cc) night fighter techniques as applicable to the Do-217: 5 months with the 101st Fighter Training Wing

dd) night fighter techniques as applicable to the FW-190 and the Bf-109: 4 months with the 6th Single-Engine Fighter Wing at Lachen/Speyerdorf

c. Aerial Reconnaissance Pilot Training (Close-Range, Long-Range, and Naval Reconnaissance)[93].

The reconnaissance pilots carried out their missions individually, avoiding aerial combat whenever possible. They served the Army, Navy, and Luftwaffe in the strategic, tactical, and operational

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93 - The data presented in this subsection are based on the following:

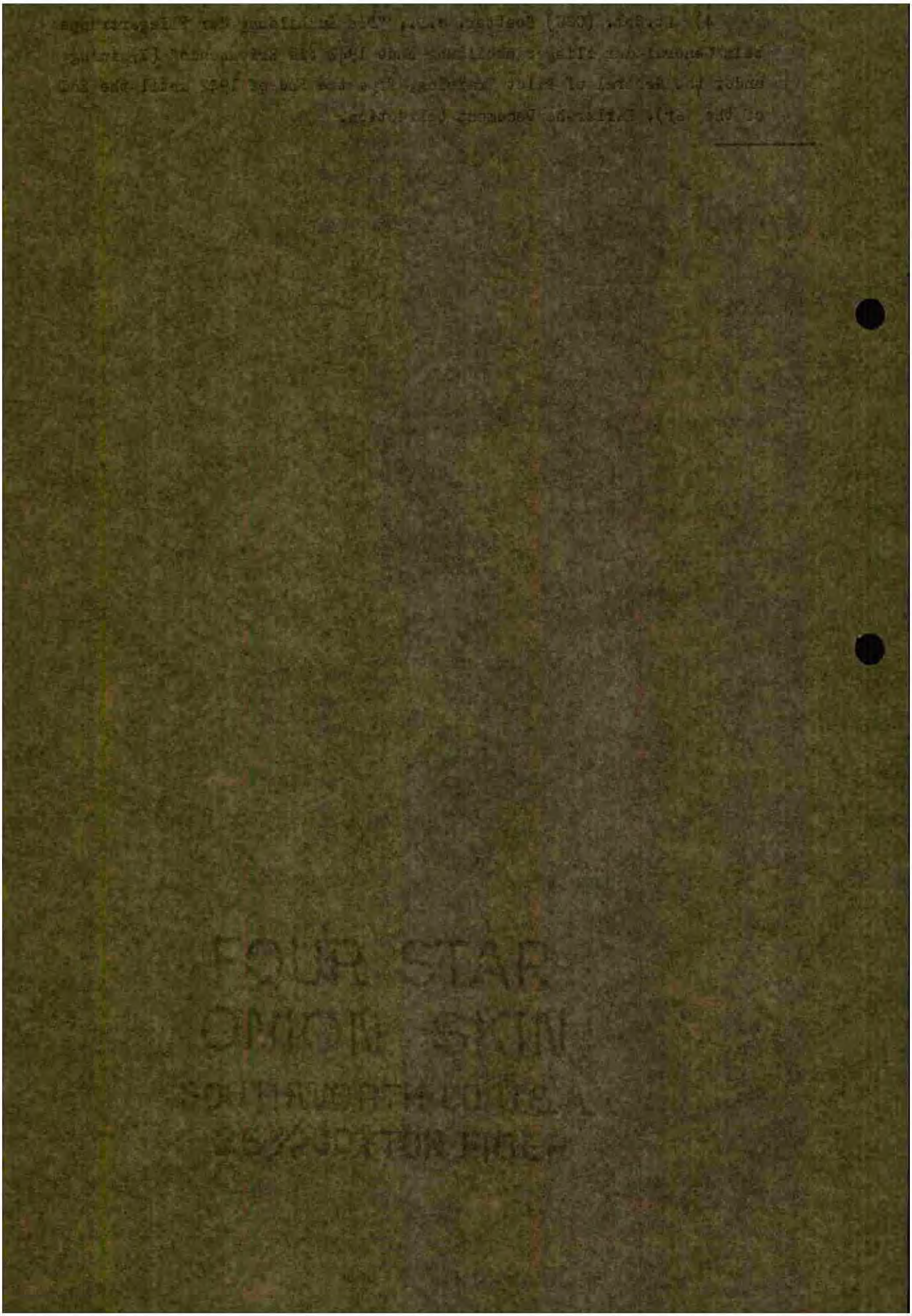
1) Colonel Roman Schneider a.D., "Die Ausbildung der Aufklaerungsflieger" (The Training of Reconnaissance Pilots), Karlsruhe Document Collection.

2) Excerpts from the study by General Drum a.D., viz: (pp 15 and 16) "Auswahl und Ausbildung der Beobachter fuer die Heeresaufklaerungsfliegerstaffeln" (Selection and Training of Observer Personnel for the Army Aerial Reconnaissance Squadrons); (pp 49-52) "Ausbildung des Personals fuer die Aufklaerungsfliegerverbaende, die fuer das Heer vorgesehen waren". (Training of Personnel for the Aerial Reconnaissance Units Destined for Assignment to the Army), Karlsruhe Document Collection.

93 - (Cont'd)

3) Directive from the General of Pilot Training, File No. 110/44, Classified, No. 1/44, Operations Branch, "Betrifft: Ausbildung im Jahre 1943" (Concerning Training during 1943), Karlsruhe Document Collection.

4) Lt.Col. (GSC) Poetter, a.D., "Die Ausbildung der Fliegertruppe beim General der Fliegerausbildung Ende 1942 bis Kriegsende" (Training under the General of Pilot Training, from the End of 1942 until the End of the War), Karlsruhe Document Collection.



planning by providing information on enemy movements on land and at sea as far away as their range would permit. The fact that they ocassionally undertook additional missions in the form of bombardment or machine-gun raids against particularly rewarding ground targets had no effect on the basic principles of their employment. In accordance with these principles, reconnaissance pilot trainees were given training in individual aerial combat at the Reconnaissance Observer Schools (Aufklaerungsbeobachterschulen) F and H in Braunschweig and Hildesheim.

In the execution of exceedingly important missions, in which results had to be achieved at all costs, the usual procedure was to utilize larger groups of reconnaissance aircraft (groups of three, five, or even of squadron strength), protected by fighter escort.

Individual training progressed to combat crew training at an even earlier stage than was the case with the bomber crews. Apart from the early routine practice flights undertaken to acquaint the trainees with aerial photography, radio communication, etc., all practice flights with one and two-seater close-range reconnaissance aircraft were actually combat crew training. The same thing was true of the long-range reconnaissance practice flights, carried out with a crew of three to four men (including an airborne radio mechanic or an aerial gunner).

The Goal of Training

The primary goal was to provide specialized training capable of fitting the crews to carry out rapid and accurate aerial reconnaissance missions for the Army, Luftwaffe, and Navy under all conditions.

It was, of course, extremely important that reconnaissance results be reported by the observer and the

squadron captain, substantiated by effective aerial photographs, in such a way that the Wehrmacht agency utilizing them was capable of understanding them fully. For this reason, the techniques involved in the preparation and transmittal of reports were accorded a great deal of importance during the training period, and the attainment of proficiency was viewed as a highly important objective. The training goals espoused by the individual crew training programs were dependent upon the needs of the individual weapons branches as they affected the missions of the aerial reconnaissance pilots.

The Various Types of Units.

Apart from a few minor variations, the aerial reconnaissance units serving the three Wehrmacht branches remained essentially the same in peacetime and in wartime.

aa) Army units

Every Army corps had one close-range aerial reconnaissance squadron at its disposal for tactical reconnaissance missions within its area of operation. Every army had a long-range aerial reconnaissance squadron to handle strategic aerial reconnaissance.

Each Army group was assigned a long-range aerial reconnaissance squadron for strategic air reconnaissance missions, and the Army High Command also had one long-range squadron at its disposal for strategic reconnaissance tasks.

bb) Luftwaffe units

Each air corps had one long-range aerial reconnaissance squadron at its disposal for tactical reconnaissance missions within its area of operation.

Each air fleet was assigned one long-range squadron for routine operational reconnaissance

missions and for weather reconnaissance. The Luftwaffe High Command had one long-range squadron at its disposal for special reconnaissance missions, as well as a number of specialized weather reconnaissance squadrons.

cc) Navy units

Each fleet unit had at its disposal a ship-based reconnaissance unit, distributed among the various smaller units.

The coastal defense agencies (North and Baltic Seas) also had coastal aerial reconnaissance units under their command.

The Air Commander (Sea) (Fuehrer der Luftstreitkraefte (See)) also had a number of long-range aerial reconnaissance units at his disposal.

The potential missions of these various types of reconnaissance units determined the kind, scope, and form of instruction given during the individual and crew training periods.

The Commander in Chief, Luftwaffe, through his representative, the General Staff, was ultimately responsible for seeing that the training of the aerial reconnaissance pilots was developed and supervised in accordance with the needs of the three Wehrmacht branches. The General Staff, in turn, delegated this responsibility to the Inspector General of the Luftwaffe with his subordinate Inspectorate for the Aerial Reconnaissance Forces and for Aerial Photography (Inspektion der Aufklaerungsflieger und des Luftbildwesens)[94].

The Subject Matter Covered

In contrast to the bomber crews, in which leadership, during peacetime and even more so in wartime, was more and more

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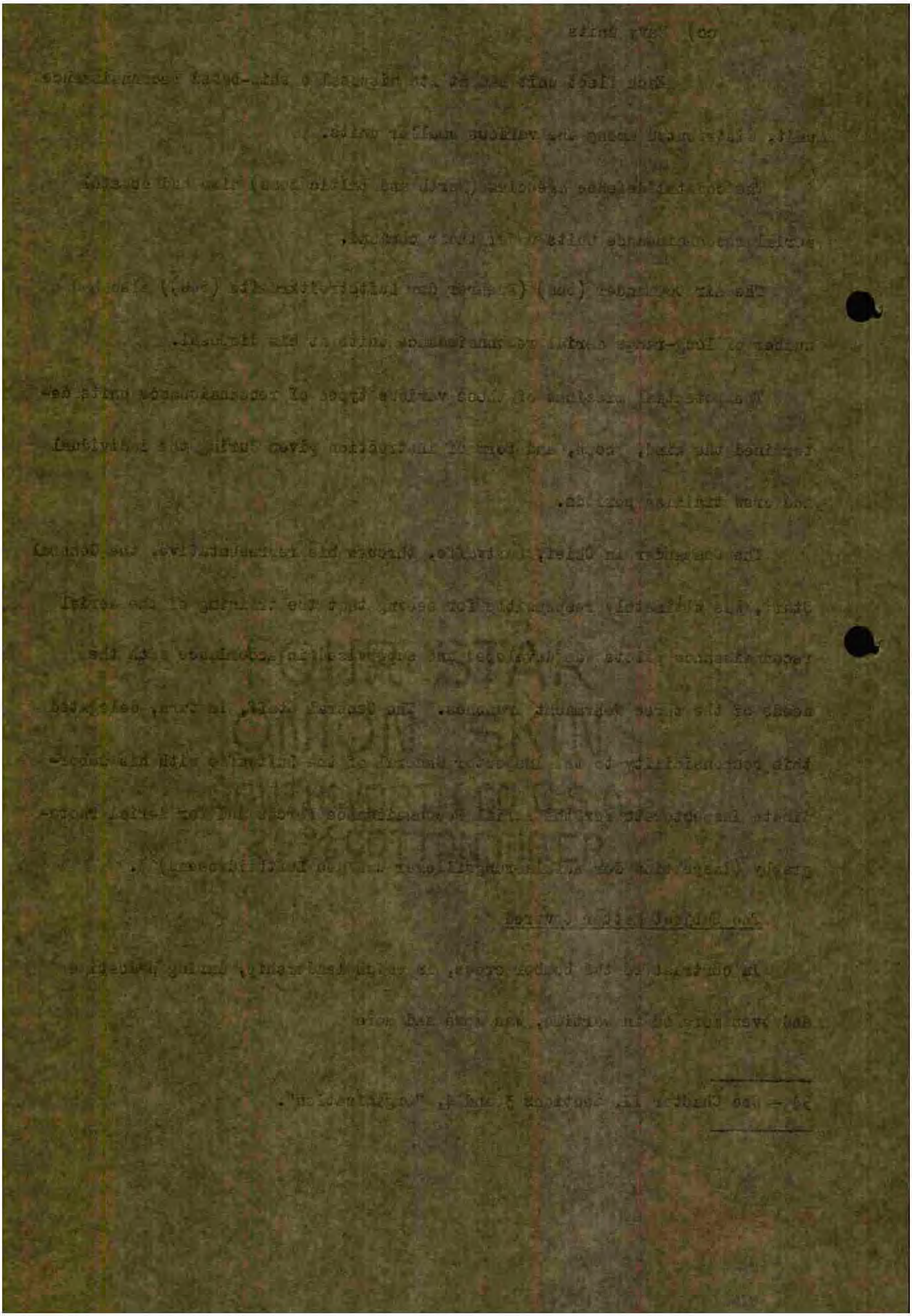
94 - See Chapter II, Sections 3 and 4, "Organization".



the prerogative of the pilot himself (as a result of technological developments - the operation of the Ju-88 dive-bomber by pilots of officer rank, for example), the situation was quite different with the reconnaissance fliers, particularly with the close-range reconnaissance forces. Without wishing to detract in any way from the importance of the pilot, we must admit that the observer was the guiding spirit of the reconnaissance crew. This situation found tangible expression in the fact that the observer was always a fully-qualified officer with tactical training and a knack for recognizing strategically important factors. As the war progressed, it proved to be progressively less and less feasible to employ the older aircraft models, even in close-range aerial reconnaissance activity, and nearly all reconnaissance units went over to the Bf-109. This, of course, meant an increase in the responsibility borne by the pilot.

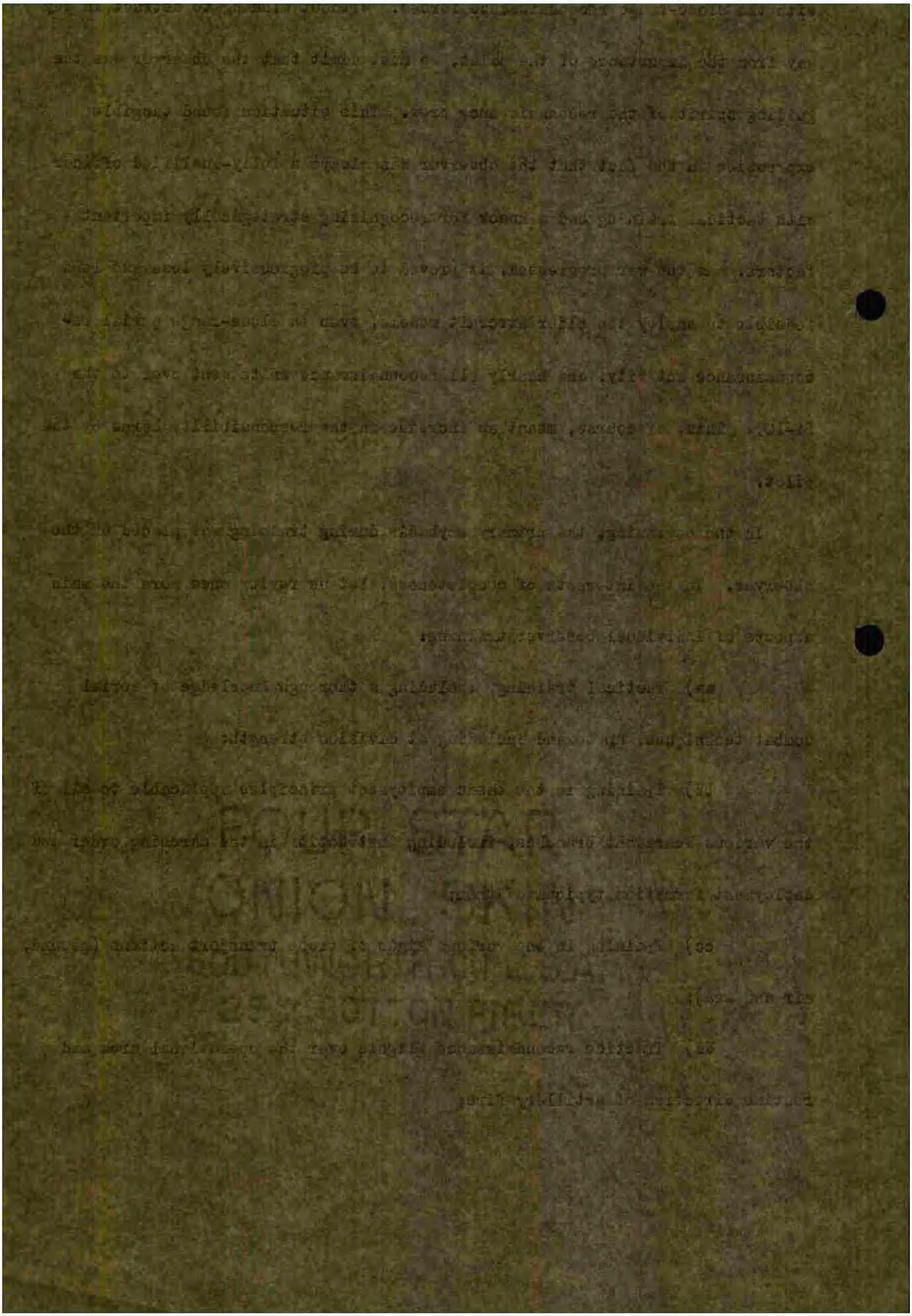
In the beginning, the primary emphasis during training was placed on the observer. In the interests of completeness, let us review once more the main aspects of individual observer training:

aa) Tactical training, including a thorough knowledge of aerial combat techniques, up to and including at division strength;

bb) Training in the basic employment principles applicable to all of the various Wehrmacht branches, including instruction in the marching order and deployment formation typical of them;

cc) Training in the various kinds of troop transport actions (ground, air and sea);

dd) Tractice reconnaissance flights over the operational area and routine direction of artillery fire;



ee) Training in radio mechanics and radio operation;

ff) Ship and aircraft identification practice;

gg) Training in air navigation (radio navigation and navigation by ground landmarks);

hh) Meteorolcgical training;

ii) Training in communications techniques and aerial photography;

jj) Training in the employment of airborne weapons and of bombs; and

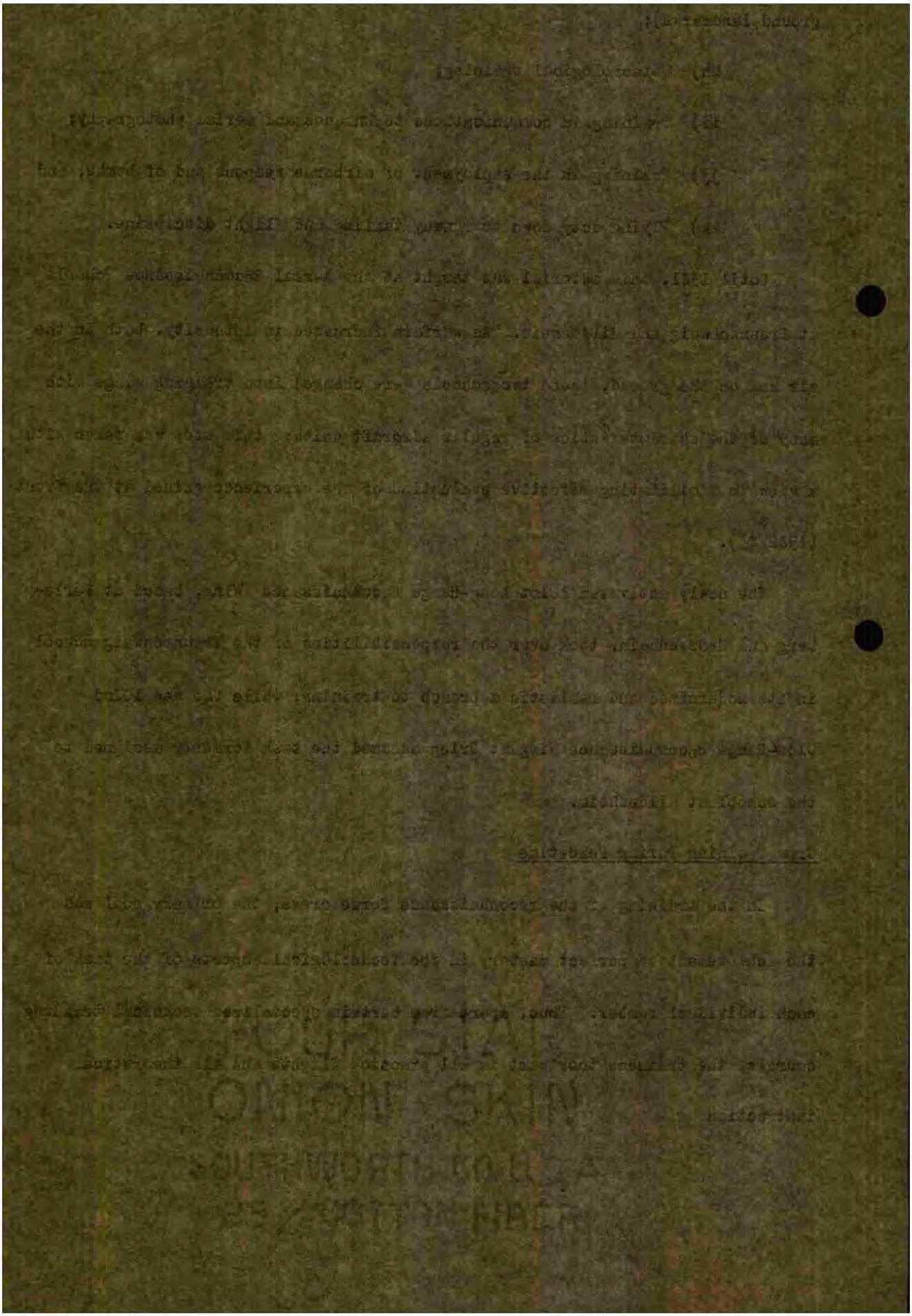
kk) Flying duty down to runway taxiing and flight discipline.

Until 1941, this material was taught at the Aerial Reconnaissance Schools at Braunschweig and Hildesheim. As warfare increased in intensity, both in the air and on the ground, these two schools were changed into training wings with many of the characteristics of regular aircraft units; this step was taken with a view to facilitating effective evaluation of the experience gained at the front (1942/43).

The newly activated 101st Long-Range Reconnaissance Wing, based at Perleberg and Grossenhain, took over the responsibilities of the Braunschweig school in its modernized and realistic approach to training, while the new 102nd Close-Range Reconnaissance Wing at Brieg assumed the task formerly assigned to the school at Hildesheim.

Crew Training During Peacetime

In the training of the reconnaissance force crews, the primary goal was the achievement of perfect mastery in the technological aspects of the task of each individual member. Thus, apart from certain specialized technical training courses, the trainees took part in all practice flights and all theoretical instruction



in full crew strength. Practice flight assignments were issued only to the crews as a whole; they were then responsible, as a complete entity, for preparation, execution, and reporting of results. The missions were designed to fit in with the routine flights and employment techniques necessary at the front. The assignments were given by the squadron captains, who explained them in briefing sessions; the necessary preparations were undertaken jointly by the crews and discussed and evaluated in sessions with the appropriate instructional personnel.

In addition to the major subjects comprising "tactics and the evaluation of operational maneuvers", emphasis was placed upon the following theoretical and practical courses:

aa) advanced instruction in radio navigation, with special attention to compound navigation;

bb) meteorology, weather forecasting, and the preparation of celestial navigation reports;

cc) practical instruction in tactical radio communication, including the enciphering and decoding of messages;

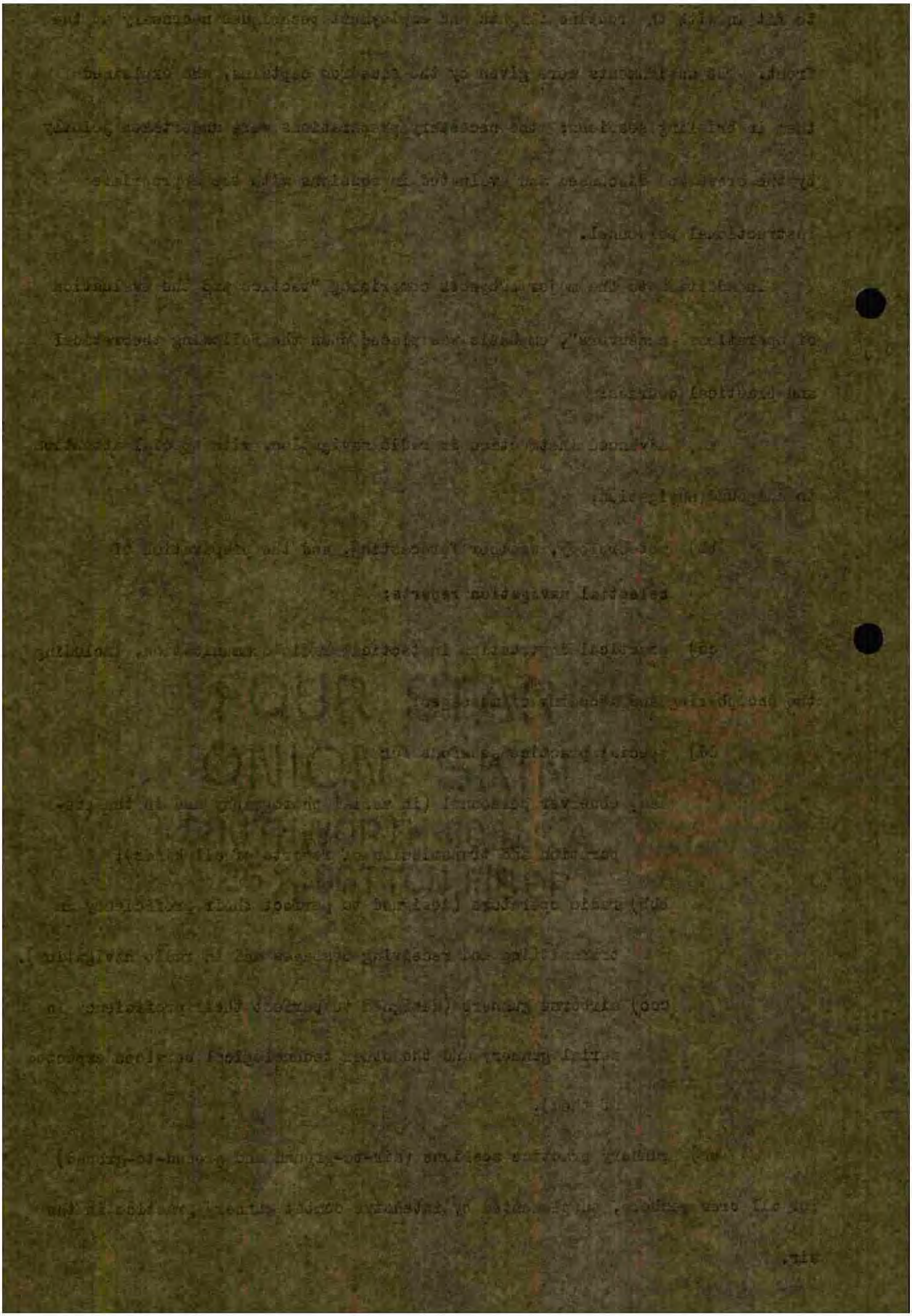
dd) special practice sessions for

aaa) observer personnel (in aerial photography and in the preparation and transmission of reports of all kinds);

bbb) radio operators (designed to perfect their proficiency in transmitting and receiving messages and in radio navigation).

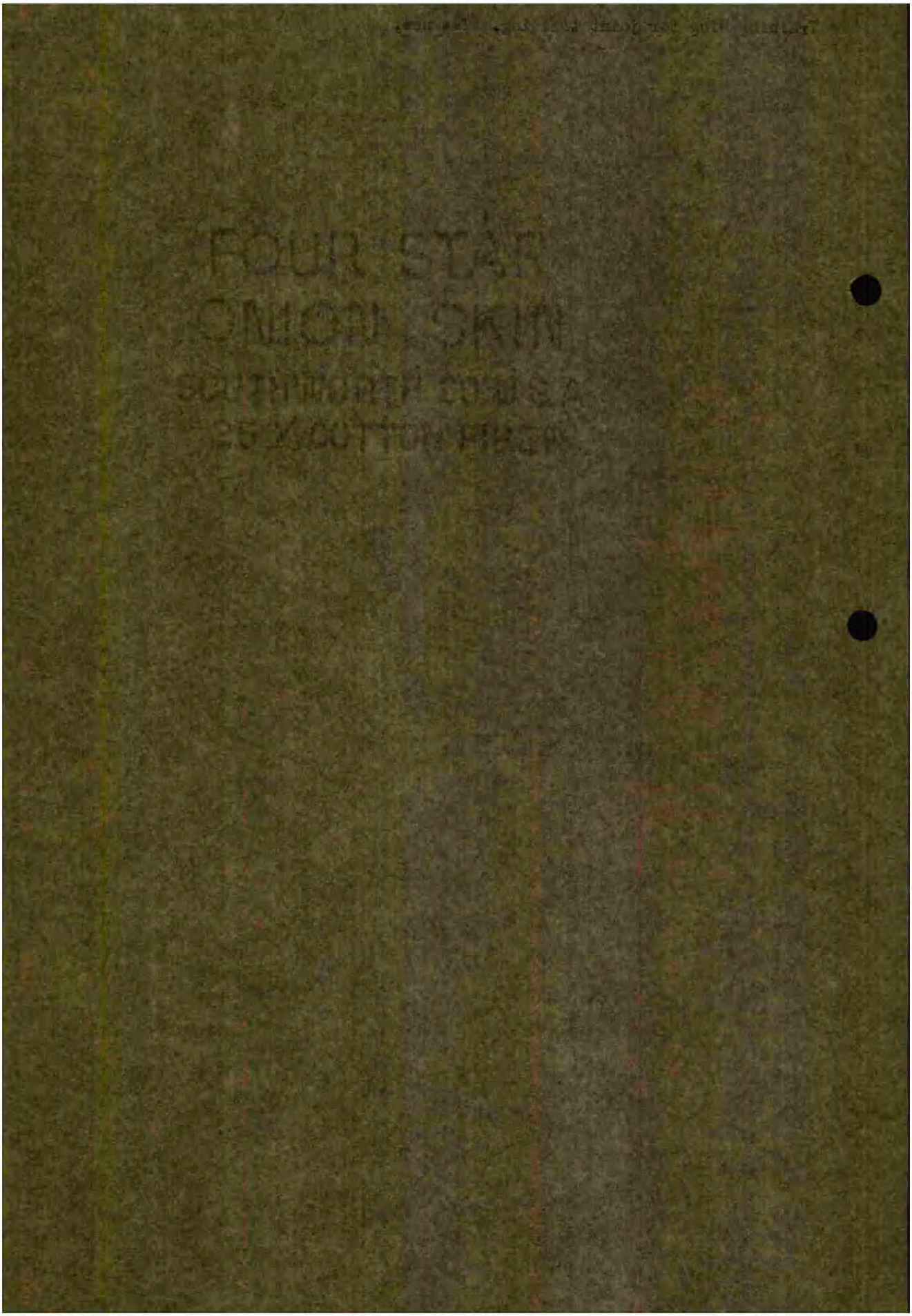
ccc) airborne gunners (designed to perfect their proficiency in aerial gunnery and the other technological services expected of them).

ee) gunnery practice sessions (air-to-ground and ground-to-ground) for all crew members, supplemented by intensive combat gunnery practice in the air.



Crew Training after 1942/43

After the funadamental change brought about in the training program by the General of Pilot Training, the crews were assigned to either the 101st or 102nd Training Wing for joint training. The new,



and special, advantages offered by the Wings were their nearness to the front, their combat-seasoned instructional personnel, and their ability to apply immediately the results of the experience gained at the front.

The crews were selected as follows:

The I Group, 101st Training Wing(Long-Range Reconnaissance Forces), in Grossenhain was responsible for the individual training of the long-range reconnaissance observers. This group of trainees was augmented by personnel coming from other schools for joint technological training and for over-all training in aerial reconnaissance - pilots from the B-schools, aerial gunners from the gunnery schools and airborne radio operators from the radio communications schools. The II Group of the same wing, stationed at Perleberg, was devoted exclusively to advanced crew training, designed to fit the graduates for assignment to the replacement groups.

The 102nd Training Wing (Close-Range Reconnaissance), with its headquarters and I Group in Brieg and its II Group in Jueterbog-Damm, was responsible for training the close-range reconnaissance pilots assigned to the Army. Although they belonged organizationally to the Luftwaffe, these units were operationally subordinate to the Army; consequently, their tactical training was determined to a large degree by the Commander in Chief, Army. This Army supervision was carried out through the Luftwaffe General, Commander in Chief, Army (General der Luftwaffe beim Oberbefehlshaber des Heeres), whose office served as the liaison agency between the Commander in Chief, Luftwaffe, and the Army authorities. The main mission of this office was to transmit to the Commander in Chief, Luftwaffe the Army's requirements as to tactical and technological training and to maintain close liaison between the two Wehrmacht branches.

The same sort of office was set up to take care of liaison between the Navy and the Luftwaffe, the office of the Luftwaffe General, Commander in Chief, Navy (General der Luftwaffe beim Oberbefehlshaber der Marine).

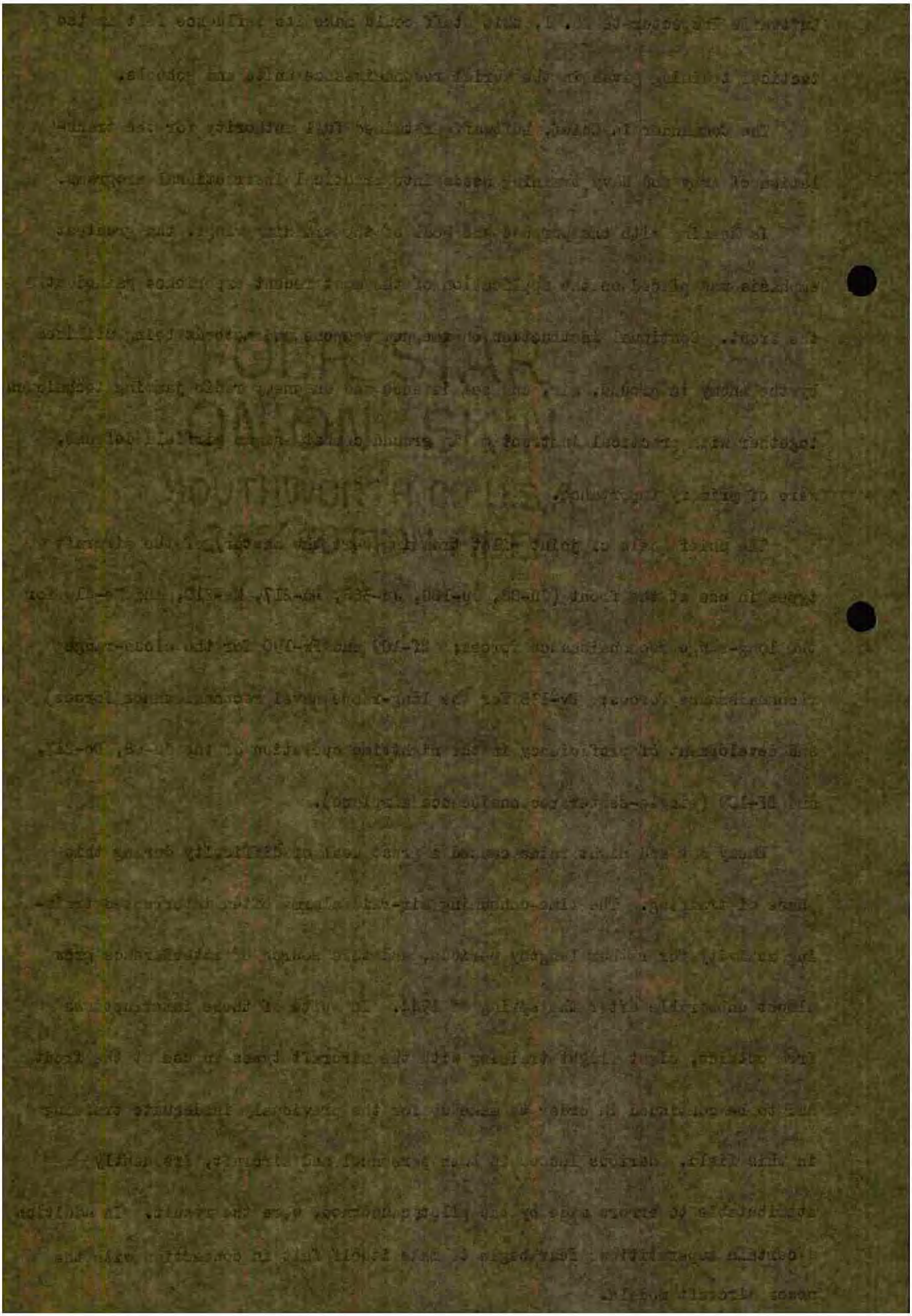
In 1937 the Commander in Chief, Army set up an "Instructional Staff for Army Tactics" (Lehrstab fuer Heerestaktik), which it placed at the disposal of the Commander in Chief, Luftwaffe, whenever necessary. Under the aegis of Luftwaffe Inspectorate No. 1, this staff could make its influence felt in the tactical training given in the aerial reconnaissance units and schools.

The Commander in Chief, Luftwaffe retained full authority for the translation of Army and Navy training needs into practical instructional programs.

In keeping with the purpose and goal of the training wings, the greatest emphasis was placed on the application of the most recent experience gained at the front. Continual instruction on the new weapons and methods being utilized by the enemy in ground, air, and sea defense and on enemy radio jamming techniques, together with practical instruction in ground combat and in airfield defense, were of primary importance.

The chief goals of joint pilot training were the mastery of the aircraft types in use at the front (Ju-88, Ju-188, Ju-388, Do-217, Me-210, and Me-410 for the long-range reconnaissance forces; Bf-109 and Fw-190 for the close-range reconnaissance forces; Bv-138 for the long-range naval reconnaissance forces) and development of proficiency in the nighttime operation of the Ju-88, Do-217, and Bf-109 (single-seater reconnaissance airplane).

Enemy day and night raids caused a great deal of difficulty during this phase of training. The time-consuming air-raid alarms often interrupted training activity for rather lengthy periods, and this source of interference grew almost unbearable after the spring of 1944. In spite of these interruptions from outside, night flight training with the aircraft types in use at the front had to be continued in order to make up for the previously inadequate training in this field. Serious losses in both personnel and aircraft, frequently attributable to errors made by the pilots concerned, were the result. In addition a certain superstitious fear began to make itself felt in connection with the newer aircraft models.



Seen from the vantage-point of the present, the factors discussed above may seem to be the product of timorous thinking or even inconsequential. The role of the gasoline shortage in decreasing the effectiveness of the training program, however, was extremely tangible!

In spite of all the difficulties it faced, quite apart from the effects of enemy activity, it is significant that the aerial reconnaissance training program produced the following personnel during the period from the beginning of the war until June 1944:

1,867 long-range reconnaissance pilots,

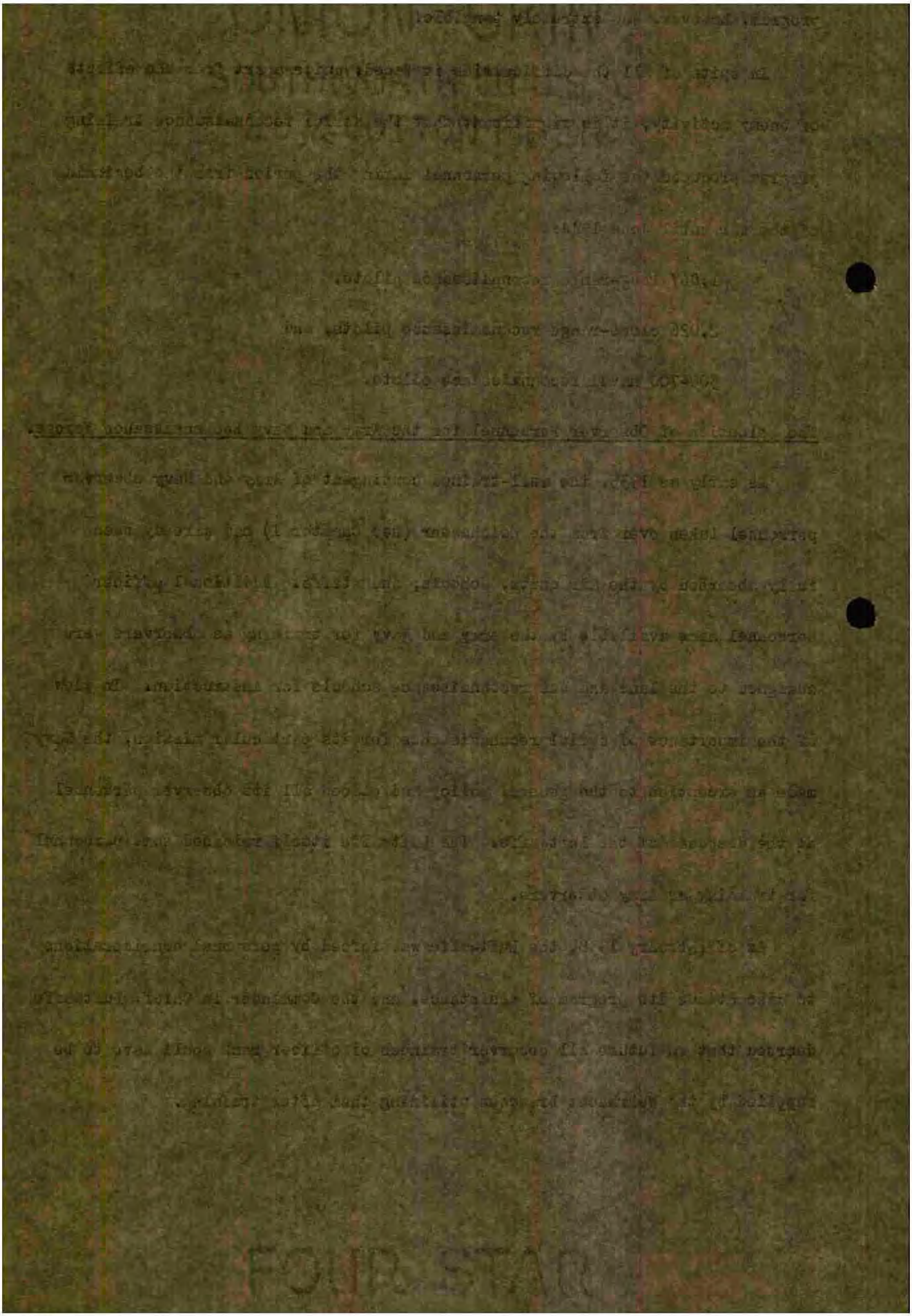
2,026 close-range reconnaissance pilots, and

500-700 naval reconnaissance pilots.

The Selection of Observer Personnel for the Army and Navy Reconnaissance Forces.

As early as 1935, the well-trained contingent of Army and Navy observer personnel taken over from the Reichswehr (see Chapter I) had already been fully absorbed by the air units, schools, and staffs. Additional officer personnel made available by the Army and Navy for training as observers were assigned to the land and sea reconnaissance schools for instruction. In view of the importance of aerial reconnaissance for its particular mission, the Navy made an exception to the general policy and placed all its observer personnel at the disposal of the Luftwaffe. The Luftwaffe itself released some personnel for training as Army observers.

As of February 1938, the Luftwaffe was forced by personnel considerations to discontinue its program of assistance, and the Commander in Chief, Luftwaffe, decreed that in future all observer trainees of officer rank would have to be supplied by the Wehrmacht branches utilizing them after training.



In principle this new restriction was a desirable one, for it meant that the observers - having been recruited from their own service branches - were better qualified for their ultimate missions with those branches. The new plan called for detaching the observer trainees, one-third of whom might be especially well-qualified non-commissioned officers, to the Luftwaffe for a period of three years, during which they would actually serve as members of Luftwaffe crews. Unfortunately, because of the critical personnel shortage, the Army was forced to fall back on young and inexperienced officers, a far cry from 1914, when nearly all the officers detached for observer training were first lieutenants or young captains. In the future, observers will have to be perfectly schooled in ground operations if they are to meet successfully the requirements inherent in the employment of modern aircraft types.

Length and Course of Reconnaissance Observer Training after 1942/43[95]

Long-range reconnaissance observers for the Ju-88 and Ju-188 units (Luftwaffe)

- 2 months' basic military training
- 2-3 months' observer trainee company
- 3 months' training as observer and crew training (elementary)
- 3 months' crew training (middle and advanced) with the 101st Long-Range Reconnaissance Wing
- assignment to a personnel replacement group
- assignment to a front unit

Close-range reconnaissance observers for the Bf-109 units (Army)

- 12 months' pilot training (culminating in the Luftwaffe Pilot's License for single-engine aircraft), including fighter and instrument flight training
- 3 months' observer training with the 102nd Close-Rahge Reconnaissance Wing

95 - See also the study by Lt.Col. Poetter, Karlsruhe Document Collection.

Long-range reconnaissance observers for the BV-138 units (Navy)[96]

- 2 months' basic military training (with the Navy)
- 2-3 months' observer trainee company at the 4th Observer School (Kampfbeobachterschule 4) at Stralsund
- 2 months' training at the Naval Training School (Seefahrtschule) at Lobbe
- 6 months' training at the 4th Observer School at Stralsund
- 4-6 months' assignment to a personnel replacement group
- assignment to a front unit

Reconnaissance observers for the coastal reconnaissance units (Navy)

- as above

96 - The Stralsund school, officially known as the 4th Observer School after 1933/34, was responsible for both individual and crew training of the pilots assigned to the coastal reconnaissance units.
The Naval Air School (Fliegerwaffenschule) in Bug on the island of Ruegen, with its subsidiary courses in Biscarosse and Bordeaux (after 1942), was responsible for the individual and crew training of the long-range reconnaissance forces of the Navy.

d. Twin-Engine Fighter Pilot Training[97]

Brief history and definition of concepts

The "twin-engine fighter" force is of comparatively recent origin; in the German Luftwaffe the concept did not come into being until 1935/36, when it was introduced by the General Staff as a synonym for the "heavy fighter" required by modern developments in the field of air strategy. The first twin-engine fighter groups were set up during 1937 and 1938.

Their history goes back presumably to the time of the Allied bombardments of the German Reich during 1917/18, when the Allies gave their bombers a fighter escort right to their targets - far inside the enemy lines.

The Italian air strategist, General Douhet, was the first military theorist to occupy himself to any great extent with the strategy of a future "bomber war", and he accorded considerable importance to the problems anticipated for the attacker as well as for the defender.

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97 - This subsection is based on data contained in the following:

1) General a.D. von Massow, "Jagdfliegerausbildung in der Ehemaligen Deutschen Luftwaffe 1925-1945" (Fighter Pilot Training in the Former German Luftwaffe, 1925-1945), Karlsruhe Document Collection.

2) Statistical charts prepared by the Quartermaster General, Luftwaffe, from 1 August 1938 through 31 December 1944.

3) Directive issued by the General of Pilot Training, File No. 110/44, Classified, No. 1/44 (Operations), Classified.

4) "Die Ausbildung der Fliegertruppe beim General der Fliegerausbildung, Ende 1942 - Kriegsende" (Pilot Training under the General of Pilot Training, from late 1942 until the End of the War), a study prepared by Lt.Col. a.D. Poetter, December 1953.

All these sources may be found in the Karlsruhe Document Collection.

The strong bomber fleets advocated by Douhet were to be accompanied by single-engine fighters with supplementary fuel tanks and by twin-engine fighters armed with extra-heavy machine-guns. This escort was expected to 1) convey its charges across the front lines and over known fighter defense areas, 2) keep off enemy fighter aircraft over the target area, and 3) pick up the bombers and escort them back to their own fields.

Douhet's was truly a far-sighted conception of aerial strategy.

Although unbacked by any practical experience, Douhet's theory determined the missions of this essentially new air force branch and at the same time the technological requirements which would have to be met by the aircraft type employed. The basic requirements were the following: extensive range of penetration; twin-engine construction, but without jeopardizing maneuverability; adaptability to instrument flight; strong armament; and operation by a crew of at least two.

Goering and his pre-war General Staff chiefs made Douhet's views on bomber strategy as the core of modern aerial strategy their own and created (in 1938) the twin-engine fighter. Their action meant not only an inevitable dissipation of the forces at their disposal but an equally inevitable neglect of the single-engine fighter program[98].

Activation of the Twin-Egnine Fighter Units and their Integration into the Training Organization.

During the period from 1938 to 2 September 1939, three twin-engine fighter wings, or a total of ten twin-engine fighter groups of three squadrons, and two personnel replacement squadrons came into being[99].

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98 - General von Massow, op.cit., pages 13 and 14.

99 - See the data dealing with Luftwaffe mobilization units, Chapter II, Section 2.

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98 - General von Rabenau, op.cit., pages 13 and 14.

99 - See the data dealing with Luftwaffe mobilization units, Chapter II, Section 2.

If one assumes that the wing and group staffs each had three twin-engine fighter and two transport aircraft and that each of the thirty-three squadrons was made up of twelve twin-engine fighter aircraft and two transport aircraft, then the total aircraft involved were:

435 twin-engine fighters

92 transport aircraft[100]

These figures are highly significant when we consider that the pilots had to be recruited, until the end of 1942, from the ranks of those who had achieved the Luftwaffe Pilot's License and, from 1943 on, from among those who had earned the Luftwaffe Advanced Pilot's License, and that the airborne radio operators (who doubled as gunners) had to be taken from the very small contingent of personnel qualified in this field.

As far as training was concerned, the newly-founded twin-engine fighter arm took advantage of the schools already established by the Luftwaffe. The pilots came from the B, C, and instrument flight schools and the radio operators (who had had supplementary training in aerial gunnery) from the Luftwaffe signal communications schools. Beginning in 1941, the Luftwaffe Gunnery School (Schiessschule der Luftwaffe) in Vaerloese, Denmark, took over responsibility for giving the twin-engine fighter pilots and radio operators special gunnery training. As precursors of a twin-engine fighter training wing, the two personnel replacement sqaudrons took on the task of combat training until such a wing could be organized.

Headquarters of the 101st Twin-Engine Fighter Wing, 1942/43

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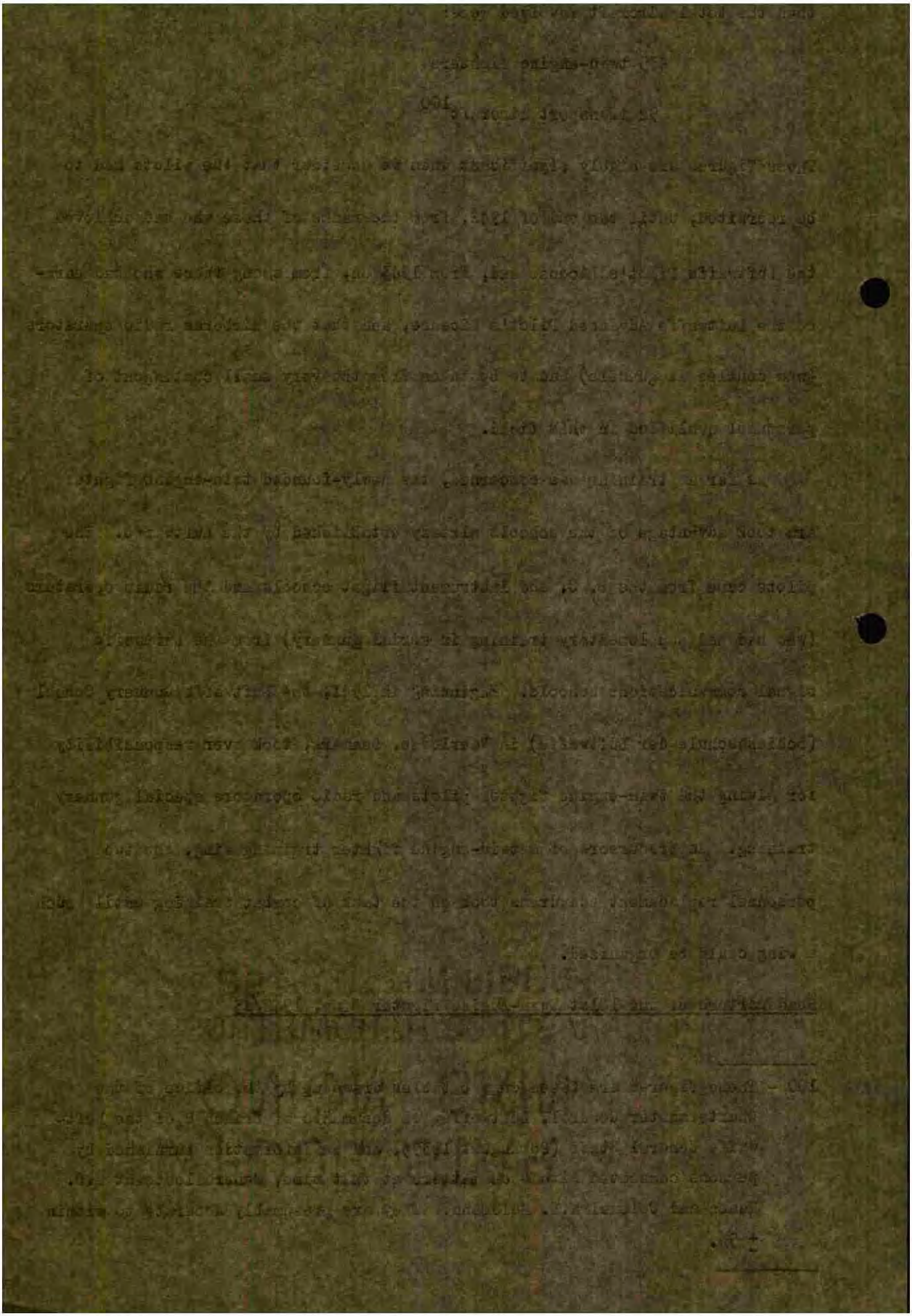
100 - These figures are based on the tables drawn up by the office of the Quartermaster General, Luftwaffe, on documents of Branch 8 of the Luftwaffe General Staff (28 August 1939), and on information furnished by persons connected with such matters at that time, Generalleutnant a.D. Maass and Colonel a.D. Heldmann. They are presumably accurate to within ± 5%.



Wing staff and I Group: Memmingen, II Group: Bad Aibling.

Within the framework of the reorganization program ordered by the General Staff Chief at the end of 1940 and designed to strengthen and expand the fighter training system, twin-engine fighter training was assigned to the newly established Senior Command, Single-Engine and Twin-Engine Fighter Schools. From 1943 on, the 4th Pilot Training Division took over responsiblity for twin-engine fighter training.

Luftwaffe Inspectorate No. 3 (Inspectorate for the Fighter Forces) retained inspection authority for the new forces.

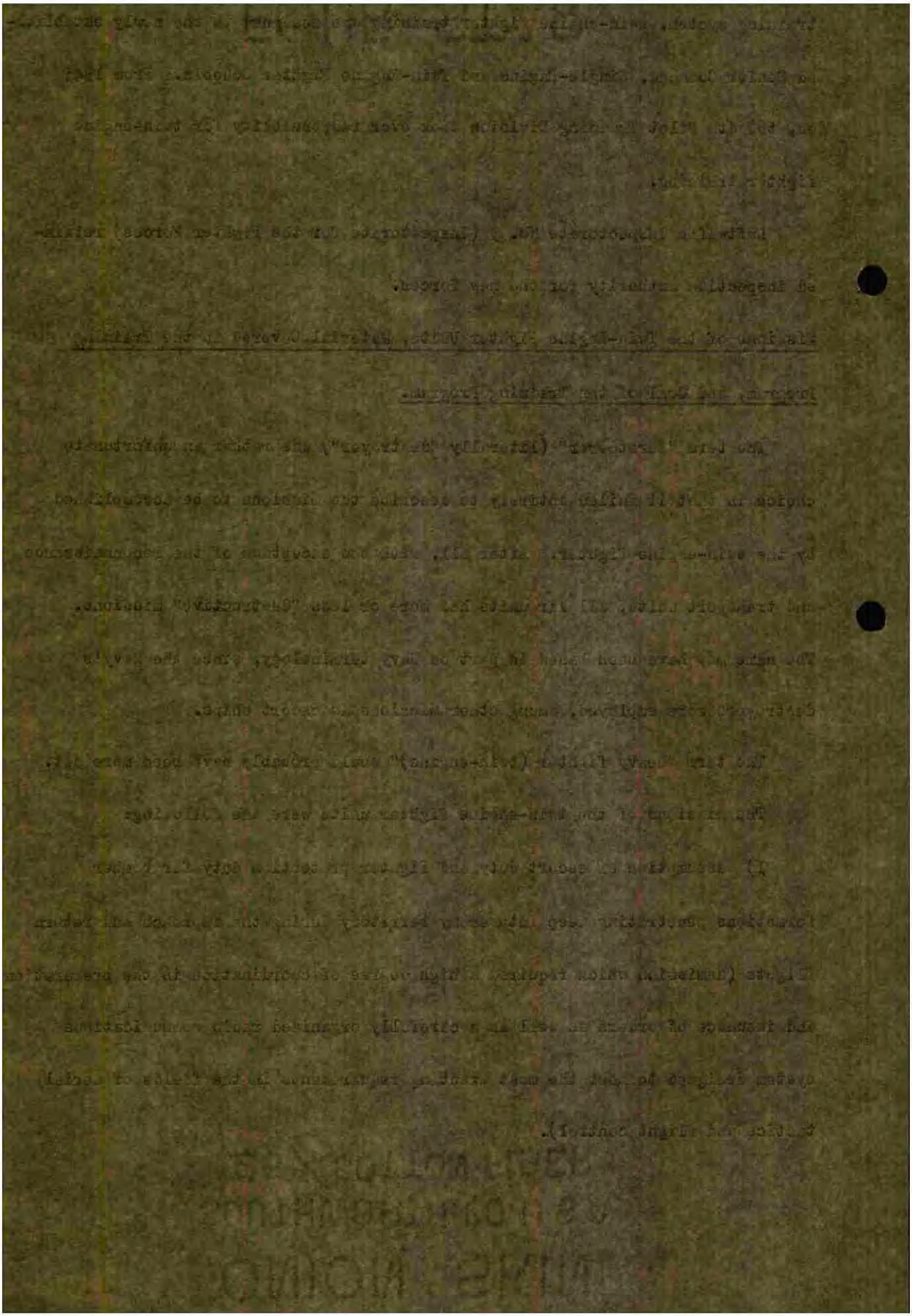
Missions of the Twin-Engine Fighter Units, Material Covered in the Training Program, and Goal of the Training Program.

The term "Zerstoerer" (literally "destroyer") was rather an unfortunate choice in that it failed entirely to describe the missions to be accomplished by the twin-engine fighter. After all, with the exception of the reconnaissance and transport units, all air units had more or less "destructive" missions. The name may have been based in part on Navy terminology, since the Navy's destroyers were employed, among other missions, as escort ships.

The term "heavy fighter (twin-engine)" would probably have been more apt.

The missions of the twin-engine fighter units were the following:

1) assumption of escort duty and fighter protection duty for bomber formations penetrating deep into enemy territory during the approach and return flights (a mission which required a high degree of coordination in the preparation and issuance of orders as well as a carefully organized radio communications system designed to meet the most exacting requirements in the fields of aerial tactics and flight control).



2) coordination with the lighter single-engine day fighter to achieve and maintain air superiority in certain areas, particularly in the target area.

3) carrying out of mass attacks on enemy bomber streams.

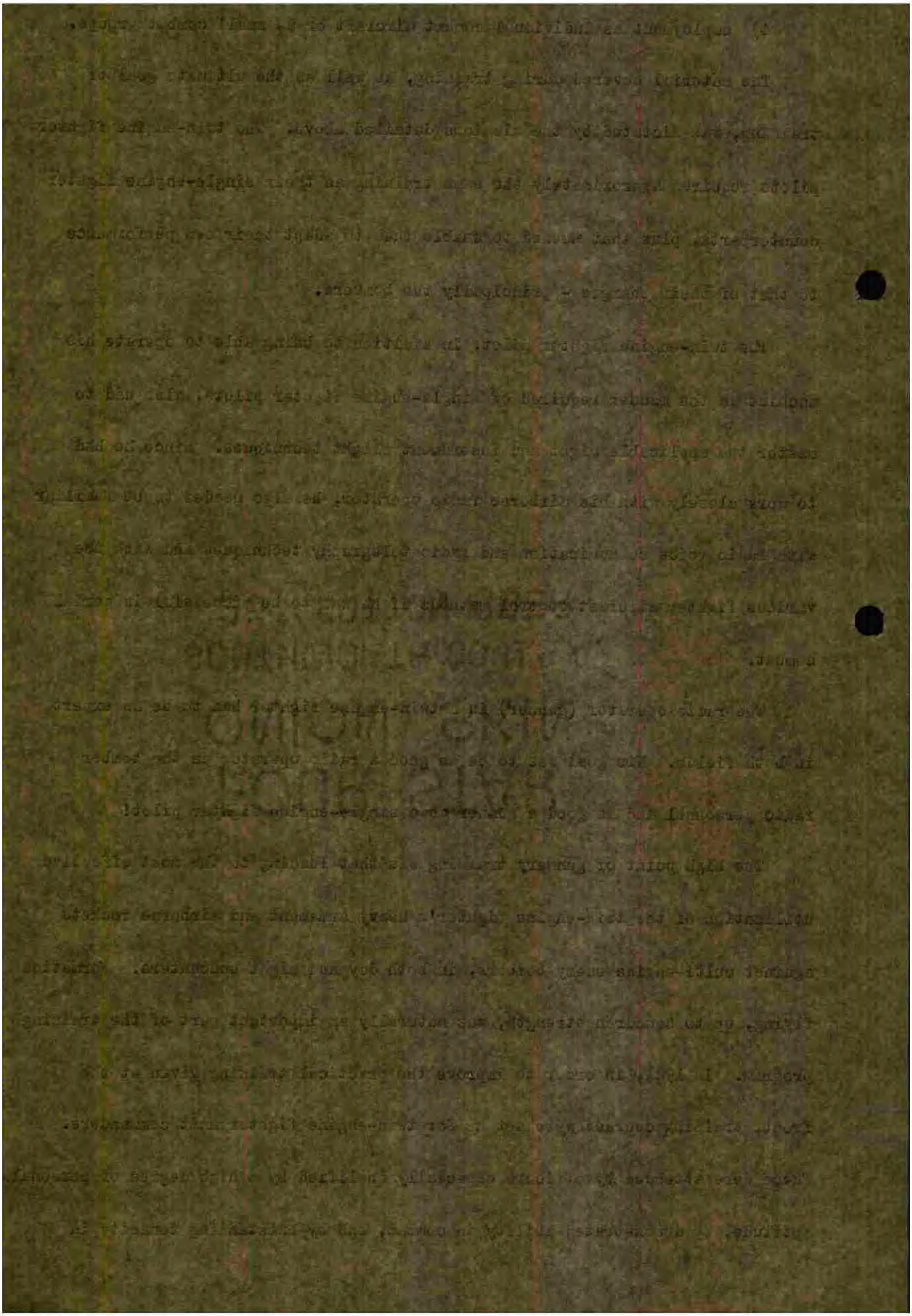
4) employment as individual combat aircraft or as small combat groups.

The material covered during training, as well as the ultimate goal of training, was dictated by the missions detailed above. The twin-engine fighter pilots required approximately the same training as their single-engine fighter counterparts, plus that needed to enable them to adapt their own performance to that of their charges - principally the bombers.

The twin-engine fighter pilot, in addition to being able to operate his machine in the manner required of single-engine fighter pilots, also had to master the applicable night and instrument flight techniques. Since he had to work closely with his airborne radio operator, he also needed to be familiar with radio voice communication and radio telegraphy techniques and with the various fighter aircraft control methods if he was to be successful in aerial combat.

The radio operator (gunner) in a twin-engine fighter had to be an expert in both fields. His goal was to be as good a radio operator as the bomber radio personnel and as good a gunner as a single-engine fighter pilot!

The high point of gunnery training was that leading to the most effective utilization of the twin-engine fighter's heavy armament and airborne rockets against multi-engine enemy bombers, in both day and night encounters. Formation flying, up to squadron strength, was naturally an important part of the training program. In 1944, in order to improve the practical training given at the front, training courses were set up for twin-engine fighter unit commanders. These were attended by officers especially qualified by a high degree of personal aptitude, by demonstrated ability in combat, and by outstanding tenacity in



combat[101].

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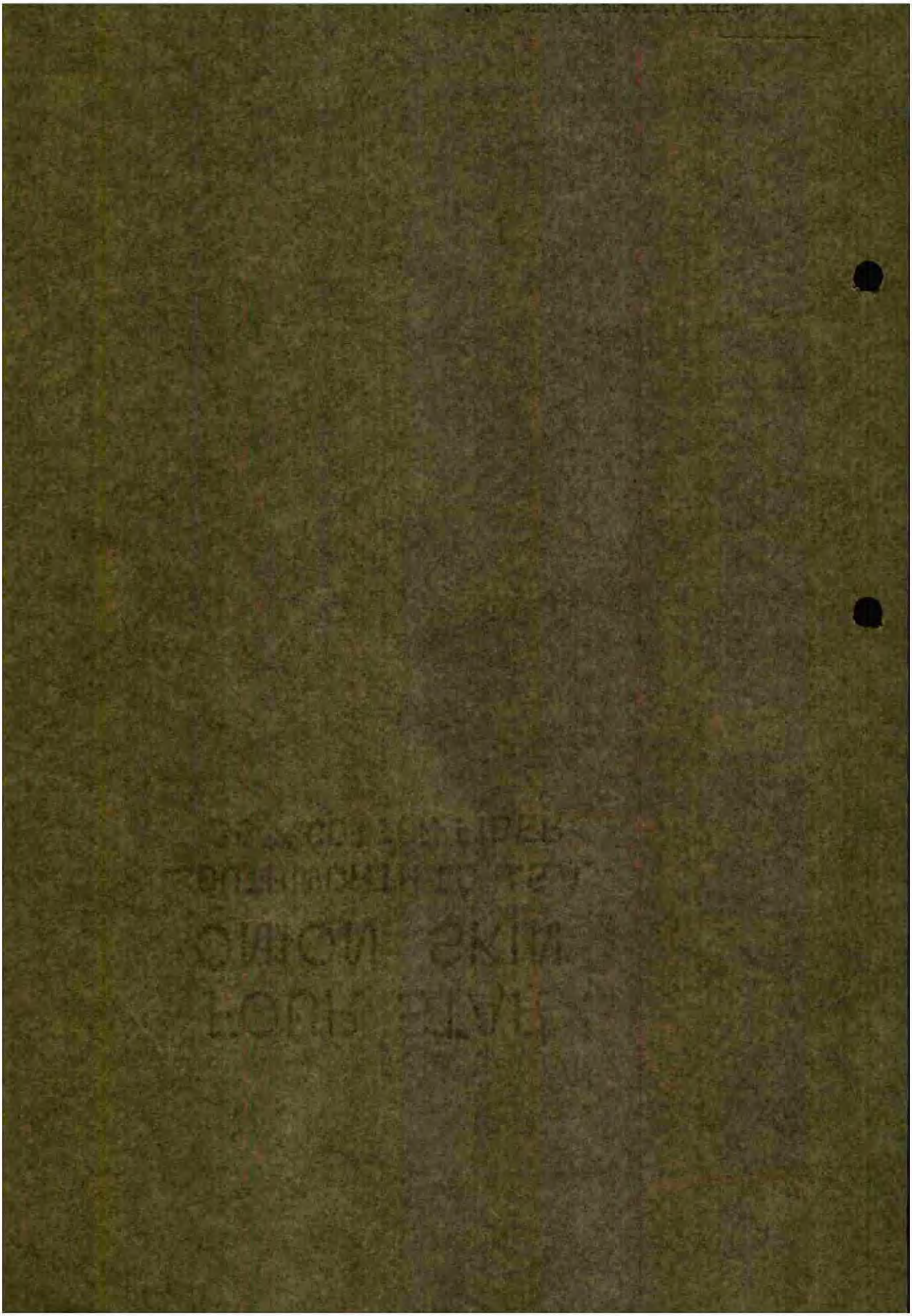
101 - Directive from the Luftwaffe High Command to General der Jagdflieger, Luftwaffe Operations Staff, File No. 1579/44, Classified (Operations/Training), dated 13 June 1944.



Course and Length of Training During Wartime

A systematic program of training for the twin-engine fighter forces did not get under way until the war had already begun. The units already in being in 1939 had been put together from single-engine fighter units, schools, and other multi-engine units, and their training had been carried out in accordance with provisional, necessarily still untested, principles.

The twin-engine fighter pilot was required to have completed flight training leading to the Luftwaffe Advanced Pilot's License, which - after the switch to voluntary training - took a total of eleven months. He was required to possess a certificate from his training supervisor to the effect that he was especially well-qualified to pilot twin-engine fighter aircraft. The next step was a four-month specialized training course with the 101st Twin-Engine Fighter Training Wing, which was followed by assignment to the personnel replacement group at Illesheim for a final training course of two to four months.

During the course of the war, and particularly after the winter of 1943/44, the Allies made increasing use of bad weather to cover their attacks. In an attempt to increase the effectiveness of German antiaircraft defenses, the Luftwaffe ordered a general improvement in instrument flight training, to include the twin-engine fighter forces, as well as intensified training in instrument take-off and landing techniques under the worst possible weather conditions[102]. Consequently, ever greater emphasis was placed upon formation flight through clouds and even through closed cloud cover.

The total duration of training was between eighteen and twenty months.

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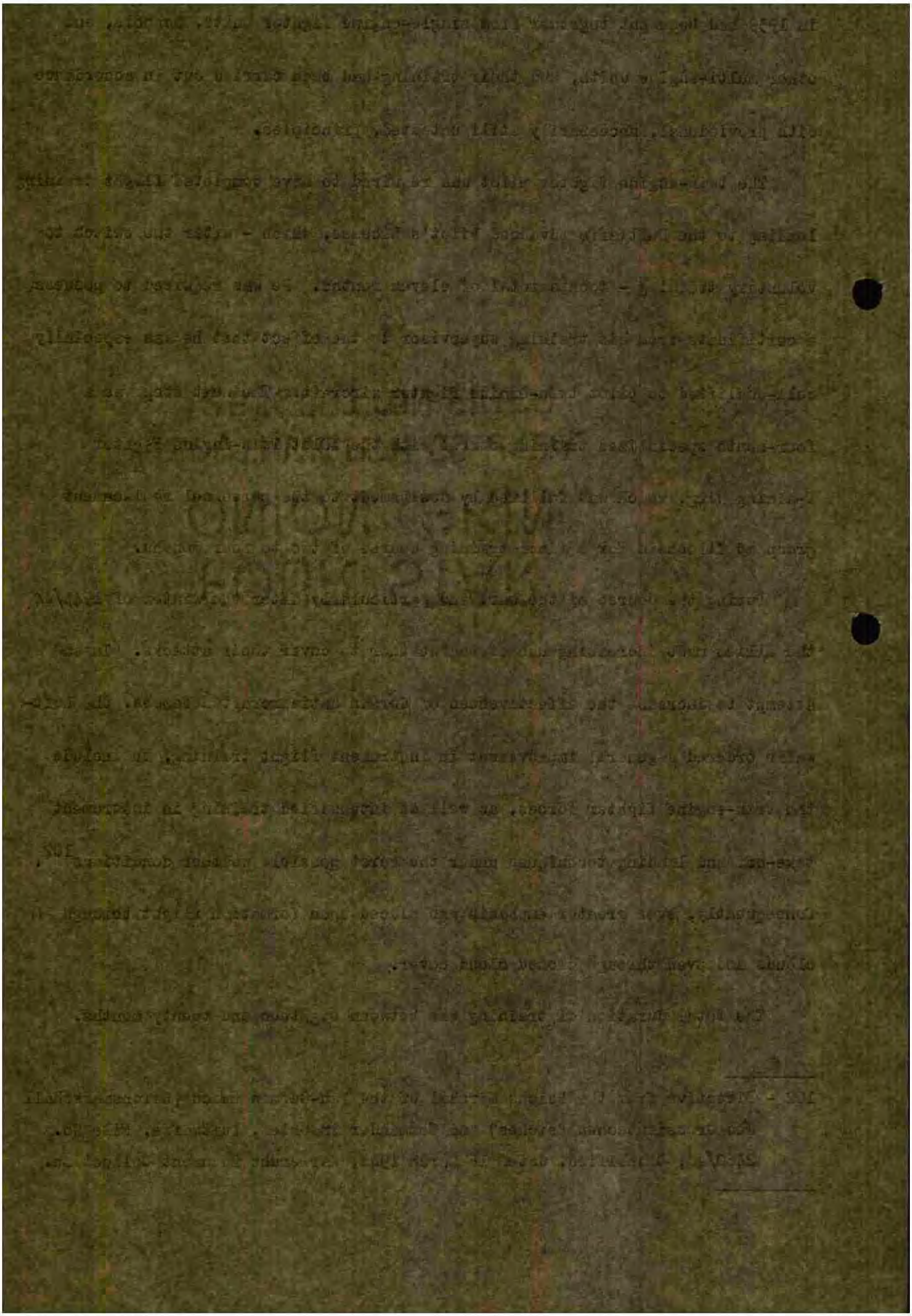
102 - Directive from the Reichs Marshal of the Pan-German Reich (Reichsmarschall des Grossdeutschen Reiches) and Commander in Chief, Luftwaffe, File No. 2460/44, Classified, dated 16 March 1944, Karlsruhe Document Collection.



Airborne radio operators (in the Me-110 and Me-410, they also served as airborne gunners) completed training at one of the Luftwaffe signal communications schools. Their schooling consisted of a two-month elementary course, a medium-level course, and a two-month advanced course, each phase requiring an average of forty to fifty hours of airborne practice. This was followed by a fourteen-day gunnery course at an aerial gunnery school, then four months of specialized training with the 101st Twin-Engine Fighter Training Wing, and two to four months' training with a personnel replacement group prior to assignment to a front units.

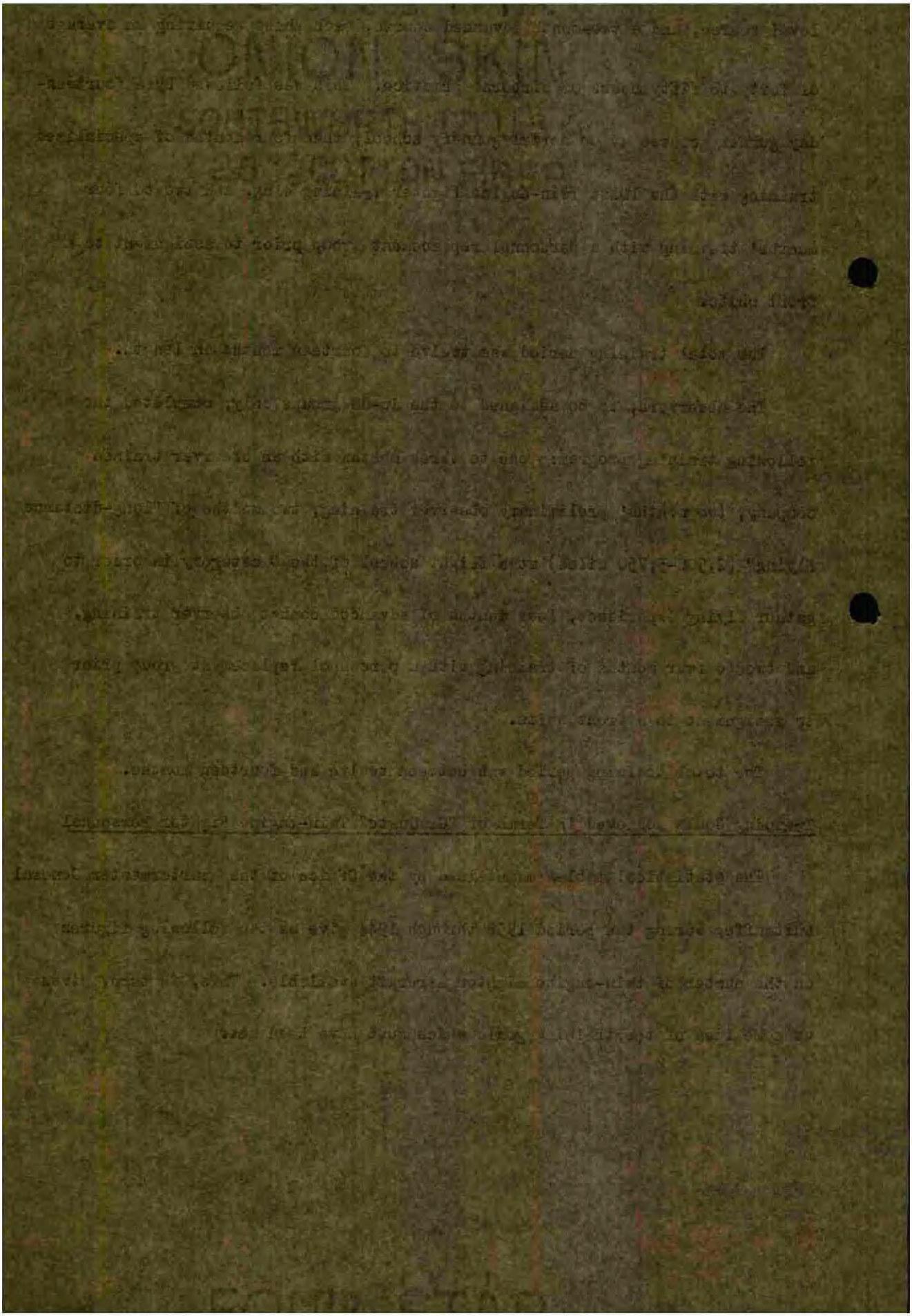
The total training period was twelve to fourteen months in length.

The observers, to be assigned to the Ju-88 groups only, completed the following training program: one to three months with an observer trainee company, two months' preliminary observer training, two months of "long-distance flying" (2,500-3,750 miles) at a flight school of the C category in order to gather flying experience, four months of advanced combat observer training, and two to four months of training with a personnel replacement group prior to assignment to a front units.

The total training period was between twelve and fourteen months.

Training Goals Achieved in Terms of "Graduate" Twin-Engine Fighter Personnel

The statistical tables maintained by the Office of the Quartermaster General, Luftwaffe, during the period 1938 through 1944 give us the following figures on the number of twin-engine fighter aircraft available. This, in turn, gives us some idea of the training goals which must have been met.



Year	Authorized Strength	Actual Strength	Discrepancy	Remarks
1939	320	310	- 10	
1940	280	250	- 30	(1)
1941	180	185	+ 5	
1942	425	400	- 25	(2)
1943	400	530	+130	
1944	250	200	- 50	(3)
	Twin-Engine Fighters (Night)			
1940	195	160	- 35	

Training Goals for Twin-Engine Fighter Crews, 1943

Authorized 435[103]

Actual 371[104]

Total Number of Twin-Engine Fighter Crews Trained for Assignment to the Front during the War (to 30 June 1944):

1,811[105].

Remarks (see above table)

(1) Authorized strength reduced by diversion of a part of the twin-engine fighters to night employment

(2) Authorized strength raised as a result of the refitting and recommitment of existing units

(3) Deactivation of some twin-engine fighter units and their subsequent integration into the single-engine fighter forces (day and night).

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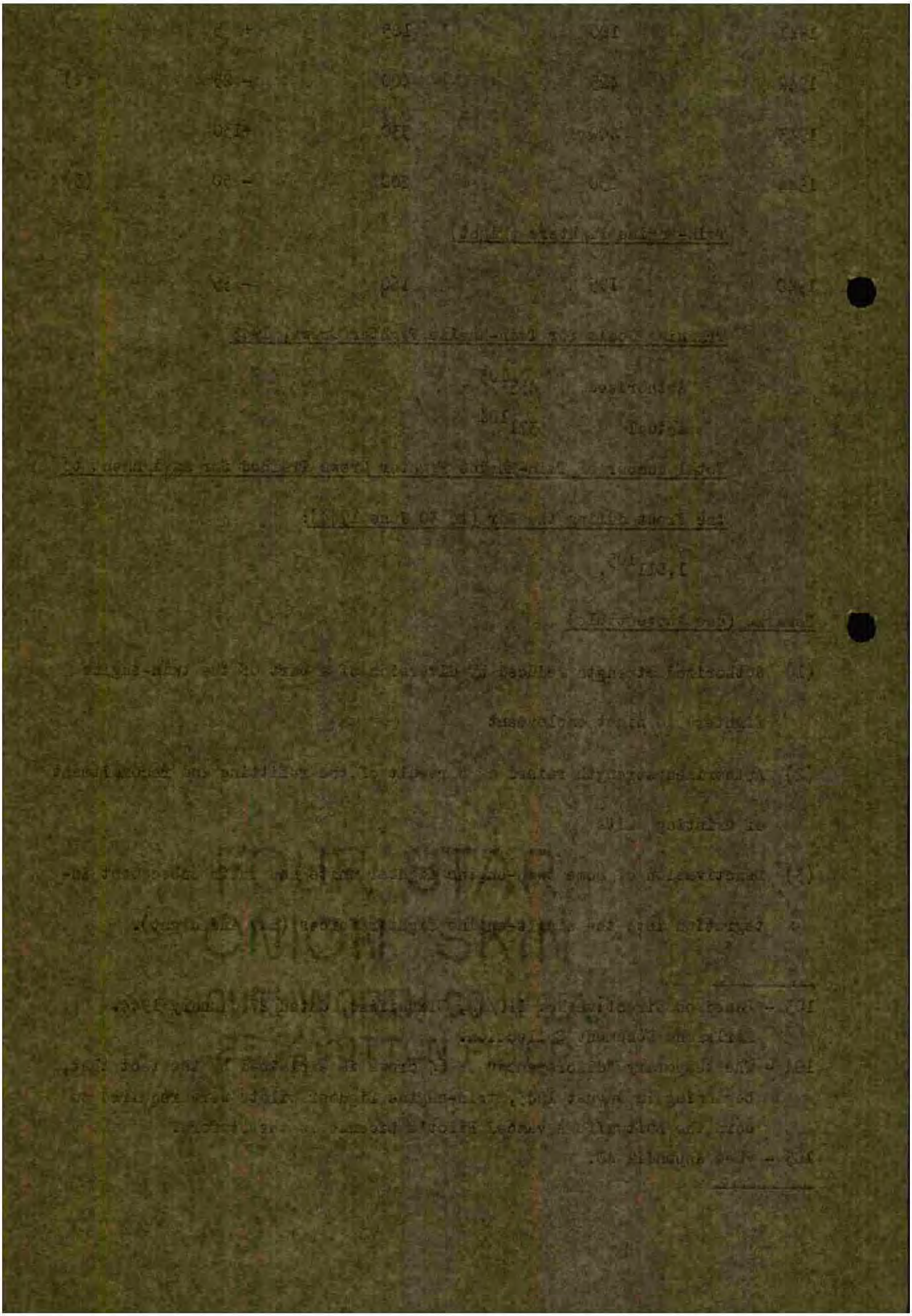
103 - Based on Directive No. 110/44, Classified, dated 27 January 1944. Karlsruhe Document Collection.

104 - The temporary "discrepancy" of 64 crews is explained by the fact that, beginning in August 1943, twin-engine fighter pilots were required to earn the Luftwaffe Advanced Pilot's License as theretofore.

105 - See Appendix 40.



e. Dive-Bomber Training

Origin of the Dive-Bomber and Definition of the Concept.

Dive-bomber aircraft became almost a legendary concept in connection with the German Luftwaffe. Their fame was based on the success they enjoyed in the campaigns in Poland, Norway (?), in the West, in the Balkans, during the battle of Crete, and during the early years of the war in the East.

It can be assumed that the reader is familiar with the history of the dive-bomber's development at the instigation of Udet, who brought the concept with him from the United States. The first model developed was the Hs-123, which was followed ultimately by the Ju-87, destined to become the standard dive-bomber of the German Luftwaffe.

Udet succeeded in convincing Luftwaffe leaders - primarily General Jeschonnek, General Staff Chief during the period 1939-1943 - of the tremendous potential effectiveness of the dive-bomber technique. He was, as a matter of fact, so persuasive that diving performance was set as a requirement not only of the twin-engine, but also of the four-engine bombers.

In view of the fact that the bomb sights utilized in horizontal bombardment were still inadequate before and right after the beginning of the war, Luftwaffe leaders saw in the dive-bomber an offensive weapon with which to attack those of the enemy's vital military, industrial, or other targets which were of relatively small geographic extent (pinpoint bombardment).

In keeping with this theory, then, the Ju-87 units were expected to carry out strategic bombardment on targets lying within their range. In the beginning there was no thought of their being used in direct support of ground operations; this idea was conceived later during the course of the air war.

The above explains why the dive-bomber forces were under the command of the General of the Bomber Forces until 1943. Prior to that time, the General of the Bomber Forces was also in charge of the dive-bomber training program.

The Ju-87 was a two-seater aircraft. The airborne radio operator had a double function: 1) to maintain contact with the ground aircraft control stations during strategic operations, and 2) acting as aerial gunner, to hold off enemy fighter aircraft during the dive-bomber's moment of lowest resistance, namely coming out of its dive and trying to regain altitude.

Course of Training

Under the Chief of Training

After completing their training at a school of the A/B category as well as a test designed to demonstrate their ability as dive-bomber pilots, the trainees were assigned to a dive-bomber school, where they were required to complete a training program covering the following subjects:

aa) Pilot training: take-offs and landings with front-type aircraft; flight training in small formations of two to five aircraft; aerial acrobatics; direction finding by reference to local landmarks; practice diving; practice target approaches; practice bombardment and aerial gunnery.

bb) Theoretical training: introduction to the various types of aircraft; meteorology; navigation; geography; tactics; instruction in the various types of bombs and their usage; instruction in the use of airborne armaments; aircraft identification; ship identification; technological

instruction; theoretical flight instruction.

cc) Gunnery training: on the ground, limited to practice in the gunnery drills set up by the Gunnery Manual, Class I (Schiessvorschrift der Schiessklasse I) for carbine rifles and pistols. Additional specialized practice was held in shooting at clay pigeons in order to sharpen the trainee's ability to pick out a target rapidly.

dd) Infantry training: This aspect of training was continued, in order that the crews might maintain their ability to perform on the ground effectively if necessary. For example, there were nemerous drills simulating an attack on an airfield; taking into considerations all the various potential developments of such an action (which could easily - in fact frequently did - happen in the case of advance airfields).

Aerial gunners were trained separately from the dive-bomber pilots until the formation flight training stage was reached. Pilots and gunners were trained jointly only in the subjects listed under bb), cc), and dd), above.

Since the aerial gunners also served as airborne radio operators, they were given additional specialized instruction in radio operation and maintenance (reception, transmission, operation and maintenance of equipment, etc.).

In keeping with their special missions, the gunner/radioman trainees' airborne armaments course differed considerably from that required of pilot personnel. The basic difference, of course, was dictated by the fact that the gunner could fire on ground targets only when the bomber was pulling out of its dive and leaving the target. Accordingly, the gunners' course concentrated on practice firing from a model tail at a swinging target. This was designed to teach the trainees to judge the firing angle accurately and to give them practice in moving the machine-gun back and forth in the tail-piece.

From the formation flight stage on, the crews were trained together in order to accustom them to coordinated operation. Every attempt was made to assign crews to their front units in the same composition in which they had been trained.

During the first two years of the war, the crews which were trained as described above at the dive-bomber schools[106] were assigned directly to the front wings without any additional intermediate training. As a result, the front units themselves had to assume responsibility for making their newly acquired personnel familiar with the experience previously gained in front commitment and to give them the necessary advanced training. In other words, the system was exactly as it had been before the war, with the exception that now the front units no longer had sufficient time to fulfill their responsibility.

Training in the Personnel Replacement Units.

As the war continued, the increasing military burden placed upon the units at the front made it impossible for them to assume any responsibility whatsoever for training, and in 1941 special personnel replacement squadrons were set up and one assigned to each wing. This step represented a rather tardy imitation of the system already in use in the bomber forces, whose "4th groups" (personnel replacement groups) had proved highly successful as training units. Personnel losses, which had been proportionately extremely high among the younger crews, were noticeably reduced by the strict training received in the replacement units. In addition, as a result of this intensive training, based exclusively on the techniques actually employed at the front, the younger crews were far sooner able to take their places beside the older, more experienced crews when they were finally assigned to the front.

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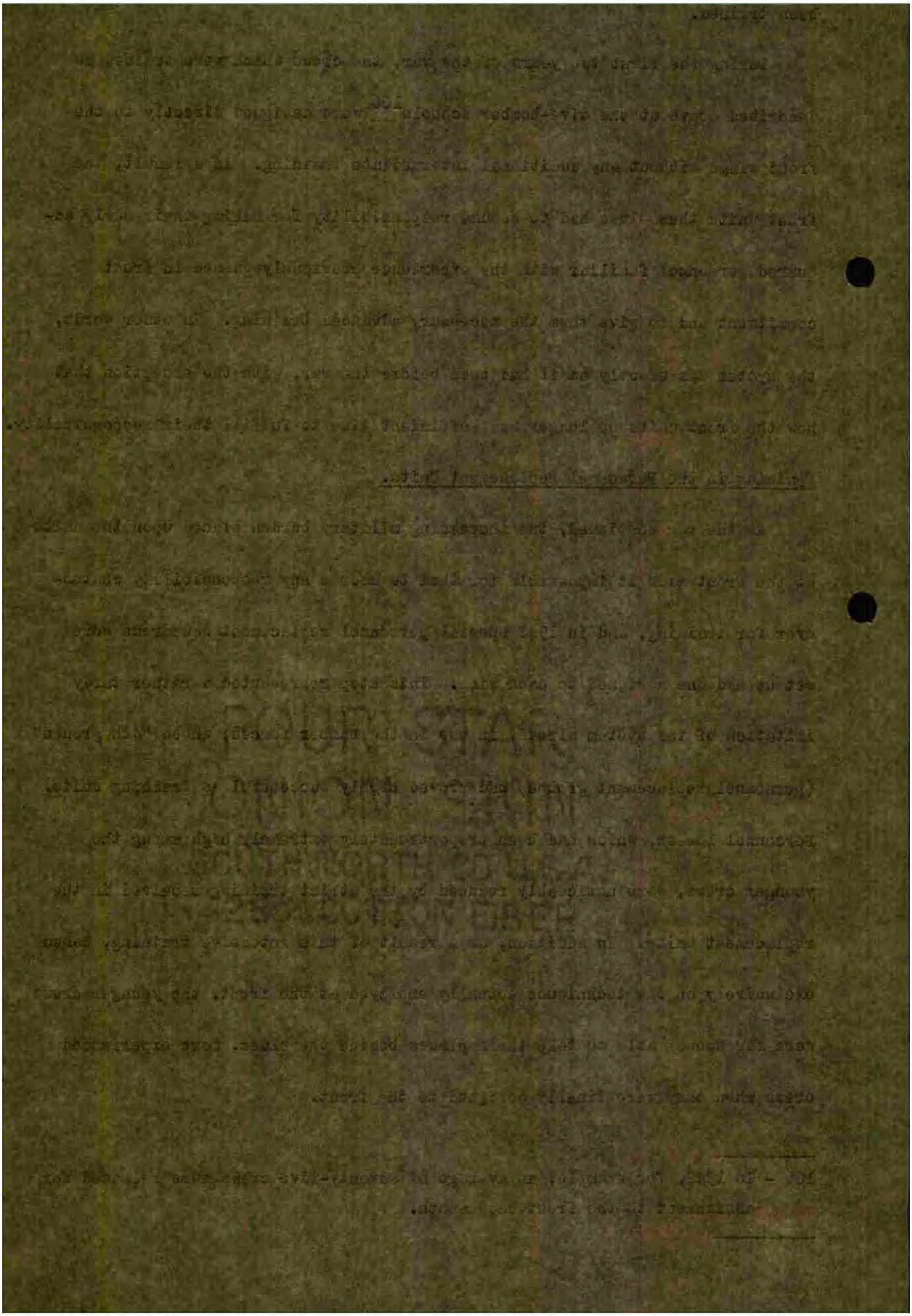
106 - In 1942, for example, an average of seventy-five crews were released for assignment to the front each month.



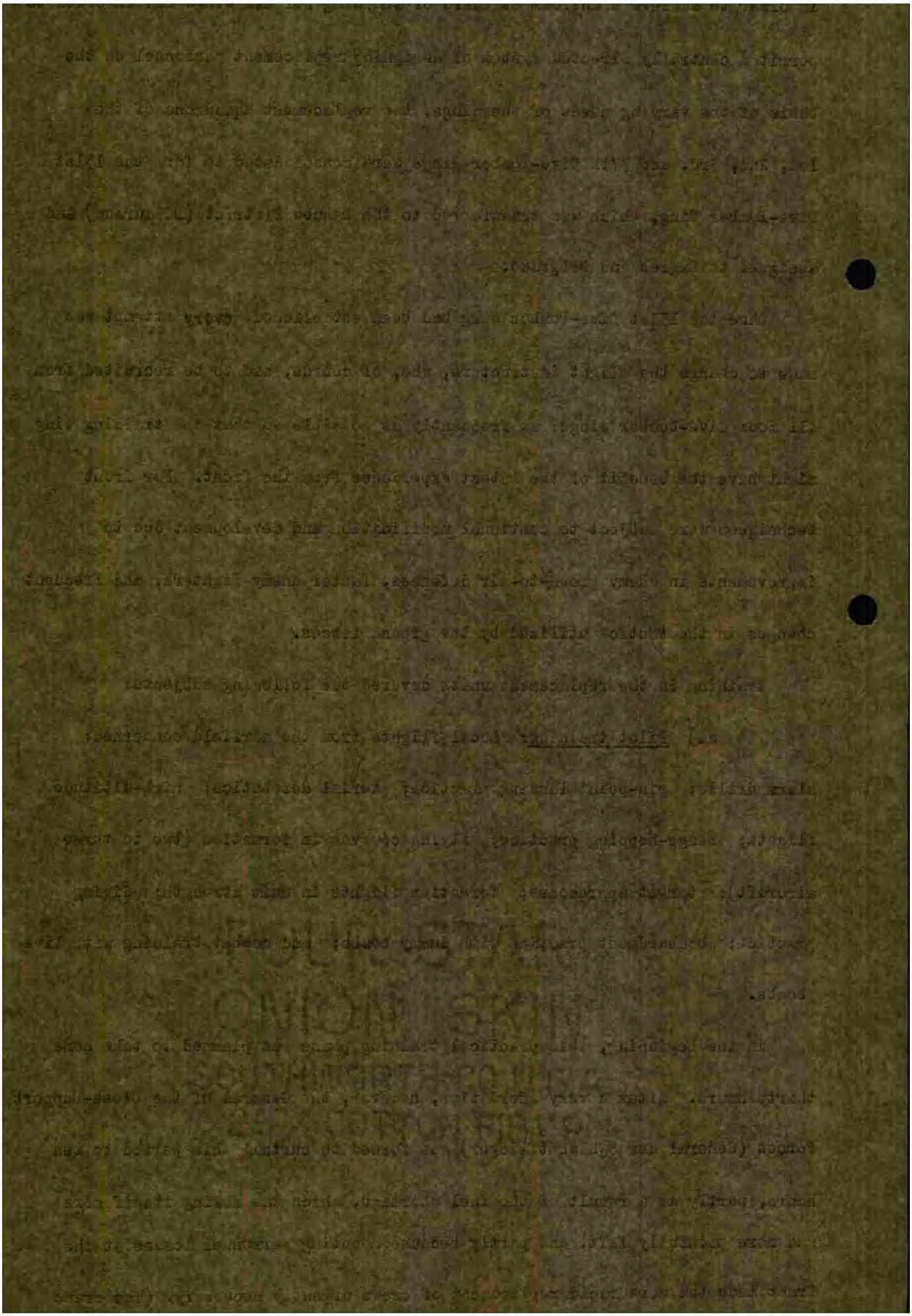
In the beginning, the training given in the replacement squadrons varied considerably since it was based in each instance on the specific missions and requirements of the wing to which the squadron was attached. In 1943, however, in order to achieve a uniform standard of training for all wings and in order to permit a centrally directed system of assigning replacement personnel on the basis of the varying needs of the wings, the replacement squadrons of the 1st, 2nd, 3rd, and 77th Dive-Bomber Wings were consolidated to form the 151st Dive-Bomber Wing, which was transferred to the Danube District (Donauraum) and assigned to Zagreb and Belgrade.

Once the 151st Dive-Bomber Wing had been established, every attempt was made to change the flight instructors, who, of course, had to be recruited from all four dive-bomber wings, as frequently as possible so that the training wing might have the benefit of the latest experience from the front. For front techniques were subject to continual modification and development due to improvements in enemy ground-to-air defenses, faster enemy fighters, and frequent changes in the tactics utilized by the ground forces.

Training in the replacement units covered the following subjects:

aa) Pilot training: Local flights from the airfield concerned; alarm drills; pin-point landing practice; aerial acrobatics; high-altitude flights; hedge-hopping practice; flying courses in formation (two to three aircraft); target approaches; formation flights in unit strength; diving practice; bombardment practice with dummy bombs; and combat training with live bombs.

In the beginning, this practical training phase was planned to take some thirty hours. After a very short time, however, the General of the Close-Support Forces (General der Schlachtflieger) was forced to curtail this period to ten hours, partly as a result of the fuel shortage, which was making itself more and more painfully felt, and partly because mounting personnel losses at the front made the more rapid replacement of crews urgently necessary. (The crews



who completed only the shortened training period, of course, were even less well able to meet the qualitative requirements demanded by front commitment).

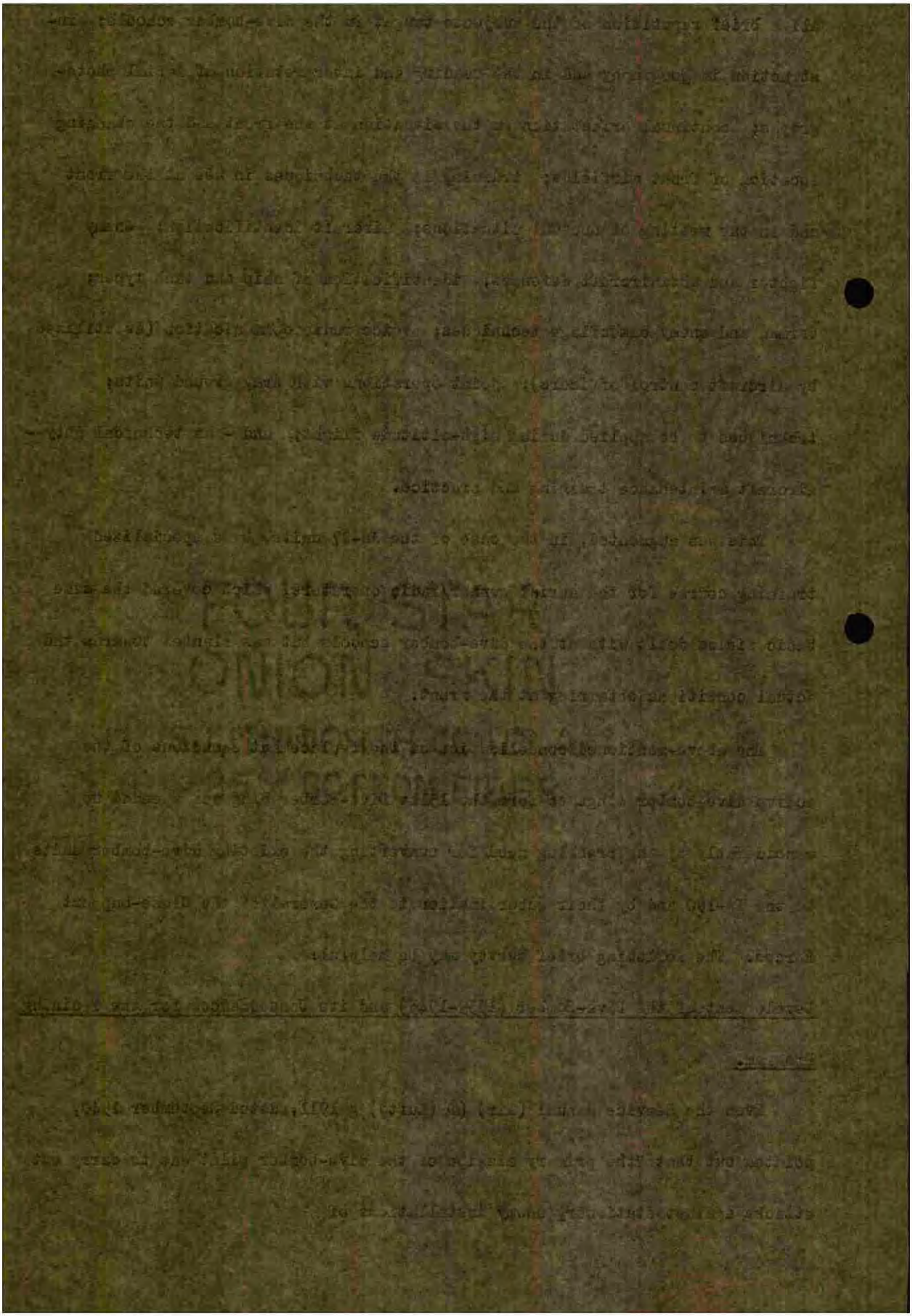
bb) Theoretical training and technical duty: This included first of all a brief repetition of the subjects taught in the dive-bomber schools; instruction in geography and in the reading and interpretation of aerial photographs; continual orientation on the situation at the front and the changing location of front airfields; training in the techniques in use at the front and in the meeting of unusual situations; aircraft identification; enemy fighter and antiaircraft defenses; identification of ship and tank types; German and enemy camouflage techniques; voice radio communication (as utilized by aircraft control officers); joint operations with Army ground units; techniques to be applied during high-altitude flight; and - as technical duty - aircraft maintenance training and practice.

This was augmented, in the case of the Ju-87 units, by a specialized training course for the aerial gunner/radio operators, which covered the same basic fields dealt with at the dive-bomber schools but was slanted towards the actual conditions obtaining at the front.

The above-mentioned consolidation of the replacement squadrons of the active dive-bomber wings to form the 151st Dive-Bomber Wing was speeded up considerably by the pressing need for converting the existing dive-bomber units to the Fw-190 and by their subordination to the General of the Close-Support Forces. The following brief survey may be helpful:

Development of the Dive-Bomber (1939-1943) and its Consequences for the Training Program.

Even the Service Manual (Air) (D (Luft)) g 1911, dated September 1940, pointed out that "the primary mission of the dive-bomber pilot was to carry out attacks against stationary enemy installations of



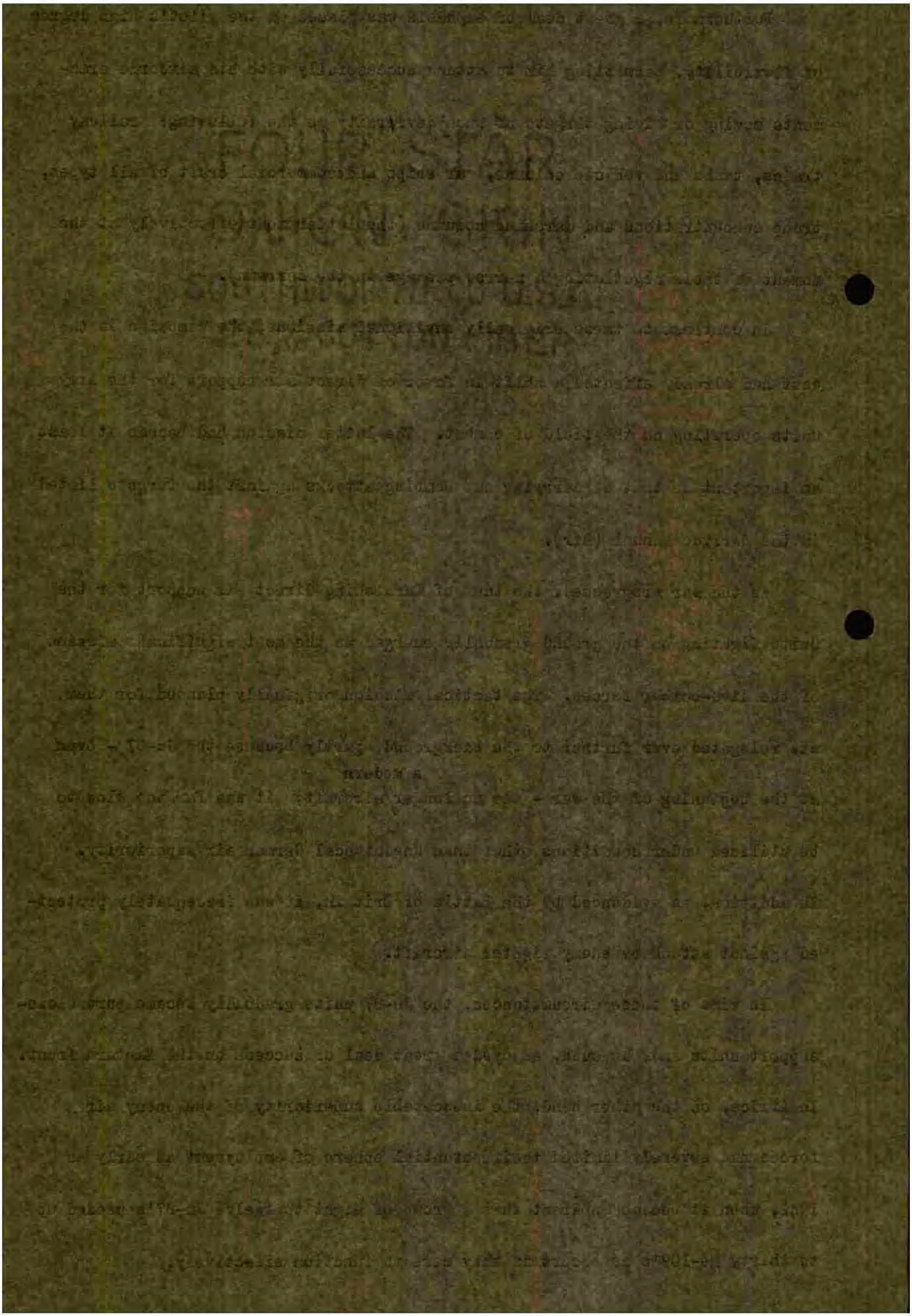
military, strategic, or vital logistical importance and limited geographical extent (isolated targets or those that lent themselves to effective pin-point bombardment)".

Furthermore, a great deal of emphasis was placed on the pilot's high degree of flexibility, permitting him to attack successfully with his airborne armaments moving or living targets of such deviersity as the following: railway trains, tanks and vehicle columns, war ships and commercial craft of all types, troop concentrations and marching columns (the latter most effectively at the moment of their negotiating a narrow passage in the terrain).

In contrast to these originally envisioned missions, the campaign in the West had already effected a shift in favor of direct air support for the Army units operating on the field of combat. The latter mission had become at least as important as that of carrying out bombing attacks against the targets listed in the Serivce Manual (Air).

As the war progressed, the task of furnishing direct air support for the units fighting on the ground gradually emerged as the most significant mission of the dive-bomber forces. The tactical mission originally planned for them was relegated ever further to the background, partly because the Ju-87 - even at the beginning of the war - was no longer a modern aircraft; it was far too slow to be utilized under conditions other than unequivocal German air superiority. In addition, as evidenced by the Battle of Britain, it was inadequately protected against attack by enemy fighter aircraft.

In view of these circumstances, the Ju-87 units gradually became pure close-support units and, as such, enjoyed a great deal of success on the Eastern front. In Africa, on the other hand, the inescapable superiority of the enemy air forces had severely limited their potential sphere of employment as early as 1942, when it became apparent that a group of eight to twelve Ju-87's needed up to thirty Me-109's as escort if they were to function effectively.



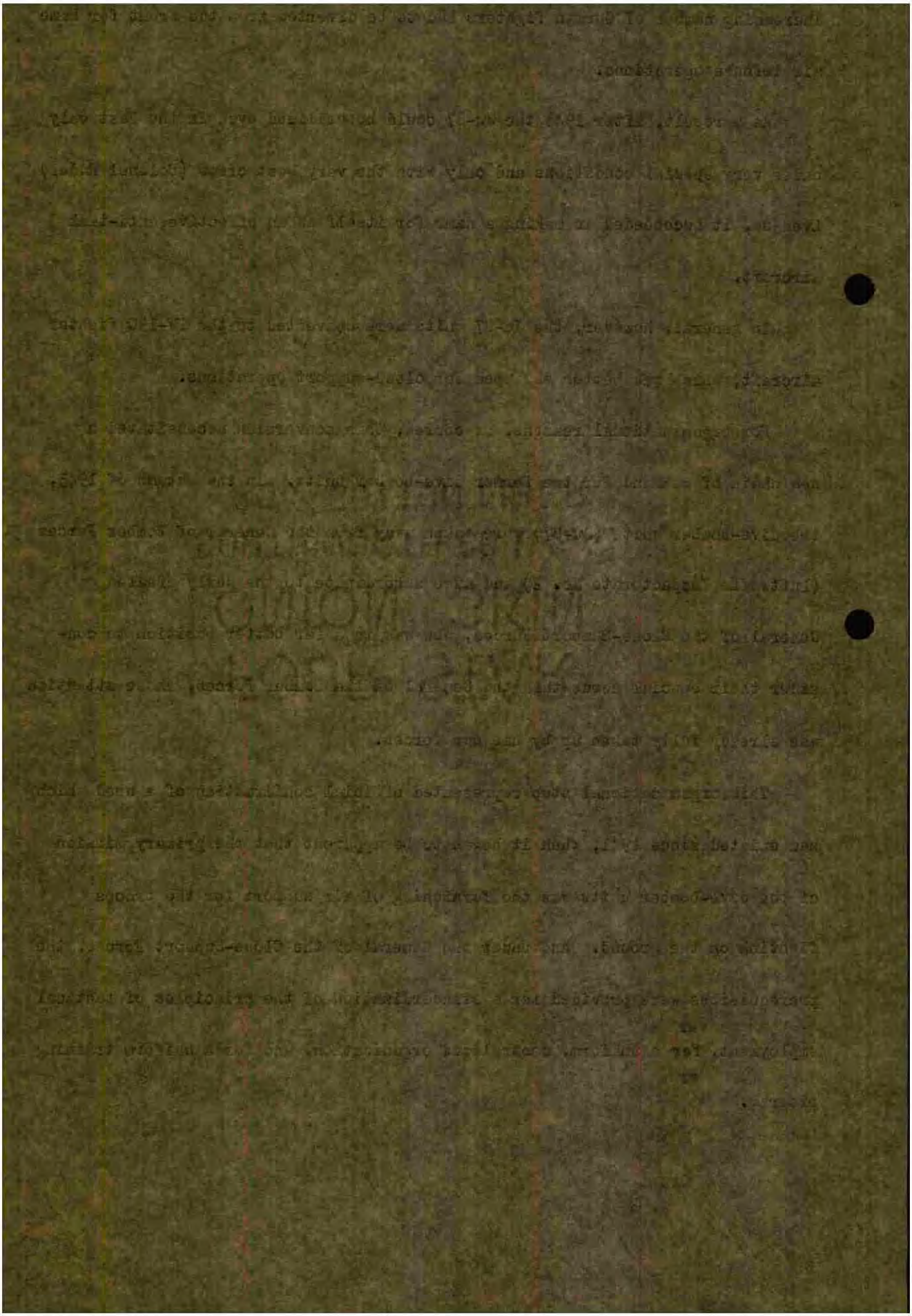
Although the Ju-87 was improved continually with each new series leaving the factory, its performance was still far inferior to that of the enemy fighters, whose steady numerical increase was becoming more and more apparent, while an increasing number of German fighters had to be diverted from the front for home air defense operations.

As a result, after 1943 the Ju-87 could be utilized even in the East only under very special conditions and only with the very best crews (Colonel Rudel) Even so, it succeeeded in making a name for itself as an effective anti-tank aircraft.

In general, however, the Ju-87 units were converted to the FW-190 fighter aircraft, which was better equipped for close-support operations.

For organizational reasons, of course, this conversion necessitated a new chain of command for the former dive-bomber units. In the autumn of 1943, the dive-bomber units (Ju-87) were taken away from the General of Bomber Forces (Luftwaffe Inspectorate No. 2) and made subordinate to the newly created General of the Close-Support Forces, who was in a far better position to consider their special needs than the General of the Bomber Forces, whose attention was already fully taken up by his own forces.

This organizational step represented official confirmation of a need which had existed since 1941, when it began to be apparent that the primary mission of the dive-bomber units was the furnishing of air support for the troops fighting on the ground. And under the General of the Close-Support Forces, the prerequisites were provided for a standardization of the principles of tactical employment, for a uniform, centralized organization, and for a uniform training program.



f. Close-Support Pilot Training

Origin of the Close-Support Forces and Definition of the Concepts Involved.

The history of the close-support forces goes back to World War I when they intervened in the ground fighting as "infantry pilots" (Infanterieflieger).

Activation of a close-support force was not a part of the plans for the new Luftwaffe which came to fruition in 1935. The main emphasis at that time was placed on the procurement of bomber and single-engine fighter aircraft. Despite the fact that Luftwaffe Service Manual 16 (Luftwaffendienstvorschrift 16) acknowledge the importance of providing direct air support for the Army, the tactical-technological criteria recognized in those days applied only to a light dive-bomber aircraft. The Hs-123, closely modelled on the Curtis Helldiver, must be viewed as the first acceptable step in this direction.

The shift in the thinking of Luftwaffe leaders towards acceptance of the provision of direct air support for the Army (by means of aircraft especially developed for that purpose and organized into independent units) as a primary mission of the Luftwaffe was a direct result of the Civil War in Spain. The motivating factor was the experience gained by the Condor Legion, which, for the first time since World War I, tested the possibilities of a close-support force on a large scale and found them highly satisfactory. It may be of interest to point out that this shift in the views of Luftwaffe leaders came about via a detour, namely via the employment of the He-51, a German aircraft model no longer sufficiently up to date to be committed as a fighter.

The employment of the He-51 to furnish direct support for the ground forces on the

battlefield was so carefully worked out and so neatly refined in joint operations with Franco's troops that the latter soon began to refrain from all defensive and offensive actions in which no air support was available.

In the summer of 1938, as the political situation in Europe was growing steadily worse in the face of imminent German occupation of the Sudeten Land, Luftwaffe leaders ordered the immediate activation of five close-support groups (No's 10, 20, 30, 40, and 50). During a period of two months, 1 July through 1 September, the training program was ordered to instruct an adequate number of pilots in the specialized techniques needed for effective close-support operations.

In November 1938, four of the original five groups were converted to Ju-87's to strengthen the dive-bomber force. At the same time, the fifth was rechristened the II Group (Close-Support), 2nd Training Wing (II. (Schlacht)/ Lehrgeschwader 2); it was the only close-support group available for commitment when the war broke out in 1939.

Course of Training

In general, the training of the close-support crews was very similar to that of the dive-bomber crews, except for the fact that the former were under the command of the General of the Fighter Forces.

During peacetime, pilots who volunteered for close-support duty and who were adjudged to be suited for such duty on the basis of their past performance, went directly from the A/B school to the close-support group, where they received the necessary specialized training. This procedure was also followed at the beginning of the war. Very soon, however, the office of the Chief of Training set up special close-support training schools similar to the dive-bomber schools. Later on

(March 1943), these schools were rechristened the 101st, 102nd, and 103rd Close-Support Wings for reasons of camouflage and organizational necessity.

As a rule the trainees were assigned to the school for a period of four months, during which they completed specialized training with the appropriate aircraft models, the Hs-123, Me-109, Fw-190, and Ju-87. In principle, this training was very similar to that received by the dive-bomber pilots.

Training with the Me-109 and Fw-190 was deemed necessary in view of the fact that a general conversion to more modern aircraft was inevitable sooner or later. In this connection, an entirely new aircraft type was being developed - the fighter-bomber -, but it was as yet uncertain whether the new type was to be classed with the fighters or the bombers[107].

In the beginning, the young crews were given training in the specialized techniques needed at the front after their assignment to the group. As was the case with the other air units, however, the additional burden of training proved to be too much for the close-support units, and separate personnel replacement units were set up to take over. In the fall of 1940, each front wing was assigned one replacement squadron; in 1942, the squadrons were increased to group strength; and an additional wing was activated from them in 1943.

In the replacement squadrons, the crews were given intensive tactical and technological training designed to perfect their proficiency in the techniques they would need for effective commitment at the front. An intermediate training period of this kind was all the more necessary in view of the fact that the missions of the close-support forces at the front were becoming both more difficult and more diversified. Advanced training

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107 - According to a memo for the record made by the Chief of Training under date of 6 May 1943, training goals had been established of 50 fighter-bomber and 30 close-support crews per month.

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covered the following: practice tactical missions under simulated front conditions; joint drills with Army and Navy units; bombardment practice with live bombs; air-to ground gunnery, etc. Those pilots who seemed especially talented for assignment as anti-tank pilots were given additional specialized instruction in tank armaments and hollow-charge grenades.

Beginning in the fall of 1943, the newly appointed General of the Close-Support Forces exercised the greatest degree of influence on the training program of his branch. Prior to that time the close-support forces had suffered noticeably from the lack of a centralized organization, for - as has already been pointed out - the Ju-87 units were subordinate to the General of the Bomber Forces, while the Hs-123, Hel29, Me-109, and Fw-190 units were under the Command of the General of the Fighter Forces (Luftwaffe Inspectorate No. 3). As a result, an instrument whose significance grew greater and greater as the war progressed was split under two different command agencies. On 7 September 1943, Colonel Kupfer, as Chief of the Close-Support Forces, was placed in command of all the close-support units; on 7 October 1943, his office was officially designated office of the General of the Close-Support Forces. As far as training was concerned, he was responsible for furnishing replacement personnel for the following types of units under his command:

close-support units (day) (the former Ju-87 units and the close-support units);

anti-tank units (Hs-129, Ju-87, and Fw-190 units);

close-support units (night).

The last-named units had developed out of the former harrassing bomber squadrons (Stoerkampfstaffeln) and were reserved for employment on the Eastern front. In the beginning, following the example set by the Russians, they were equipped with old training aircraft models, the Ar-66 and the Go-145. Later on these were replaced by the

Ju-87, whose employment in daylight operations had become extremely hazardous and which had therefore been largely supplanted by the Fw-190. The Ju-87 had already proved its value as a night close-support aircraft at Nettuno, and subsequently it was even employed with success in this capacity against the Allies in the West.

Training for these night units was the responsibility of the General of Pilot Training and was carried out by the 111th Close-Support Training Wing (Night) at Stubendorf. The course lasted approximately one and one-half months, and the trainees were usually older pilots (bomber pilots, former instructors, etc.) who were no longer suited for assignment to the Fw-190. The training aircraft utilized were the Ju-87, Ar-66, and Go-145; the course included thirty-six flight hours. In order to achieve more than simple harrassment of the enemy, the personnel replacement units of the night close-support forces were given intensive training in the combatting of targets illuminated by parachute flares or by target-marking bombs. Thus radar guidance of the illuminator aircraft was one of the most important factors in the employment of the night close-support units.

The training standard required by the 151st Dive-Bomber Wing at Zagreb and Belgrade made extremely high demands upon the trainees assigned there. Some of them (as many as 20%) proved to lack the necessary concentration and stamina and thus were returned to the General of the Close-Support Forces for further assignment elsewhere. The climax of their training took the form of a military maneuver involving the transfer of at least two squadrons of fully loaded and fully armed aircraft to a specified airfield. The maneuver was carried out at the prescribed altitude of 16,000 ft. or higher; a fighter escort was provided either by single-engine fighter aircraft or by

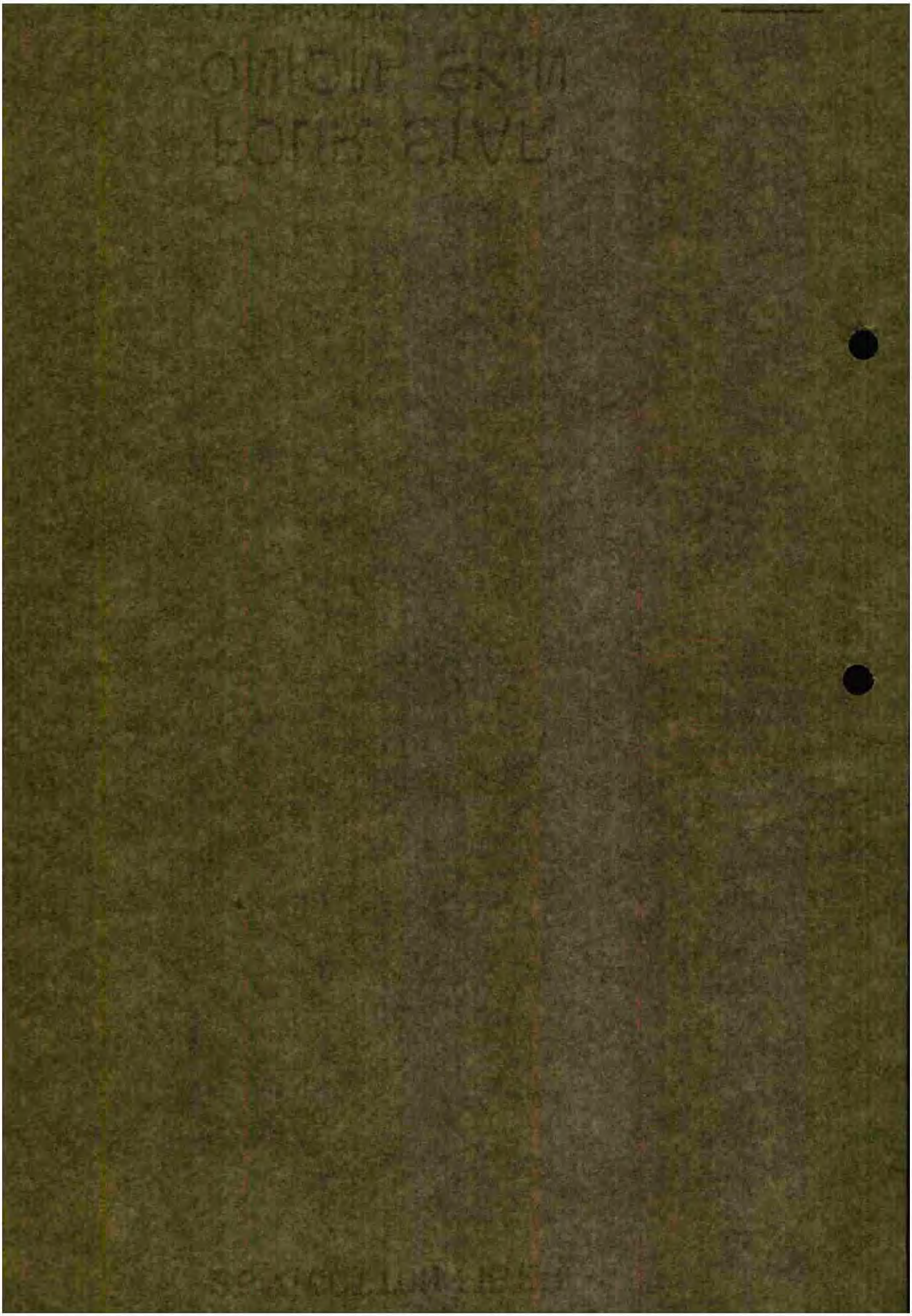
other dive-bombers temporarily assuming the role of fighters. The target was their own bombardment practice area. After the attack, they were required to leave the target in low-altitude flight or to climb and reform in squadron line formation. A total of thirty hours was devoted to training for this final exercise. Specialized anti-tank training with portable antitank rockets was scheduled to begin with the 151st Dive-Bomber Wing in the spring of 1945. The preparations made for this venture could no longer be put into effect.

The Effectiveness of the Training Program

Beginning in 1943, the training of the close-support pilots was also adversely affected by the same shortages which were hurting all the Luftwaffe training programs - aviation fuels and front-type aircraft for training purposes.

The last General of the Close-Support Forces, for example, complains of the serious lack of experience on the part of the young pilots whose training had to be so curtailed for the reason given above[108]. As a result, they usually suffered inordinately high losses during their very first missions, especially when the military situation was a difficult one, with strong enemy antiaircraft defenses to contend with. The curtailment of the training period left almost no time at all for badly-needed instruction and practice in blind and instrument flight. Another difficult problem was the lack of well-qualified young officer personnel, which made itself very much felt whenever experienced officers were needed for appointment of squadron captain or group commander posts. As a matter of fact, it very frequently devolved upon qualified non-commissioned officers to lead the units during their assigned missions. Under these circumstances, of course, it was hopelessly out of the question to attempt to staff the training units with an adequate number of experienced and fully-qualified officers or to set up a systematic program for training unit commanders and squadron captains in regular unit leader courses.

108 - Generalmajor a.D. Hitschhold, "Erfahrungen und Maengel in der deutschen Schlachtflieger" (The Experience Gained by the German Close-Support Forces and the Deficiencies Inherent in These Forces), 24 October 1945, Karlsruhe Document Collection.



Thus, when General Koller pointed out in March 1944 that there were far fewer close-support groups at the front than ought to be the case[109], the only possible rejoinder was the simple truth - that Germany's aircraft industry had been unable to keep up with the demands made upon it and that, as a consequence, the close-support pilot training program could not be carried out on the scale actually required by military developments.

Training in the Air Transport Forces

Origin of the Air Transport Forces and Definition of the Concept Involved.

The Ju-52, Germany's standard transport aircraft during World War II, passed its first major test during the Spanish Civil War, when it was employed to move a large Moroccan fighting force from Tetuan to continental Spain for immediate commitment at a decisive area.

The potential significance of this first airlift was recognized, and Luftwaffe leaders decided to keep one group (IV Group, Bomber Wing Hindenburg) of the bomber forces being converted to more modern aircraft types equipped with Ju-52's, as the nucleus of an air transport force.

The IV Group was to be utilized in conjunction with the paratrooper battalion then in process of activation. In addition it was to serve as the basis for new activations of air transport units, designed to keep pace with

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109 - General Koller, Chief of the Luftwaffe Operations Staff, in a military briefing session held on 2 March 1944. Karlsruhe Document Collection.

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the planned expansion of the parachute and air landing forces. In October 1937, the IV Group was redesignated the 1st Special Duty Bomber Group (Kampfgruppe z.b.V. 1).

Effective 1 August 1938, the group was divided into two and each half, augmented by new personnel and equipment, became a complete group (1st and 2nd Special Duty Bomber Groups).

During the summer of 1939, two more groups were activated (primarily new personnel and equipment, very little was taken over from the two original groups), and consolidated with the 1st and 2nd to form the 1st Special Duty Bomber Wing. With the wing, the air transport forces had reached the same strength as the paratroopers, who were now available in regiment strength. As preparations continued for the activation of a second paratrooper regiment, however, it was decided that no attempt should be made to activate an equal number of air transport units at the same time. Instead, the Chief of Training was instructed to take whatever organizational steps might be necessary to permit recruitment, in case of need, of the Ju-52's and instructional personnel assigned to the schools[110]. As a result, there was only one active air transport wing available at the time the war began.

During the course of the war, the air transport forces came off with flying colors on all fronts. After their well-known missions in Norway, in the West, on the Isthmus of Corinth, and on Crete, their original mission of coordinated operations with the parachute forces gradually receded into the background in favor of such assignments as supplying encircled troops by air, transporting reinforcements to threatened points at

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110 - See Generalmajor a.D. Morzik, "Die Luftbrueckenunternehmungen der deutschen Luftwaffe" (The Airlift Undertakings of the German Luftwaffe), Part I, Karlsruhe Document Collection.

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the front, and - above all - carrying out large-scale materiel transports of all kinds. This last mission brought Germany's air transport forces to all the critical areas of operation, from the northern part of Norway to Africa, from Brittainy to Stalingrad - always in a desperate effort to keep up with the mounting demands for their services.

Course of Training

Unfortunately it must be admitted that the vital importance of the air transport mission was hardly reflected in the funds and equipment expended for the training of air transport crews. As a matter of fact, air transport training was sadly neglected all through the war.

Air Transport Crew Training under the Chief of Training

The personnel making up the one air transport wing in existence at the beginning of the war were all highly qualified, having received their advanced training with the active units under peacetime conditions. The individual crew members - pilots, observers, radio operators, airborne mechanics - had completed their specialized training at the appropriate schools and had gone on to the unit for advanced training. This was the same system as was followed in all Luftwaffe branches prior to the war.

In the case of the air transport forces, this system was retained during the early war years. It was not until 1943 that the belated decision was made to set up a personnel replacement unit for the transport crews, following the model already in use in the other Luftwaffe branches as early as 1940.

The personnel replacement situation was made all the more critical for the air transport forces by the fact that there was only one active wing available when the war began, whereas the demands

for air transport services soon increased astronomically. As has been mentioned above, these demands were to be met by arbitrary activation of units from the personnel and equipment assigned to the office of the Chief of Training. This plan was put into effect repeatedly during the course of the war, with the result that the training program was forced to get along without urgently-needed instructional personnel and training aircraft for long periods at a time. Later on in the present study, we shall come back to the tragically serious influence which this factor had on the entire training program.

Without any doubt, the crews recruited from the schools had enjoyed excellent training at the C-schools and instrument flight schools and they were certainly capable of meeting the requirement set for them. Nonetheless, they could not be expected to be so well-grounded in the advanced training normally received with the active unit as the members of the 1st Special Duty Bomber Wing.

In addition to the units recruited from the schools to carry out special missions or to meet emergency demands for air transport services, during the first two years of the war the activation of a number of regular groups proved unavoidable. The necessary personnel had to be recruited from the flight training schools or - in the beginning at least - from the few available reserve crews. In neither instance, of course, could the training standard be expected to be equal to that of the active units.

The crews recruited from the flight schools had completed the prescribed flight training course, but had had no experience whatsoever in flying with an active unit. They had no choice but to gather this experience at the front itself.

It cannot be denied that the personnel replacement program for the air transport forces suffered somewhat from the wide-spread fallacy that, after all, all the transport pilot had to do was operate a Ju-52, an aircraft

which even the most inexperienced crew could handle with impunity. This very short-sighted notion was to lead to serious losses, for flying a loaded, in fact often over-loaded, Ju-52 over mountains and oceans under all possible weather conditions takes a good deal more ability and experience than is generally assumed. The loser in the long run was the front, of course. Conditions at the front simply could not permit the air transport forces the luxury of taking the training level of their crews into consideration. For every single aircraft reported ready to go had to be put into the air at once. A number of fatal crashes, with total loss of crew and machine, were the inevitable result.

Theoretically, when the pilots left training for assignment to the air transport units, they were expected to have qualified for the instrument flight certificate, class II; however, students who had completed training at a C-school were also accepted. Thus, not all the pilots in the active units were capable of instrument flight, which, of course, had a detrimental effect on the full operational readiness of the transport forces, especially in view of the fact that the majority of air supply operations were carried out at night or under adverse weather conditions. The only solution open to the units was to try to accustom their younger crews gradually to the more difficult missions.

Ordinarily, the observers were needed only as jumpmasters during paratrooper operations. Thus, they were not regularly assigned to the air transport units, but were requested when needed, i.e. in the event of a planned air landing or paratrooper operation, from the Jumpmaster School (Absetzerschule) of the XI Air Corps at Freiburg/Breisgau. This school, set up in accordance with the experience gained during the operations on Crete, provided the jumpmasters with a thorough knowledge of

their task, enabling them to instruct the crews accordingly. The jumpmasters were responsible for determining when the paratroopers should be released, for computing wind direction and velocity, for determining flight altitude, target approach direction, etc.; in short, they were fully responsible for the jump and thus, in good part, for the ultimate success of the over-all operation[111].

The requirement that the transport aircraft be prepared at all times for night or bad-weather employment soon gave rise to the demand for regularly assigned observer personnel capable of taking over navigational responsibility during bad-weather flights, when the pilots had more than enough to do to operate the machine. The personnel from the Freiburg school were, for the most part, ready and willing to assume this responsibility, but unfortunately they possessed only the most rudimentary theoretical knowledge of navigation techniques and were sadly lacking in practical experience.

The majority of the airborne radio personnel came with the pilots from the instrument flight schools to the units. They had completed the usual radio operation and maintenance courses and had earned the airborne radio operator's license (Bordfunkerschein). In general, their training was adequate to the demands made upon them.

Most of the airborne mechanics and airborne gunners were recruited from among the aerotechnical or general ground personnel and requisitioned by the active units. Subsequently, they were detached to an aerial gunnery school (Bordschuetzenschule), after completion of which they retruned to their new units[112].

In conclusion, there is one other category of air transport personnel to be dealt with - the freight glider pilots. In the Glider Tow Schools (Schleppschulen) No's 1 and 2 (in Neuhausen and Langendiebach respectively),

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111 - During paratrooper operations on the island of Crete, on 20 May 1941, a

111 - (cont'd) badly-handled jump was the cause of heavy losses among the paratroopers. Moreover, General Student was constrained to point out in his operations report that the air transport units, despite the experience ostensibly gained during operations in Holland, had made no progress whatsoever in their training program. This was the chief motivation behind his subsequent order to set up the Freiburg school under Major Willerding. General Student also attributed the catastrophe in Crete to the fact that the hastily activated air transport and parachute units had not had an opportunity to establish and maintain the close contact which was necessary to assure effective coordinated operations. (Hqs, XI Air Corps, Operations Branch, No. 1839/41, classified, dated 2 October 1941, copy # 31. Karlsruhe Document Collection).

112- According to a memo for the record prepared by the Chief of Training on 6 May 1943, an average of forty crews per month were being assigned to the air transport forces.

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these pilots were trained in the operation of gliders of the DFS-230, Go-242, and Me-321,models, all of which were towed by other aircraft into the immediate vicinity of the target.

Training in the Personnel Replacement Wing

Finally, in May 1943, the continual pleas on the part of the active air transport units for better training of replacement personnel were heard, and a personnel replacement wing consisting of two groups was set up as a central clearing-house, through which all replacement personnel would be assigned. In addition, the replacement wing took over personnel temporarily not assigned to the active units and gave them needed refresher training; it also carried out a testing program to try out new developments in aircraft design and construction, and instituted a practical course in the proper loading of transport aircraft.

In the personnel replacement units, flying personnel were evaluated in respect to their ability and assigned to the active units accordingly. In this way, there was a good chance that each pilot, after the completion of advanced training with his active unit, would really be capable of meeting the demands to be made upon him during employment at the front. Personnel were released for assignment to the front only after they had demonstrated their readiness for such asignment. Training in the replacement units emphasized the following:

If the pilot was to be fully in control of his aircraft at all times, he must also be capable of taking off and landing on small, often no more than provisionally equipped airfields, of low-altitude flight, and of formation flight - all with fully-loaded aircraft. Thorough training was given in instrument flight techniques, including intensive practice in instrument landing, as well as in the releasing of paratroopers over their target. Observer personnel were expected to possess a well-founded basic knowledge of radio navigation techniques. In addition they had to be familiar with the regulations governing the loading and unloading of supply containers, the most usual methods of releasing them , and the most common target location methods. Direction finding, especially in low-altitude flight, by reference to local landmarks was an important part of the training of observer personnel.

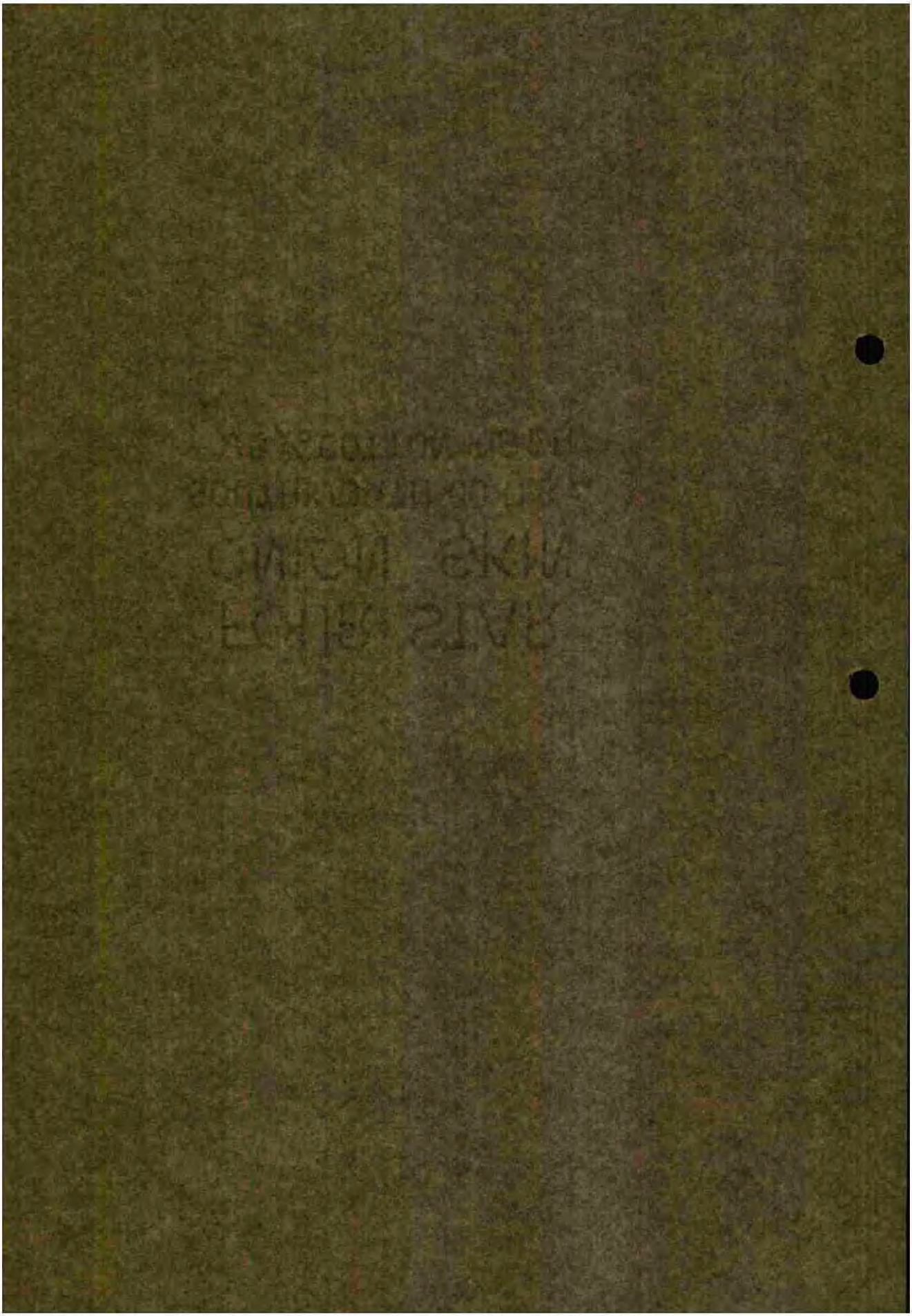
As far as the airborne radio personnel were concerned, training with the replacement wing consisted largely in reviewing and expanding the instruction received at the radio school and in providing them with practical experience as part of an actual crew.

The airborne mechanics and aerial gunners were trained thoroughly in the proper loading and unloading of the aircraft, including the most efficacious load distribution. They also had to be familiar with the technical maintenance of the transport aircraft and be capable of carrying out maintenance service in case of necessity.

The goal of crew training was the development of a closely coordinated group, each member of which was able to take over the tasks of the rest in case of emergency.

As has already been pointed out, the establishment of the personnel replacement wing came relatively late, which meant that it was no longer able to carry out its mission to the fullest extent. The shortage of aviation fuels, which

became more and more painfully acute during 1944, finally led to the dissolution of the wing. In the fall of 1944, it was reduced to one group and in November 1944, to a single squadron.



h. Naval Flight Training

The air forces assigned to coordinated operations with the Navy in Germany never attained the importance of their counterparts in other countries, England and the United States, for example. One reason for this is the fact that the navies of these countries played a much larger role than the German Navy and were, in fact, at the top of the hierarchy of their respective military service branches. Even more significant for the situation in Germany, however, were certain political and personal points of view which were permitted to influence the course of events. Goering, as Commander in Chief, Luftwaffe, was firmly convinced that everything operating in the air was subordinate to him and could be employed only at his express command. For this reason, the forces placed at the disposal of the German Navy by the Luftwaffe were limited to an unavoidable minimum. Strategic aerial warfare over water was carried out by the Luftwaffe with its own units.

After the reorganization of the training program under the auspices of the Chief of Training, the Inspectorate for Naval Air Forces (Inspektion der See-flieger) (Luftwaffe Inspectorate No. 8) was created on 1 February 1939 to assume responsibility for the training of the air crews destined for detachment to the Navy.

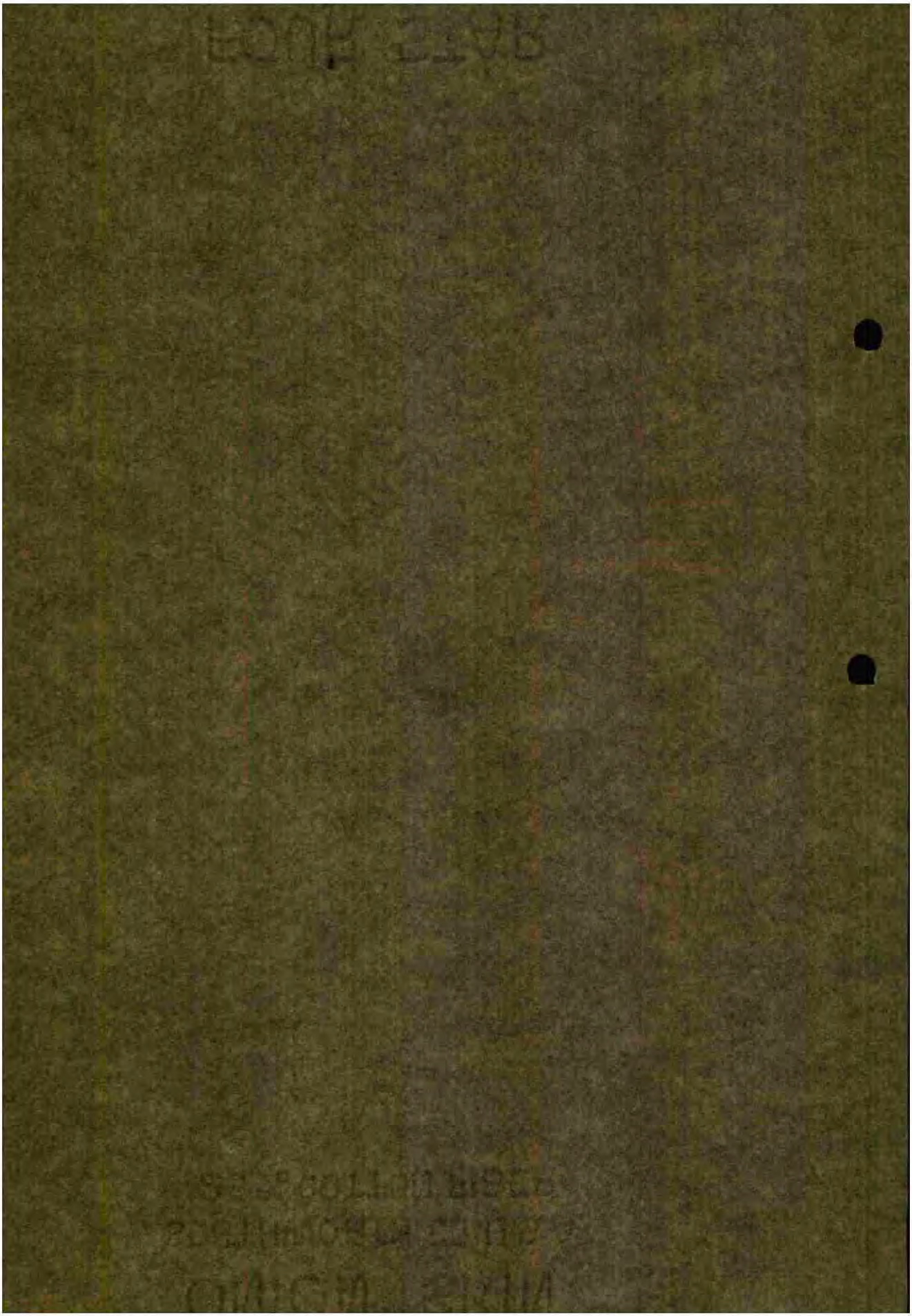
Luftwaffe Inspectorate No. 8 had charge of the training of pilots, observers, airborne radio operators, airborne mechanics, and aerial gunners for the various naval air forces up to the time of their assignment to an active unit. Assembled into permanent crews in the active units, they were given advanced, specialized training to prepare them for assignment to

the front. Again, this was the same system as was followed in the other Luftwaffe branches, and - again - the same situation developed. During the early years of the war, the active units were still able to carry on pre-front training with some degree of effectiveness. Soon, however, special personnel replacement units had to be organized to take over the advanced training of the young crews assigned by the office of the Chief of Training. These replacement units were located in Kamp (Copenhagen), in Holtenau (attached to the 9th Sea Reserve Squadron (Seenotstaffel)), and at the headquarters of the personnel replacement wing of the air transport forces.

The number of crews participating in this training program was never particularly large. During the summer of 1943, for example, an average of no more than fifteen crews completed training each month. They belonged to the following categories: 4 crews for shipbased and coastal reconnaissance aircraft; 5 crews for long-range reconnaissance aircraft (sea); and 6 crews for the sea rescue squadrons[113].

Before going any further, a few explanatory remarks may be in order concerning the concept of "air seamanship" (Flugseemannschaft), or "airmanship" (Fliegerschaft), as it was later called - a concept which enjoyed great popularity among naval air force personnel. It had its special significance for each member of the crew and it served as a general basis for the over-all training program. For the pilot it meant the proper handling of his seaplance on the water, including landing on the water, taking off smoothly from the water, loading and unloading personnel and materiel with the help of a crane, anchoring the plance to a buoy, preparing the plane to drift, anchoring the plance firmly, weighing anchor, starting the engines at sea, maneuvering to permit a boat to come alongside, etc. In this same general direction, each crew member

113 - Based on a report by the Chief of Training, No. 530/43, classified, dated 6 May 1943, "Ausbildungszahlen" (Training Statistics). Karlsruhe Document Collection.



was expected to be thoroughly familiar with his own part of the over-all task and fully capable of working without supervision.

In the training of observer personnel, special emphasis was placed on absolute mastery of compound navigation (including determination of wind direction and velocity), as the one form of radio navigation which is invulnerable to enemy interference and which is wholly different from ocean navigation or even aerial navigation over land. The accurate identification of ship types was extremely important in view of the generally recognized difficulty of estimating the size of a ship from a distance, especially from the air, and intensive instruction was given in the identification of war ships by nationality, class ,and - if possible - name. In this respect, a good many errors were made during the war - by the naval air forces of other nations as well - chiefly when there was no way of identifying accurately at least one ship of a group in order to use it as a measuring rod for the others.

In case of need, i.e. in the event of an emergency landing on the water, the airborne radio operator had to be capable of exhausting all available possibilities in order to establish contact with the sea rescue service.

In order to be sure that they acquired the quality of "air seamanship", all flying personnel assigned to the Navy (unless they had been recruited from the Navy in the first place) were required to attend the Luftwaffe Naval School (Seefahrtschule der Luftwaffe) at Lobbe, on the island of Ruegen.

The reorganization of the over-all training program ordered by the General of Pilot Training

in 1943 tightened up the naval air training program as well, in that it shortened the length of the training period by some 15-20% (in comparison with pre-war days). In this connection the reader is referred to Appendix 42[114], which presents a graphic summary of the length and course of training for the naval air forces, broken down into the various categories of flying and aerotechnical personnel.

114 - See Appendix 42, which is based upon the directive issued by the Reichs Air Minister and Commander in Chief, Luftwaffe, No. 460/44, classified (General of Pilot Training, Training Branch V), copy # 24, Karlsruhe Document Collection.

Section 4. Supplementary Flight Training at Specialized Luftwaffe Schools

a. Instrument Flight Training

The training leading to full qualification as an instrument flight pilot, category C, was the lengthiest, the most complicated, and the most costly (in terms of both money and equipment) in the entire Luftwaffe. Its origin, in the commercial flight schools, goes back to the years 1929 and 1930; it was to reach its peak during World War II.

Course of Training (up to 1942)

During peacetime and even during the first few years of the war (until 1942), pilot candidates came from the A/B schools to the C-schools where they were trained to operate multi-engine aircraft and at the same time earned their instrument flight license, class A.

Once the trainees had reached the point where they were able to handle their new aircraft well under normal flight conditions, training in instrument flight began. The level of difficulty was gradually raised until the trainee was able to hold his machine steady in the usual flight positions by instrument only. At the same time a start was made in night flight training, at first in the form of short flights over the airfield, then gradually to points farther and farther away. Thus, the students were already being trained to qualify for the instrument flight license, class A, which required demonstrated mastery of the instrument flight techniques (utilizing direction indicator, bank-and-turn indicator, sphere, and variometer) needed to keep the aircraft in a given position,

to penetrate cloud covers at approximately 990 ft., and to carry out short flights through the clouds. The basis for navigation, however, was still orientation by visible landmarks, and all landings were carried out under adequate visibility conditions.

Further training, leading to the instrument flight license, class B (known during the war as instrument flight, category II), was left to the instrument flight schools.

There the trainees were introduced to the Link-trainer, a structure consisting of a covered cockpit with instrument panel and steering gear, hydraulically and electrically equipped to simulate flight position and to operate the instruments accordingly.

Unfortunately, there were not enough of these valuable machines available. They did have certain defects, of course, and because of this their use was opposed by some, but they were extremely useful in teaching the student to think in terms of his position in space and in preparing him for practical flight training in a real aircraft. Their use saved a good many flight hours.

Once graduated to real aircraft, the student began his training towards the instrument flight license, class B, with steadily increasing flights inside the clouds. At this point, of course, radio navigation came in for thorough study. In intensive theoretical instruction on the ground, course computation was practiced and radio navigation and direction finding problems worked out until the theories involved had been mastered thoroughly. The final practical test took the form of an instrument flight through the clouds from point A, via points B and C, to point D, where the candidate was required to land in accordance with a certain specified procedure.

In order to facilitate landings of this type (bad-weather landings), the Luftwaffe

developed the ground-to-air and air-based direction finding methods. The first was based upon a radio station on the ground which guided the aircraft to its destination by feeding it direction-finding data and checking its reported course. In this method it was the airborne radio operator who played the most important role, since it was his efficiency which determined success or failure. For this reason, the pilots and radio operators took this part of their training together, so that they might become accustomed to working together; usually they remained together in their final assignment to a front unit as well. The ground-to-air method had the decided disadvantage that it could rarely be used over enemy territory; in addition there was always the danger of enemy monitoring and a consequent discovery of one's own plans.

The air-based direction-finding system required no radio transmission from the aircraft; the observer or radio operator took his bearings and computed his position. The aircraft in use at the front even had built in direction-finders (type V-a) which enabled the pilot to take bearings for himself. In addition, his navigational charts (Mercator projection) indicated the exact location of radio transmitters and Luftwaffe radio beacons. The air-based method was the one most often used at the front, particularly in view of the usual requirement of maintaining radio silence.

Bad-weather approaches and landings were the most important and, at the same time, the most difficult phase of the instrument flight training. Depending upon weather conditions, three separate methods had been developed: 1) break-through after computing distance from the ground (looping approach) 2) the zz-procedure*, for use under particularly bad weather conditions; and 3) landing by radio beacon,

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Translator's Note: "Instrument approach system that uses very high frequency direction-finding stations to take bearings on aircraft and to give instructions on when to make standard turns to bring the aircraft in for landing." (USAF Dictionary, Air University Press, 1956 p. 577)

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for use when the cloud cover was below 160 ft and visibility ahead less than 1,600 ft. Only the best crews and the instuctional personnel mastered the last two methods; the breakthrough procedure was sufficient for the majority of the crews. For this reason, before each mission the meteorological charts were carefully studied and alternate landing fields designated.

Prior to the beginning of the war, there existed two instrument flight schools, one in Wesendorf and one in Brandis. Their combined capacity was adequate only because of the fact that some of the pilots assigned directly from the C-schools to the active units were able to earn their instrument flight license, class B, with the units.[115] And thus the situation remained through the first winter of the war. Then, however, the rapidly sinking rate of operational readiness at the front necessitated both a speed-up and an increase in the assignment of replacement pilots, and the instrument flight training program had to be expanded accordingly. At the peak of its development, in 1943, the program had thirteen schools at its disposal. They were subordinate to a special command headquarters.

Reorganization in the Training Program (1945)

This considerable increase in the number of instrument flight schools was due not only to the increased needs of the front. An even more important factor was the expansion of the night fighter, air transport, long-range reconnaissance, and twin-engine fighter units to the point where their demands for crews trained in instrument flight began to exceed those of the bomber units, which had been the biggest customer up to that time.

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115 - Training was carried out by experienced pilots holding the instrument flight license, class C (Instructors' permit); navigational instruction was provided by the group navigators.

In addition, night employment was becoming a regular thing for a part of the bomber units, and this, too, served to intensify the demand for pilots capable of flying by instrument.

The fundamental reorganization of the pilot training program, which we have already described above[116], was designed to meet these new demands. During the course of the reorganization, the functions of the former C-schools and instrument flight schools were combined in the newly established B-schools. The distribution of flight hours was altered to give the trainees, once they had learned to operate front-type aircraft, considerably longer and more intensive training in instrument flight techniques, enabling them finally to qualify as combat instrument pilots (negotiating a curve with two or three bank-and-turn indicator degrees).

In the meantime, the Allies' change in offensive tactics had also created the need for mastery of instrument flight on the part of the single-engine fighter units assigned to home air defense operations. The development of new bomb-sights which made pinpoint bombardment possible even through clouds and during inclement weather made it imperative that the defending fighters be sufficiently invulnerable to weather conditions that they could fly through a cloud bank in formation. Instrument flight training for fighter pilots was carried out by the 110th Single-Engine Fighter Wing at the newly established (1943) instrument flight school for single-engine aircraft at Altenburg. At the same time, the units at the front began to install special fighter landing aids in their aircraft, devices which enabled the pilot to find his way back to his home airfield even in bad weather. Though viewed with considerable distrust in the beginning,

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116 - See Chapter II, Section 4

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these landing aids soon came to enjoy great popularity[117]. As a matter of fact, they did much to give the fighter pilot a feeling of security and confidence while in the air.

During the course of the war, the instrument flight training program suffered under the same shortages which forced the curtailment of other training programs - lack of aviation gasoline and lack of sufficient front-type aircraft for training purposes. In view of the vital role played by instrument flight, the inevitable results were chronically understrengthed front units and a high rate of otherwise avoidable losses[118]. The course of training and the material covered proved entirely satisfactory.

b. Flight Instructor Training in the Luftwaffe[119]

Development Prior to 1939.

During the years following World War I steps towards the establishment of a corps of flight instructors were taken in the form of training programs attached to the schools of the Sport Fliers, Inc. (Sportflug G.m.b.H.) and the Commercial Flight School. The Sport Fliers' schools trained the student from the A-license through the B-1 license and the aeronautical acrobatics license; at the Commercial Flight School, the student went on to qualify for the B-2 license. Advanced training leading to assignment as a commercial pilot was carried out by experienced members of that profession.

These post-war flight schools had no lack of experienced instructional personnel, but there was a decided lack of uniformity in the training they gave.

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117 - See J. Priller, "Geschichte eines Jagdgeschwaders" (History of a Single-Engine Fighter Wing), Heidelberg, 1956.

118 - See Chapter V, the Lessons of Experience.

119 - The data contained in this subsection are based on an essay by General-major a.D. Otto Fruhner, "Einheitliche Ausbildung der Fluglehrer" (Uniform Training of Flight Instructors), Karlsruhe Document Collection.

The flight instructors, whether older, experienced pilots from World War I or experienced commercial pilots, had themselves been trained in accordance with a number of vastly different systems and each one naturally passed on his own method to his students. The bewildering variety in the training program always became painfully apparent when instructors were transferred from one school to another, for the students always needed a bit of time to adjust themselves to the new teacher's method of instruction. In addition to the loss of time involved, this situation placed an extra burden on the already inadequate training facilities.

When the time came to establish the new German Luftwaffe, in 1934/35 this problem was bound to be one of the most important. Despite the undeniable significance of such matters as expanding and organizing air armaments production and developing a smoothly functioning ground organization, certainly the main emphasis would have to be placed upon the training of flying personnel in general and pilots in particular. This obviously meant that an adequate corps of instructional personnel would have to be available.

To ensure the availability of such a group, the following sources were exploited:

aa) the flight instructors employed by the existing commercial flight schools, most of them World War I pilots;

bb) the flight instructors from the sport fliers' clubs, who had been given a faint idea of instructional methods and procedures in a brief six-week course; and

cc) other civilian pilots, who had earned their licenses privately and then joined the sport fliers' clubs.

The methods used by these men in instructing the students assigned to them were as widely varied as their own origins. There was no such thing as a uniform concept regarding the most desirable method of training the nation's future pilots.

When the student pilots, ostensibly having completed flight training, were assigned to their units, the deficiencies of the heterogenous training system became apparent. The young pilots coming from the various schools usually had to be given a brief summary flight course before unit training could begin. This meant additional time, additional work for unit personnel and additional wear and tear on equipment, and it soon led to complaints regarding the flight school programs in general.

The Flight Training School Command did its best to ameliorate the situation by means of training directives, special instruction, and memoranda, but with negligible success. Equally futile was the attempt to combine certain schools with particular units as a kind of producer-consumer set-up. There was no way out - a new solution simply had to be found. It lay in the founding, in 1939, of the Flight Instructor's School (Fluglehrerschule) in Brandenburg-Briest.

Missions of the Flight Instructors' School (1939-1945)

aa) training of all instructors and instructor candidates in a uniform, standard teaching method;

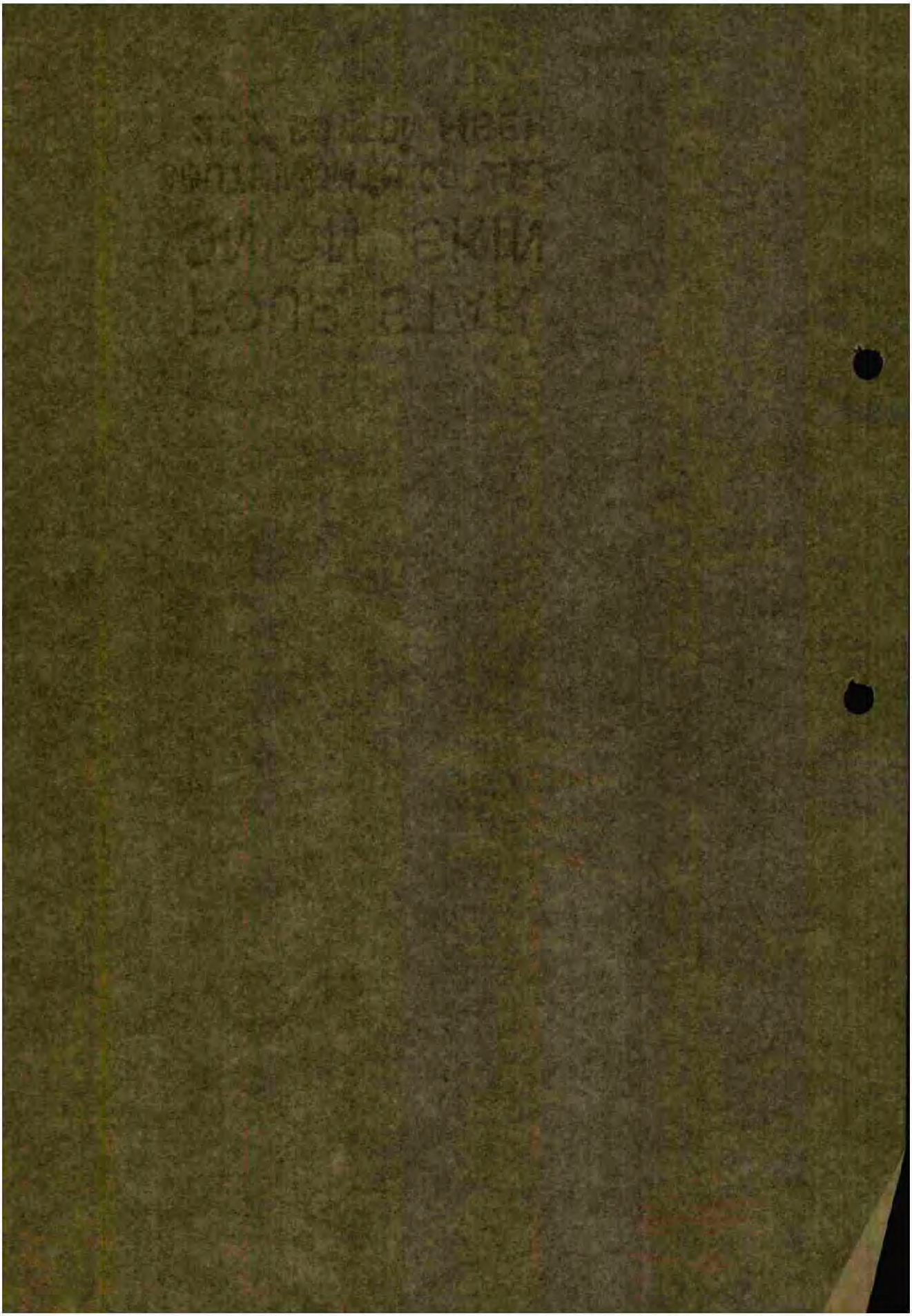
bb) bringing all instructors up to date on new developments in aeronautical theory and practice, for example in navigation techniques, radio operation, aircraft models, air traffic control, etc.;

cc) holding "methods" courses for instructors in the various theoretical training fields in order to standardize the presentation of subject matter;

dd) providing instructional equipment and visual aids, and maintaining a development and testing program for such materials;

ee) final testing of all training aircraft; and

Mention should also be made of two other phases of training which received a great deal of attention-practice alarm drills and bad-weather flights.



Careful training in these two items served to give the flight instructor confidence in his own ability and in his aircraft, so that he would be capable of handling such training later on in such a way as not to jeopardize the personnel and equipment entrusted to him.

The Flight Instructors' School was also in charge of the test courses for holders of the Luftwaffe Pilot's License and the Luftwaffe Advanced Pilot's License, in which the performance of pilots chronically addicted to crash landings, for example, or pilots who had been wounded in combat or injured in accident was evaluated in order to determine their further assignment.

The School also had a well-equipped experimental workshop, where suitable instructional materials and visual aids could be developed, tested, and passed on to the schools. This became all the more valuable after 1939, since industry was no longer in a position to furnish the schools with such items.

A continual, eager exchange of thinking between the schools and the active units made for immediate evaluation of the experience gathered by all of them and for appropriate revision of existing regulations. In this way, it was possible to keep the instructor training program up to date at all times.

One very critical problem was the recruitment of instructor candidates. These were selected by the schools and assigned to the Instructors' School at Brandenburg-Briest for special training. After completion of this training, they were returned to their old schools as instructors. In this way the schools were finally taught to be more careful in their selection. Even so there were never really enough well-qualified instructor candidates; since the vast majority of trainees were eager for assignment to the front, there were very few volunteers. This improved somewhat when candidates were permitted to volunteer for a specified period of instructor duty, after which they were

given the privilege of choosing their own unit at the front.

Beginning in 1943, the Flight Instructors' School made repeated suggestions to the effect that the available instructors and aircraft be consolidated into a fighter squadron to take over alarm duty with the Home air defense forces. This recommendation, however, was consistently and correctly disapproved by the General of Pilot Training[120], since it was vitally important that the training program not be jeopardized by the possible loss of irreplaceable instructional personnel, and since the employment of provisionally organized units of that kind could not be particularly successful in any case.

During the period of its existence, the Luftwaffe Flight Instructors' School fulfilled its mission in an exemplary fashion and succeeded in standardizing the training of all flight instructional personnel. Its effectiveness justified its continued existence until the very end of the war; its presence in organizational charts can be substantiated as late as February 1945[121].

c. Training in the Luftwaffe Bombardment School (Bombenschule der Luftwaffe)[122]

Course of Training Prior to 1939

In 1935, when the Luftwaffe Observers' Schools were set up, there were no trained personnel available to take over the job of instruction in such fields as bombardment techniques and the handling and use of the various types of bombs and fuses. The commissioned and non-commissioned officers assigned as instructors and assistant instructors

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120 - General Fruhner's view (op.cit.) is diametrically opposed to the one expressed here.

121 - In this connection the reader is referred to Appendix 30, which deals with the organization of the staff of the General of Pilot Training as of 8 February 1945.

122 - The data contained in this subsection are based on a study by Generalmajor a.D. Krause, "Die Ausbildung im Bombenwurf und im Bomben-Zuenderwesen bei den Kampfverbaenden (ohne Ju-87 Verbaende)" (Training in Bombardment Techniques and in the Science of Bomb and Fuse Handling in the Bomber

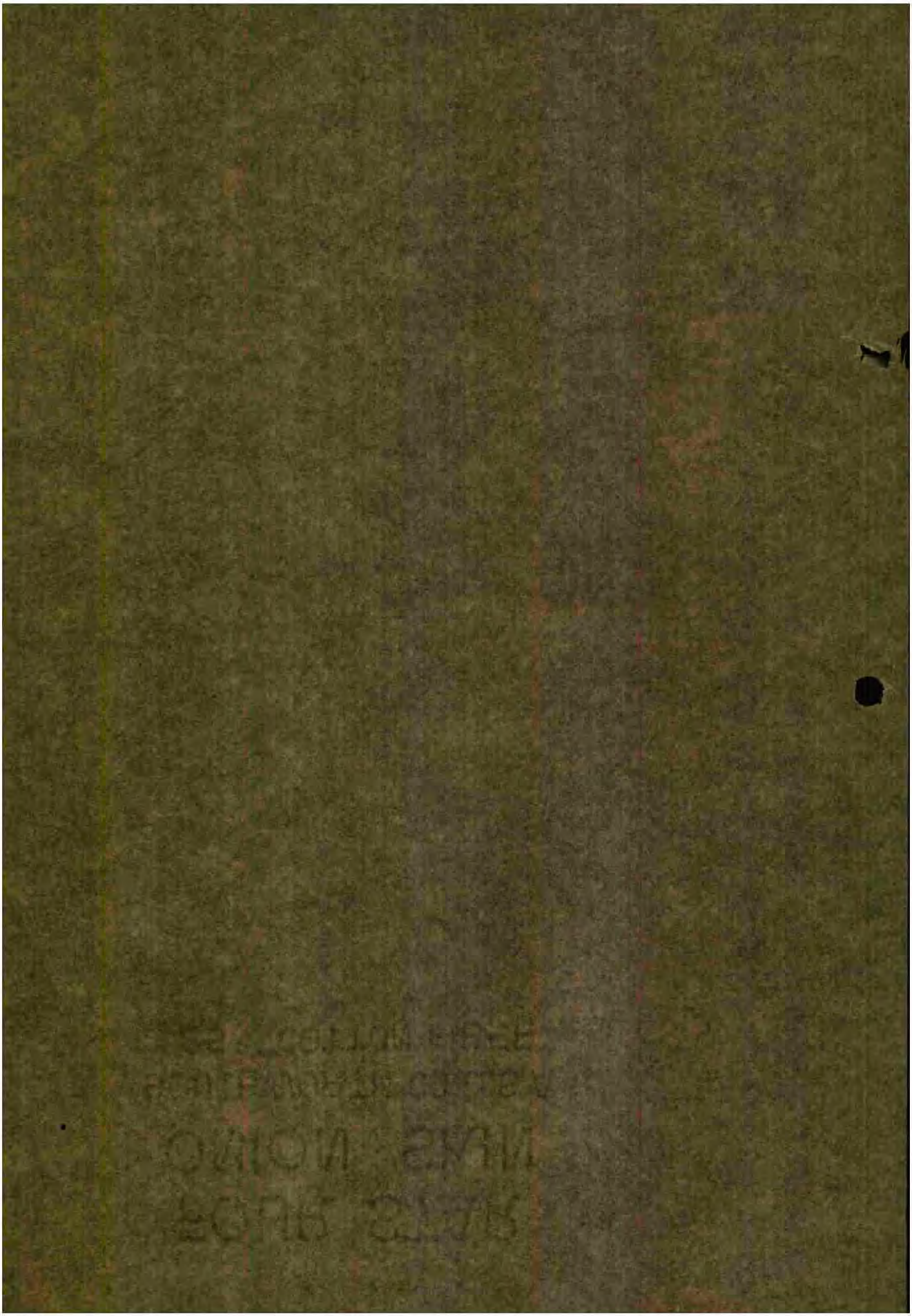
ff) evaluating and disseminating experience gained to units and schools.

The Flight Instructors' School was the first step towards the establishment of a uniformly-trained corps of instructional personnel. The second was to evaluate and classify the old instructors as well as all those currently in training as instructors elsewhere. In the beginning, this action caused no little resentment on the part of the school commanders and training supervisors, who considered it an instance of unwarranted interference in their activities. Their resentment was intensified by the fact that quite a few of the older instructors proved to have neither the practical ability nor the theoretical knowledge to meet the new requirements.

In the beginning, the training program was at a disadvantage, in that it did not yet have sufficient up-to-date aircraft, instructional materials, or personnel at its disposal. By 1940, however, pilots well-versed in the operation of front-type aircraft had been assigned to instructor duty. The existent instructor courses at the A/B and C schools were augmented by a course in the instruction of instrument flight techniques, and all practical and theoretical instruction was carefully coordinated. At the same time, a system of evaluation was developed to provide a uniform standard by which to measure achievement. Courses in applied psychology and in the techniques of effective leadership were also given.

During the course of 1940, an increasing number of bomber units were converted to the Ju-88, which had a reputation of being difficult to handle. In order to combat the resultant feeling of mistrust on the part of the units, the Flight Instructors' School initiated a course for Ju-88 instructors, in which they were taught the most desirable methods for converting the troops to the new type. In this way, the School broadened the foundation of the training program for this particular aircraft type.

122 - (cont'd) Units (Excluding the Ju-87 Units)), Karlsruhe Document Collection, as well as on the personal views of the author.



were only partially qualified for their task and had themselves a great deal to learn. The entire program bore the stamp of a stop-gap measure. The greatest emphasis was usually placed on providing a knowledge of the various equipment involved (chiefly comprising the technical data of the instruments concerned) and on the utilization of the various bombardment methods, the last frequently based on erroneous ballistical concepts. The basic training given at the schools covered bomb sights, bomb release mechanisms, bombs, fuses, and bombardment techniques. Crew and combat training emphasized coordinated operation by the crew and included target approaches and practice bombardment with sacks of cement as well as with live bombs. Responsibility for training lay in the hands of the armament officers (Bombenoffiziere), who were also in charge of instructing the assistant observers assigned to the squadrons.

The number of practice bombardment runs was, for the most part, adequate but the runs themselves were often pointless since they were limited to too low an altitude (3300 to 6600 fr.) or were carried out only against or only with the wind. Moreover, no one considered it necessary to devise an accurate and objective method of evaluating the effectiveness of each run (a serious psychological error - no method of checking individual performance). As a result, the records kept were unreliable and somtimes totally incorredt. Unfortunately, post-practice briefings were not consistently held, although they alone - with their detailed discussion and definition of the lessons gained - would have been capable of making training truly effective.

The inadequacy of the results attained could be attributed, in great part, to the deficiencies of the available bomb sights. The Goerz-Visier-219, a mechanical instrument, was not stabilized, which meant that the point of aim could not be held consistently; it was inaccurate in measuring lateral drift, so that

bomb release either directly with the wind or directly against the wind was the only assurance of success. Measurement of aircraft speed in relation to the ground was of very little help, especially since it could not be carried out directly over the target. The coordination of the tasks of the pilot and the observer during the target approach flight was extremely difficult, and adequate performance was attained only after a great deal of practice and with the use of tightly defined criteria. Practical training in the technical fields of bombardment and gunnery was largely neglected, since flying was the important thing for the units. The notion prevailed that these items were secondary, that in case of necessity the target would be hit somehow; this bears testimony to a gross exaggeration of the effectiveness of the bomb.

The optical sight Lotfe 7-C, still in process of being introduced when the war began, permitted stabilized aim and, in addition, could be integrated into directional control equipment, thus increasing hitting accuracy considerably. Prior to the outbreak of the war, however, this device was not available for training purposes in the units.

The poor results achieved with the Goerz-Visier-219 in horizontal bombing - presumably it was incapable of anything more in high-altitude employment - were an important factor in the increasing preference (and final exaggerated confidence) bestowed upon the dive-bomber technique.

Establishment of the Bombardment School at Anklam in 1939 and the Missions Entrusted to It.

In 1939, the unsatisfactory conditions in the field of horizontal bombardment led to the founding of the Luftwaffe Bombardment School at Anklam. Obviously, it was incapable of bringing about a change for the better in bombardment training over night. Its two primary missions were the following:

Training of all bombardment instructors and assistant instructors, and

Training of units commanders in bombardment techniques and in the handling and employment of bombs and fuses.

When the school was established in 1939, it consisted of an instructional group[123] and an experimental group[124].

In 1940 the two original sections were augmented by an instructional station at Cognac, devoted to the study of bombardment techniques for application to naval targets. Together with the 40th Bomber Group, this station developed a procedure for the bombardment of naval targets which proved highly successful. With the help of the Lotfe 7-D, even high-altitude horizontal attacks on ships proved feasible, when enemy antiaircraft defenses made low-level attacks too dangerous.

At the end of 1941, the school was transferred to Greifswald and re-designated the 1st Bomber Training Wing.

In 1942, the Unit Commander School (Verbandsfuehrerschule) at Tours was attached to it.

In 1943, it was rechristened the 101st Bomber Wing and reorganized into the following four groups:

I Group - instructional group (Greifswald)

II Group - experimental group (Greifswald)

III Group - naval bombardment group (Cognac)

IV Group - unit commander school (bomber) (Tours)

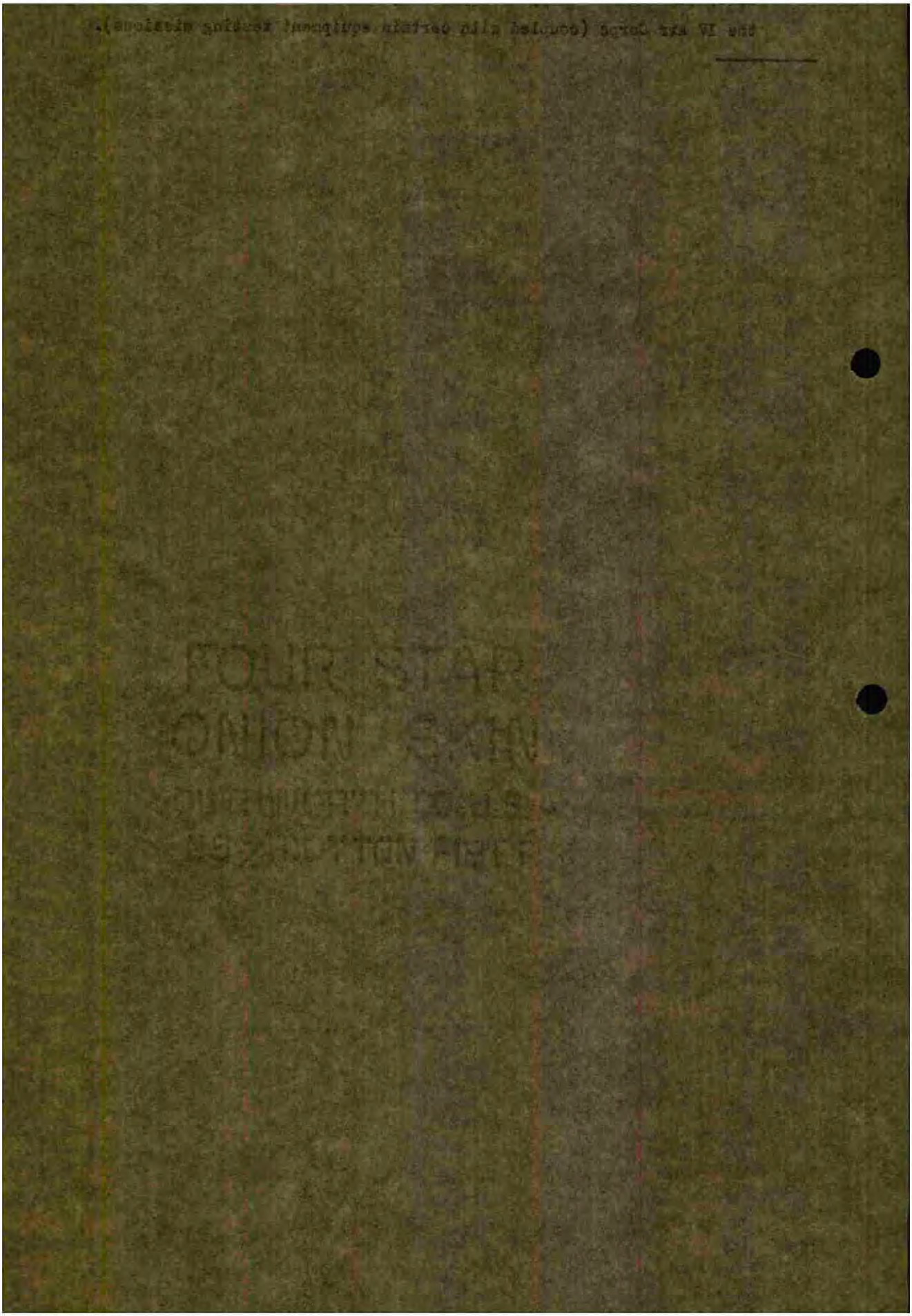
In May 1943, the III Group was reorganized to a fast bomber group (Schnell-kampfgruppe), only to be deactivated completely in the fall of 1943.

In September 1944, the wing staff of the 101st Bomber Wing was deactivated and the I and II Groups combined to form the Bombardment and Target Location School (Bomben- und Zielfinderschule)[125].

123 - Its chief advocate and commander was Lt.Col. Boehm.

124 - Major Taubert was its commander for many years.

125 - In 1944 the most experienced squadron captain of the target location unit, 4th Bomber Group, set up a target location training squadron for the IV Air Corps (coupled with certain equipment testing missions).



The Unit Commander School resumed its original status as an independent entity.

Within the framework of the organizational set-up described above, the Bombardment School carried out the following training missions:

aa) Training of bombardment instructors and assistant instructors for all schools;

bb) Training of all instructional personnel assigned to the "fourth" (replacement) groups;

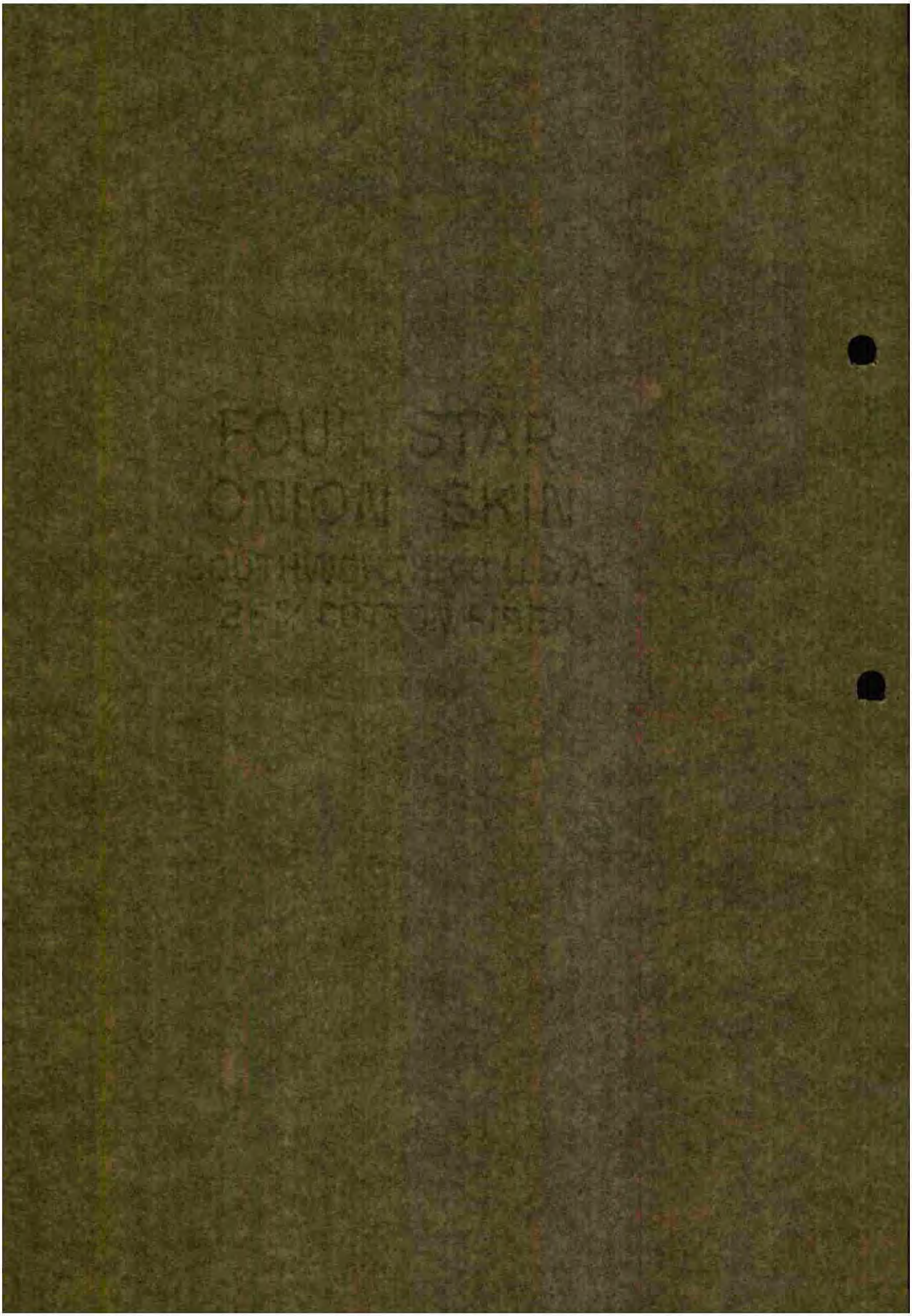
cc) Training of unit leaders and unit commanders; and

dd) Conversion of units to modern bomb sights, both in the schools and at the front.

In connection with the first mission named above, it should be emphasized that both theoretical and practical training were given. In addition to a thorough grounding in bomb sights, bombardment techniques, and the utilization of the various types of fuses, the trainees carried out practice target approaches, first at the target table and then at the school's practice bombardment range. Once the student had mastered the approach technique, he was drilled in bombardment. The results were usually remarkably good and even in high-altitude bombardment (above 13,000 ft.) perfectly acceptable, especially in view of the fact that in a real situation at the front the target would be covered by an entire unit or at least several aircraft, while the practice runs were carried out by individual aircraft. The trainees, almost without exception, were able to convince themselves that the bomb sight Lotfe 7-D was absolutely reliable and, when properly utilized in the target approach and aiming operations, guaranteed a direct hit.

As far as the second of the above-listed missions is concerned, we must take into consideration the fact that training in bombardment techniques was

steadily becoming an important part of the training given in the replacement groups. Combat-seasoned crews detached to instruction duty were given thorough training



at the Bombardment Schools in both the material to be covered and in the methods to be utilized in covering it. The emphasis, of course, was less on the training of bombardment techniques than on the practical methods of passing these techniques on to the students, since after all the crews of the replacement groups were destined for direct assignment to the front. Thus the primary stress was placed upon absolute mastery of the target location prodedure, which - in the case of really good crews - was not supposed to take longer than one minute. The Bombardment School compared this extremely important run through enemy antiaircraft fire with the last "spurt" of infantry troops moving in to the attack - an action which simply had to be accomplished correctly. Naturally, perfect mastery required a rigorous period of combat training comprising countless practice runs under daylight and nighttime conditions. During periods of bad weather, drills were held at the practice-bombing panel with the bomb sights; the techniques of measuring drift directly over the target area had to be mastered perfectly. Trainees were reminded again and again that direct hits could be achieved with even the very best aiming devices only by dint of unrelenting practice and that hit-and-miss training could not possibly lead to success. No matter how far an aircraft might penetrate into enemy territory, its mission was pointless unless the target were actually hit.

Training in the handling of the various types of bombs and fuses placed the greatest emphasis on the proper selection of the bomb and the fuse to be used for each particular purpose. Theoretical training was supplemented by special drills designed to illustrate the principles advocated.