From the very beginning, they were on military duty.

The preliminary selection of applicants could be carried out in accordance with the same high standards as prevailed in the case of recruitment for the basic schools, for there was no lack of volunteers.

These young men all had a good school education behind them when they entered the non-commissioned officer schools. They had either completed apprentice training and a vocational school course or had gone through a secondary school (Gymnasium) at least as far as "Sekunda-Reife" (approximately the equivalent of high-school graduation).

The course of training was as follows:

a. one year of non-commissioned officer school, comprising basic military training and the completion of non-commissioned officer duty with a regular troop unit. Athletics, general school subjects, and instruction in national political ideals were also included in the duty schedule.

b. six months' service in a troop unit as acting corporal (Gefreiter); upon successful completion of this probationary period, assignment to non-commissioned officer rank.

This training period of one and one-half years was regarded as a minimum during time of war; during peacetime it would have been augmented by an additional six months.

The first troop-level reports on the effectiveness of non-commissioned officer training program were highly favorable. The first crop of graduates assigned to the troops performed with exemplary efficiency.

The schools were abolished in 1944 and 1945. When the fighting advanced into the Aix-la-Chapelle area, the last two were deactivated.

6. Evaluation of the Trainees and Their Assignment to Further Training Categories.

It was the policy of the Luftwaffe to make certain that each young recruit was given training in that specific field for which his background and capabilities best suited him. And in view of the many different fields of activity represented in the flying units, the aerotechnical service, the air ordnance service, and the signal communications forces, it was imperative that the recruits be classified in the appropriate training categories during their very first training course. In addition to character and military ability (as evidenced by their performance during training), such factors as pre-induction background, former profession, and individual talents and inclinations were also taken into consideration in evaluating the recruits.

Whenever a man was released by a training unit for assignment to a school or to a duty unit, a complete report on his performance and a brief evaluation of his ability accompanied him to the gaining agency. This evaluation gave a concise picture of the man's character, his performance during training, his particular talents, and recommended possible areas of employment. The written evaluation accompanied the individual throughout his military career. Each new supervisor was expected to add to it or, if necessary, to correct previous entries in the light of new evidence (suitability for special missions, readiness for promotion, etc.).

Section 2. Flight Training[64].

1. Preface.

Training for service with the flying units, with their fifteen different branches and sub-branches, each comprising some forty distinct airborne categories of personnel plus approximately thirty-five aerotechnical and air ordnance categories, was necessarily highly specialized and thoroughly decentralized[65]. Over-all command, however, was exercised though a single agency in order to guarantee some degree of uniformity in the training program.

Depending upon their specific functions within an airborne crew, all flying personnel completed a course lasting from one to two years and divided into the following fields of training:

a. individual training in the student's own field of activity,

b. training as a member of a crew, and

c. advanced training in some fields.

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64 - The data included in this section are based on the following documents:

1. L. Dv. 21 "Die Flugzeugfuehrerausbildung Land und See" (Luftwaffe Directive 21, Pilot Training, Land and Sea Aircraft), edition of 1940.
2. A study by Generalmajor Rath, last commander of the 1st Air Training Division, Goeppingen, "Die Flugzeugfuehrerausbildung A/B" (Pilot Training in the A/B Schools).
3. A study by Major Weldin, commander of an A/B school, "Organisation des Ausbildungsdienstes einer Flugzeugfuehrerschule A/B" (The Organization of the Training Program at a Pilot Training School of the A/B Category).
4. Ausbildungs-Richtlinien Nr. 3 (Training Guideline No. 3), by Major Weldin, containing directives for the flight group instructors.

(All of these sources are contained in the Karlsruhe Document Collection).

65 - See Appendices 31 and 32.

Advanced flight training by unit, designed to prepare the students for action at the front by teaching them combat mehtods within the wing, will be dealt with separately in subsection 3, below.

All aspects of the flight training program were based on appropriate printed Luftwaffe directives (Luftwaffen- Druckvorschriften), supplemented by special service manuals and training instructions put out by the Luftwaffe Inspectorates and the offices of the branch generals. Further details may be obtained from the summaries of these publications contained in subsection 11, below.

In the year 1939, the Luftwaffe had a total of 110 aircraft of all types for use in the training program.

The first phase of training (a, above) served to familiarize the trainee with his own particular function, bringing him up to peacetime proficiency. The students were separated during this phase of training, each group attending its appropriate school. The ultimate goal of this first phase was to prepare the trainees for further study at the appropriate Luftwaffe ordnance schools.

The second phase (b, above) served to perfect the student's mastery of his chosen field, including the ability to accomplish his own particular task effectively as a member of the crew. This phase was the responsibility of the appropriate Luftwaffe ordnance schools, which united the graduates of the individual preliminary courses (pilots, airborne radio operators, etc.) for joint training at crew level.

Beginning 1940, the second phase was subjected to alterations as follows, as a result of the experience gained during the first years of warfare.

and of the economy measures necessitated by the military situation:

a. 1940: Crew-level training was taken over from the Luftwaffe ordnance schools by the newly-established groups IV (Training) - later known as Personnel Replacement Groups (Ergaenzungsgruppen) - of the front training wings. Training was closely supervised by the wings in an effort to expose the young crews to the experience gained at the front as directly and as early as possible.

b. 1943: The Luftwaffe ordnance schools were reorganized into t training wings, without experiencing any change in their responsibilities. Their primary tasks were training at crew level and assignment of the ultimately qualified crews to the personnel replacement groups. The steadily worsening air situation at the front and in the home area, however, soon made even more drastic modifications imperative.

These training wings (single-engine fighter, night fighter, twin-engine fighter, and ground support) were given concurrent duty assignments as home air defense units. At this point, of course, the last phase of training was automatically integrated into actual employment at the front.

Naturally, it was not possible to employ the training wings as integral units. The best-qualified and most advanced students were organized into squadrons which were utilized for special, short-term missions within the framework of home air defense operations. There can be no doubt that these measures, born of the exigencies of the situation, were anything but conducive to an effective training program.

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These training wings (single-engine fighter, night fighter, twin-engine fighter, and ground support) were given concurrent duty assignments as home air defense units. At this, of course, the last phase of training was subconsciously interpreted into actual employment at the fronts.

Naturally, it was not possible to employ the training wings as integral units. The best-qualified and most advanced students were organized into squadrons which were utilized for special, short-term missions within the framework of home air defense operations. There can be no doubt that these measures, born of the exigencies of the situation, were anything but conducive to an effective training program.

c. late 1943: The missions assigned to the bomber and reconnaissance training wings were changed once more. The wings were transformed into bombardment observer and reconnaissance observer schools (Kampfbeobachter- und Aufklaerungsbeobachterschulen). The main emphasis was shifted to the training of observers, bombardiers, and airborne radiomen to the detriment of crew-level training as a whole. This step, also dictated by a lack of time and of adequate numbers of front-model training aircraft, led further long the road towards standardization of training. At the same time, it placed an increased burden on the facilities of the personnel replacement units, which now had to assume full responsibility for assembling the crews and for preparing them for ultimate assignment to the front.

Despite all the various reorganizations and modifications, the Luftwaffe ordnance schools and the training wings retained at least the nominal goal of preparing their trainees for at least limited employment at the front. The personnel replacement groups still aimed at full preparation for front assignment.

The third phase of training (c, above) was intended as a review and intensification of the training given in the first two phases; the trainees were usually specialist personnel from the units. In addition, these specialized supplemental training courses made it possible for the units to keep up to date on new aeronautical and technoligical development by detaching qualified personnel temporarily for school attendance.

The cooperation of the ordnance inspectorates and the headquarters of the various ordnance branches contributed a great deal to the effectiveness of the specialized training program.

2. Individual Training of Crew Members.

a. Pilot Training (up to the Advanced of Luftwaffe Pilot's License - for Land and Sea Aircraft).

Introduction.

In order to operate a military aircraft belonging to the German Luftwaffe, a pilot needed official permission from the Reichs Air Minister and Commander in Chief, Luftwaffe. Licenses were issued, based upon the type and size of the aircraft involved, upon successful completion of the prescribed training courses and the official examinations. Prior to 1936, training and testing requirements were based on the German Aviation Law (Deutsches Luftverkehrsgesetz) and the Aviation Ordinance (Verordnung ueber den Luftverkehr); after 1936, on Luftwaffe Directive No. 21.

Qualification for a Luftwaffe Pilot's License presupposed successful completion of a flight training school of the A/B category; for the Advanced Luftwaffe Pilot's License, completion of a flight training school of the C category (multi-engine aircraft). Flight training in sea aircraft, a separate and independent program, was the prerogative of the C schools. After completion of a specified number of hours in cross-country formation flight in C-type aircraft, C school graduates were eligible for further training in instrument flight leading to the Instrument Flight License, Category I or II, and to the Instrument Flight Instructor License.

The purposes and goals of the instrument flight training program are described in detail in paragraph 4 a, below.

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Qualification for a Luftwaffe pilot's license presupposed successful completion of a flight training school of the A/B category; for the advanced Luftwaffe pilot's license, completion of a flight training school of the C category (multi-engine aircraft). Flight training in one aircraft a separate and independent program, was the prerogative of the C schools. After completion of a specified number of hours in cross-country formation flight in C-type aircraft, C school graduates were eligible for further training in instrument flight leading to the Instrument Flight License, Category I or II, and to the Instrument Flight Instructor license.

The purposes and goals of the instrument flight training program are described in detail in paragraph 4 a, below.

The Organization of Training at Flight Training Schools of the A/B Category.

The A-B schools were the beginner schools for pilot training; their students, coming from the pilot candidate battalions, encountered Luftwaffe aircraft for the first time. The subsequent development of "flyer mentality" and flight discipline often depended upon the way in which the young recruit was received at his A/B school and the manner of his introduction to flying.

The school commander and the class leader (Lehrgangleiter) bore the greatest responsibility for the proper instillment and development of these attitudes and ideals. Thus, their task included a great deal more than merely making certain that the training offered was thorough and competent.

The military education and personal development of the trainee were, of course, just as important as his professional training. The ultimate goal was a corps of highly-qualified aircraft crews whose general training was substantially above that usually found among the lower ranks.

The role of the A/B school was to qualify its trainees for the Luftwaffe Pilot's License and to evaluate their abilities and inclinations accurately enough to be able to recommend them for one of the two following advanced training programs:

a. training at the appropriate Luftwaffe ordnance schools as close-range reconnaissance, fighter, dive-bomber, or close-support pilots.

b. training at a C school (multi-engine aircraft) as long-range reconnaissance, bomber, or transport pilot.

Scope of the A/B Schools; Organization and Operation of a Typical School.

The A/B schools were naturally more numerous than any other type of pilot training school. In addition to the air war academies with the A/B curriculum and

aircraft for the first time. The subsequent development of "flyer mentality" and flight discipline often depended upon the way in which the young recruit was received at his A/S school and the manner of his introduction to flying.

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The military school and personal development of the trainee were, of course, just as important as his professional training. The ultimate goal was a corps of highly-qualified aircraft crews whose general training was substantially above that usually found among the lower ranks.

The role of the A/S school was to qualify its trainees for the difficult pilot's license and to evaluate their abilities and inclinations accurately enough to be able to recommend them for one of the two following advanced training programs:

a. Training at the appropriate tactical evidence schools as close-range reconnaissance, fighter, dive-bomber, or close-support pilots.

b. Training at a G school (multi-engine aircraft) as long-range reconnaissance, bomber, or transport pilot.

Scope of the A/S School: Organization and Operation of a Typical School.

The A/S schools were naturally more numerous than any other type of pilot training school. In addition to the air war academies with the A/S curriculums

and

the E type pilot training schools taken over from the Air District Reserve Boards (Luftgaureserve), there were thirty-four schools in the A/B category. Chapter II, with its section on "Organization", dealt in detail with the frequent organizational changes to which these schools were subjected.

Prior to 1937, the A/B schools were independent entities, their commanders having the disciplinary authority of an independent battalion commander. When the pilot training regiments were set up in 1938, each school was assigned to a regiment as its 3rd battalion. No sooner had the war begun than this situation was altered. As a result of the geographical separation of the stationary battalions from their mobile regiments, made increasingly necessary by military developments, and the steadily growing importance of the training function, the A/B schools soon outgrew their organizational framework and were detached from their regiments to become independent units once more. This time their commanding officers were granted the administrative authority of a regiment commander[66].

Let us examine the functions of the key school personnel at this point:

a. The commander, as top-level administrator, bore the over-all responsibility for the school - for the training, discipline, administration, and logistical support of the units under his jurisdiction. To help him discharge these various responsibilities, he had at his disposal a "school staff" (Schulstab) and an "administrative group" (Gruppe "Verwaltung").

b. The class leader, at the same time chief of his assigned training company (Schuelerkompaniechef), was the most important person after the school commander. He had full charge of the organization and accomplishment of training activity. The class leader was usually an officer of captain's or major's rank, and

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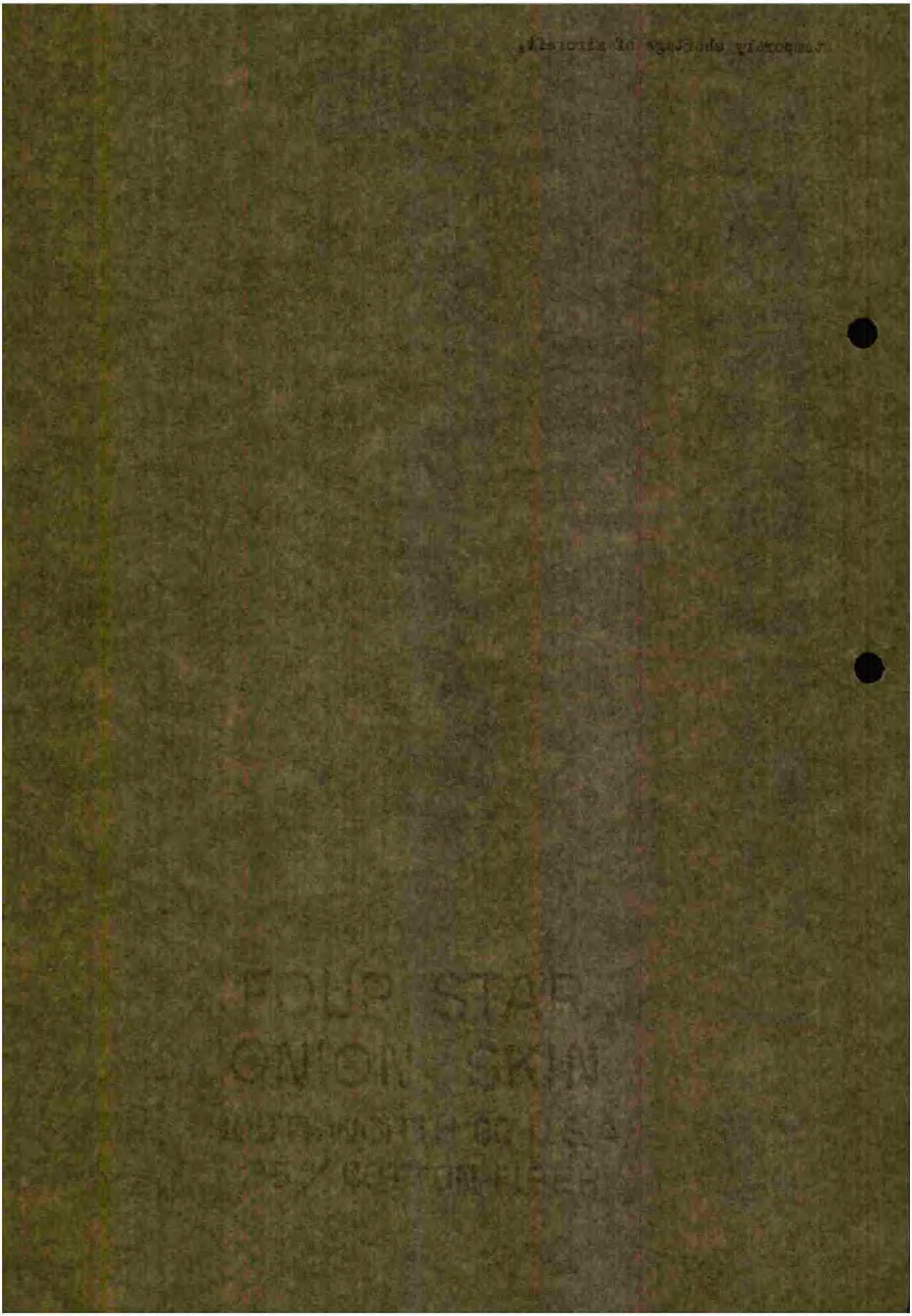
66 - Appendix 32 presents a graphic description of the organizational structure of a pilot training school of the A/B category.

framework in which training was actually carried out. The smooth functioning of the class, in turn, depended upon rational organization as the only means by which the countless typical and atypical problems - bad weather periods, temporary shortage of aircraft,



as a matter of course, was expected to be fully familiar with all the aircraft models utilized within his own special field.

To facilitate the discharge of his duties and to symbolize the extent of his authority, he had the disciplinary rank of a dependent battalion commander (nicht selbstaendiger Bataillonskommandeur). His missions were the following:

1) Orientation and supervision of the instructional staff
2) Preparation of flight duty schedules (including bad-weather schedules)
3) Supervision of the training flight program and inspection of the training standard achieved
4) Coordination of individual training projects and assignment of the subject matter to be covered
5) Assignment and release of students
6) Evaluation of students in terms of their military and professional performance and the making of definite recommendations as to their future employment.

c. The technical officer (Technischer Offizier) was the personal representative of the commander in all matters concerned with the technological operation of the school. It was his primary duty to assure the availability of sufficient training aircraft to meet the school's needs. In the last analysis, the training effectiveness of the school depended on his capabilities and energy. It was particularly important that he maintain a spirit of harmonious cooperation among the aircraft repair depot center (Fliegerhorst-Werftleitung), the class leaders, and the chief of the Technical Company (Technische Kompanie), who had charge of all military maintenance personnel.

The class itself, as an independently occupied entity outside the school staff, was that factor which gave the school its character; it provided the

consequent backlog of trainees, time-consuming duties of purely military nature, etc. - faced by any pilot training school could be met. The ideal, of course, was to integrate military duties with flight duty and theoretical instruction into a smoothly-meshed triumvirate of instructive activity. In order to meet this goal it was imperative that the trainees be grouped into training squads in accordance with the stage of training achieved. Each training squad was entrusted to a group flight instructor (Gruppenfluglehrer), who had eight flight instructors at his disposal[67].

The capacity of the classes varied tremendously, as the events of the war revealed later on. Depending upon how well the school was equipped with aircraft and instruments, how large and efficient an instructional staff it had at its disposal, and how adequate its billeting and airfield facilities were, the normal peacetime capacity of 180 - 210 per class was expanded to 300 - 400 students per class.

Theoretically, a "class" was divided into a probationary period (Anwaerterabschnitt), followed by five flight training periods. Assuming an over-all class strength of 210, this would mean thirty-five trainees in each period.

The probationary period was devoted to military service, maintenance duty, and introductory glider training. Three flight training periods were utilized for local practice flights and two for cross-country practice flight. During the first three periods, the participants were divided into two groups, half of each one practicing in the air while the other halves were given theoretical instruction or technical drill.

During the cross-country practice periods, two half-groups were in the air at the same time. Under this arrangement, some 70% of the

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67 - See Appendix 34.

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air participants were unavailable due to flying duty elsewhere, thus obviating a distracting queue of students milling about waiting to take off. In view of the fact that the entire quota of training aircraft was already in use on such occasions, this was the only way of meeting the situation. Moreover, theoretical and practical training could be handled more efficaciously with the smaller half-groups.

On the average, the training schedule envisaged a total of seven months per class in which to complete pilot training. Thus, with an average overall capacity of 210 trainees, approximately thirty graduates could be released each month.

After the war began, of course, the demand for replacement pilots increased steadily, and after the reorganization of the training program in 1943, which increased the number of students per class, the monthly discharge quota was raised to 70 - 80 students.

Instructional Personnel

The instructional staff of an A/B School was composed of the following personnel:

a. group flight instructors, flight instructors, and assistant flight instructors

b. flight engineers, airborne master mechanics, other airborne maintenance personnel of master rank

c. airborne navigators

d. Luftwaffe signal communications officers

e. Luftwaffe meteorologists

f. military training instructors.

The recruitment sources and training requirements of the above categories of personnel may be summarized as follows:

Prior to the official establishment of the Luftwaffe, pilot training personnel were recruited from Germany's commercial flying schools (see Chapter I). Once the Luftwaffe had been set up, the majority of flight instructors were simply taken over from the commercial schools. After successful completion of military training, they were assigned non-commissioned or commissioned officer rank, depending upon their military ability and previous training. Since there were no special flight instructor training programs in operation prior to 1941, the all-important problem of building a reserve of trained instructors was the responsibility of the flight training schools themselves. The school commanders, with the concurrence of their superior headquarters, solved the problem by holding some of the best-qualified and best-suited pilot students back from each graduating class for further training to fit them for flight instruction duty. Later on, the majority of flight instructor requirements were met by the Flight Training School at Brandenburg/Briest (see Section C (??))

The flight engineers and supervisory aerotechnical personnel were recruited for the most part from the appropriate branches of industry or from the commercial aviation field. This group of personnel was given uniform military training at the Luftwaffe aerotechnical schools or advanced aerotechnical schools.

Most navigational personnel came to the Luftwaffe from the merchant marine or from the seamen's schools. Still others came from the Reichswehr and from the pre-induction flight training schools. Luftwaffe Inspectorates No. 2 (Bomber Forces) and - after 1939 - No. 12 (Navigation, Instrument Flight, and Meteorology) were responsible for the standardization of the military background of this group as well as for their further professional training. Meteorological personnel went through approximately the same procedure,

first under the supervision of the Reichs Meteorological Service (Reichswetterdienst), Reichs Air Ministry, and later under that of Luftwaffe Inspectorate No. 12.

The training of personnel in the signal communications and air traffic control services was the responsibility of special Luftwaffe signal officers detached to such activity. Training officers, commissioned and non-commissioned, came exclusively from the ranks of the Luftwaffe signal communications forces. The Chief of the Signal Communications Forces was responsible for the training of instructional personnel through the establishment of special training squads.

Student Personnel

The pilot training candidates were made up primarily of volunteers. That agency having disciplinary authority for the school or school command was responsible for their selection. Desirable personal qualities as well as military aptitude and physical fitness in all respects for the rigors of military flying were indespensible prerequisites. Physical fitness was determined in a rigorous series of examinations conducted at the Pilot Examination Centers (Fliegeruntersuchungsstellen) of the Air Area Commands (later Air District Commands) in accordance with the guidelines on physical fitness set up by Luftwaffe Inspectorate No. 14 (Luftwaffe Medical Affairs) (Luftwaffensanitaetswesen)) and with Luftwaffe Directive No. 94 (Psychological Tests (Psychologische Pruefungen)). The final screening before the candidate was admitted to an A/B school was accomplished during a one to two-month probation course with a Pilot Candidate Company (Fluganwaerterkompanie).

The pilot candidates were either officer candidates or were required to obtain a certificate from their disciplinary chief attesting to their suitability for a career as active non-commissioned officer. The maximum age of a pilot candidate was

established at either twenty-eight or (for persons already in the service) the tenth year of service.

The Course and Goals of Training

The length of training and the subject matter to be covered in training are described in detail in Luftwaffe Directive 21 (1940 edition) and in the individual monographs issued by training specialists[68]. For that reason, the course of training will be examined only briefly here.

Training was made up of troop duty, preparatory instruction, and flight duty (the latter received the most emphasis). In keeping with the experience gained in the past, ideally no student who failed in anyone of these areas should be retained, for failure in one was usually indicative of general weaknesses which would ultimately lead to failure in the others as well. Troop duty was designed to refresh the student's previous basic military training and to maintain his standards of military order and discipline. Only a few hours each week (usually the relief hours from flying duty) were reserved for troop duty.

Flying duty, and the comprehensive theoretical training it entailed, claimed the majority of the available time. As we have already pointed out in the section on class leaders, in view of the constant acute pressure of time, flight duty - with its systematic progression to full capability and ultimate assignment to a unit - could be guided successfully only by means of the most painstaking coordination based on the degree of mastery attained by the individual flight groups. The indispensible aids for effective coordination were the training progress charts, performance curves, and basic schedules for the various stages of training. The special-duty officer on the staff of the class leader,

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68 - Available in the Karlsruhe Document Collection.

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with his draftmen, statisticians, and other clerical office personnel, was a vitally important source of information and assistance in this respect[69].

Depending upon the season of the year, the duration of the training period leading to the Luftwaffe Pilot's License was between six and eight months. As the war progressed, the duration of training was steadily increased with the predictable poor results. The reasons, of course, were the usual exigencies of war - temporary shortages of aircraft, the constant shortage of aviation gasoline, direct interference by the enemy, etc. The resultant necessary increase in the duration of training periods, a frequent occurrence during the war, often resulted in a serious backlog of students at the A/B schools. Naturally, this backlog also affected the number of students released for assignment to the front. Consequently, students were forced to wait longer before they could be accepted for advanced training; this intervening period of waiting, of course, also had detrimental effect on their preparedness for advanced training.

The training goal of the A/B schools was complete mastery of the standard A 2, B 1, B 2, and front-type aircraft in single flight, so that the trainees would be fully prepared for the special ordnance branch schools. Unfortunately, however, the supply of modern front-type aircraft available for training purposes was never really sufficient; this was true not only during the war, but also prior to the war. As a result the students released by the A/B schools for advanced training at the branch schools were rarely well-grounded in the operation of front-type aircraft.

Examination and Evaluation

Prior to 1935, the Aviation Branch, Reichs Ministry of Traffic, was responsible for conducting the tests required of candidates for pilots' licenses. This responsibility was delegated to the Aviation Expert (Luftfahrtsachverstaendiger) assigned to the State Police (Landespolizei). The Air Traffic Law

(Luftverkehrsgesetz) was the foundation on which the examinations were based.

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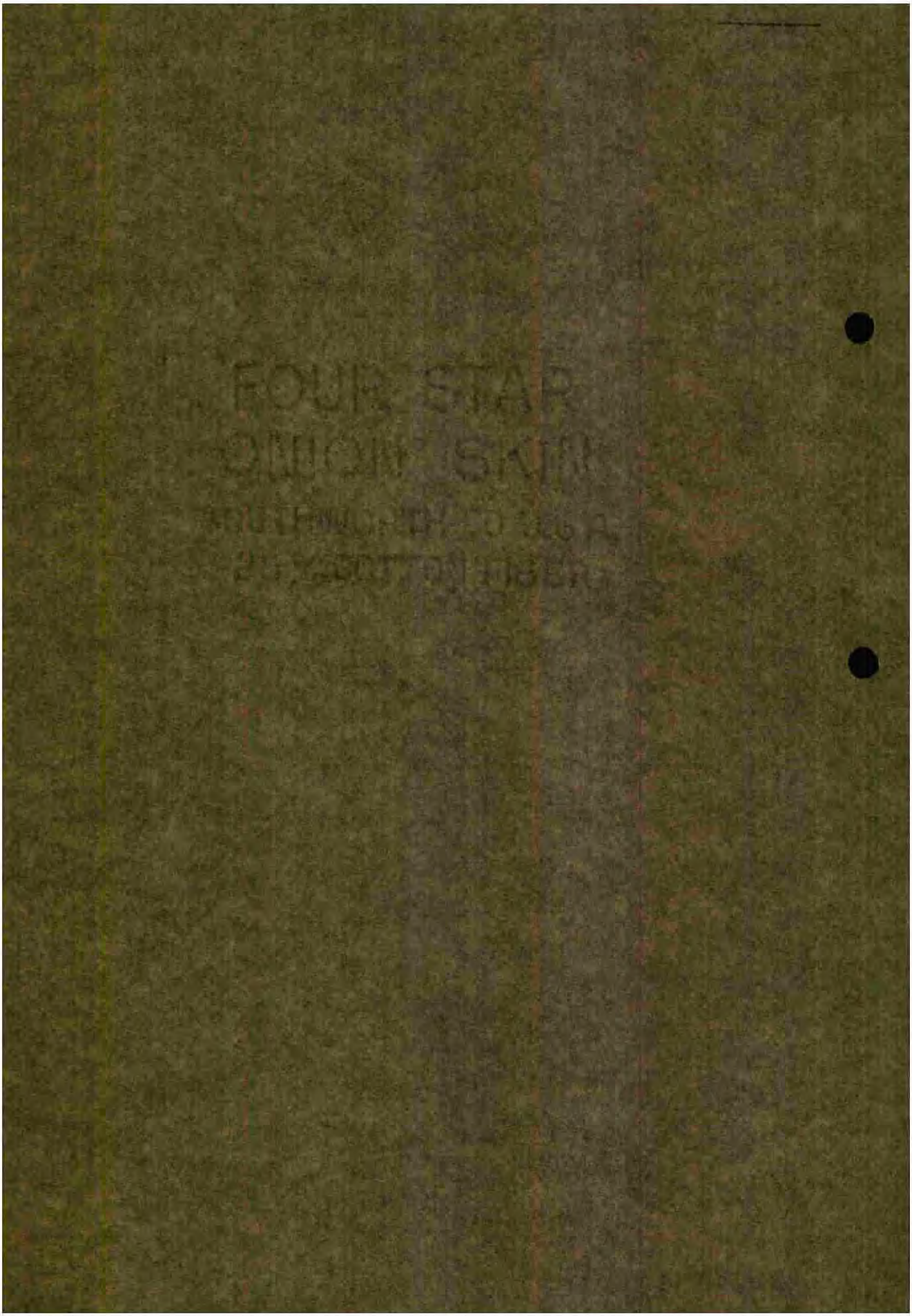
69 - See Appendices 35 and 36



After 1935, the Luftwaffe arrogated to itself the responsibility for these examinations, and delegated their conduct to the so-called military air experts (Militaer-Luftsachverstaendige), who were Luftwaffe appointees. These experts were commissioned and non-commissioned officers whose experience had been gained during years of service in the pilot training field and who, in addition, possessed the necessary legal, technological, and practical knowledge.

The examination consisted of an oral part and a practical test of ability. The practical part included pinpoint landings, high-altitude flights, cross-country flight with control barographs, night flights, formation flying, instrument flights, and aerial acrobatics.

Each of these practical tests had to be completed with a perfect record; the candidate either passed or failed in each one. Candidates who failed in one or more might repeat the test within a time limit set by their disciplinary supervisors in concurrence with the military air experts (Luftwaffe Directive 21 contains detailed information concerning the regulations governing the conduct of examinations).

A great deal of importance was attached to the periodic evaluations made of the student's performance during training. The performance evaluations made by the flight instructors were the most significant single factor for the examining committees and for the class leader, whose task it was to recommend each student's further assignment. The cumulative evaluation was supposed to be an accurate mosaic of the Student's training career, the sum total of contributions by all his various instructors.

The recommendation made for each student's further assignment was a decisive factor in his career and was expected to provide an accurate prediction of his potential effectiveness in an active unit. The recommendation might be for any one of the following: further training as a short-range or long-range reconnaissance pilot, fighter pilot,

close-support pilot, bomber pilot, flight instructor, or special-duty pilot.

If the recommendation indicated assignment to some activity other than flying, it had to be fully substantiated; the reason might be character defects, professional inability, or disciplinary problems. If the recommendation was based on flying incompetence alone, and the case seemed to be deserving of further consideration, as many as three months' additional flight training might be granted.

Training Aircraft and Other Training Aids

In general an A/B school had approximately twenty glider aircraft for preliminary training and 120 - 140 engine-driven aircraft for more advanced work.

The aircraft types represented were many and varied, particularly before 1935 (see the Appendices pertaining to Chapter I). Not until 1936 was a serious attempt at standardization made.

The main types utilized for A 2 training were the following:

FW-44 "Stieglitz"

He-72 "Kadett"

Buecker 131 and 181

Arado 66

The main types utilized for B 1 training were:

Messerschmitt BF - 108

Arado 96

Gotha 145

The main types utilized for B 2 training were:

Junkers W-34

FW-58

Siebel 204

Caudron 445

In addition to the above, of course, there were a number of older types available.

As regards the extremely important problem of the repair of damaged aircraft, the following should be pointed out:

Very minor repairs were made by the maintenance groups at the schools under the supervision of the aircraft maintenance supervisors of the school and of the airfield command.

More serious damage was repaired by the airfield command repair depot whenever possible.

Very seriously damaged aircraft were turned back to the aircraft industry for repair or were assigned to repair depots with specialized equipment.

Periodic engine and fuselage check-ups were the responsibility of the school, or rather the airfield repair depot, concerned. A tickler file of check-ups due was kept by the aircraft maintenance supervisor, who saw to it that they were carried out as required.

Apart from training aircraft, the A/B schools had the following training aids at their disposal:

a) fuselage models with which to drill the students in the handling of the parts

b) link trainers (available in very limited numbers to the A/B schools) for preliminary training in instrument flight

c) practice direction-finding and radio equipment, airborne radio sets, navigation instruments such as triangulation computers (Knemeyer), course measurement devices, flight compasses, and maps and charts for radio navigation and navigation by visible landmarks

d) technical models of all kinds

e) directives, memoranda, technological instructions (the latter issued either by the appropriate sections of the office of the Commander in Chief, Luftwaffe, or by the aircraft and aircraft equipment industries) (see Paragraph XI (?) for more detailed information).

Each school had two or three practice areas of the sort to be described below.

These were indispensible to the school's activity, and did much to decrease the burden placed on the available runways and turf landing fields. In addition, they could be utilized as alternate fields by practice flight groups, whose activity could not always be easily coordinated with that of similar groups from an adjacent training school. For example, acrobatic training and pinpoint landing practice could hardly be coordinated with training school flights or with practice solo flights by comparative beginners.

Organization of Training Leading to the Luftwaffe Advanced Pilot's License (Land Aircraft) and Training in the C Schools; The C School System.

The pilot training schools in the C category were designed to provide advanced training with multi-engine aircraft. The great variety of large-size, multi-engine aircraft and the advanced, almost independent flight duty demanded of its students gave the C school a special status of its own. It represented a training center for all the pilots of multi-engine aircraft - bomber pilots, long-range reconnaissance pilots, twin-engine fighter pilots, air transport pilots, etc.

Beginning with 1 April 1936, the following schools were available for training leading to the Luftwaffe Advanced Pilot's License (Land Aircraft):

1936 - 7 C schools

1937 - 14 C schools

1939 - 21 C schools

1943 - 22 C schools (see the special study on "Schools").

The organization of the training programs leading to the Luftwaffe Advanced Pilot's License (Land Aircraft) and (Sea Aircraft) has been described in Sections 2 through 4, Chapter II.

As far as the organizational structure and training capacity of the individual C school are concerned, the following is of interest:

Inevitably, the structure of the C school was closely adapted to the organization of the A/B school, which we have already described. The commander, entrusted with the over-all responsibility, was in charge of coordinating the work of his staff - the class leaders and the training supervisors, the technical officer, and those airfield command agencies concerned with flight duty

(air traffic control, direction-finding crews, and meteorogogical service) - in such a way as to achieve maximum effectiveness[70].

In this connection, it is significant that the practice of uniting the functions of the school commander and the airfield area commander in a single person proved highly satisfactory, particularly at the airfields exclusively devoted to training activity.

The agency having supervision over the training activity of a C school was made up of the following[71]:

a) flight duty group

scheduling of flight duty; supervision of flight duty

b) technical group

aircraft maintenance; checking on flight hours per aircraft; periodic engine and fuselage check-up; minor repairs; coordination with the airfield command repair depot

c) flight instructor group, including auxiliary instructors and students; each instructor had a group of six to ten students

d) navigation and radio group

training; maintenance of instruments and equipment; coordination with the signal communications officer assigned to the airfield command; air traffic control; runway reports from all over the Reich (airfield area command)

e) meteorological group

provision of meteorological information; weather forecasts; maintenance of weather maps and charts; training

f) instrument and night flight group

ground functions in coordination with the airfield command; airfield illumination; direction-finding and meteorological services; coordination with the air traffic control and radio stations of the airfield command (alternate

airfields)

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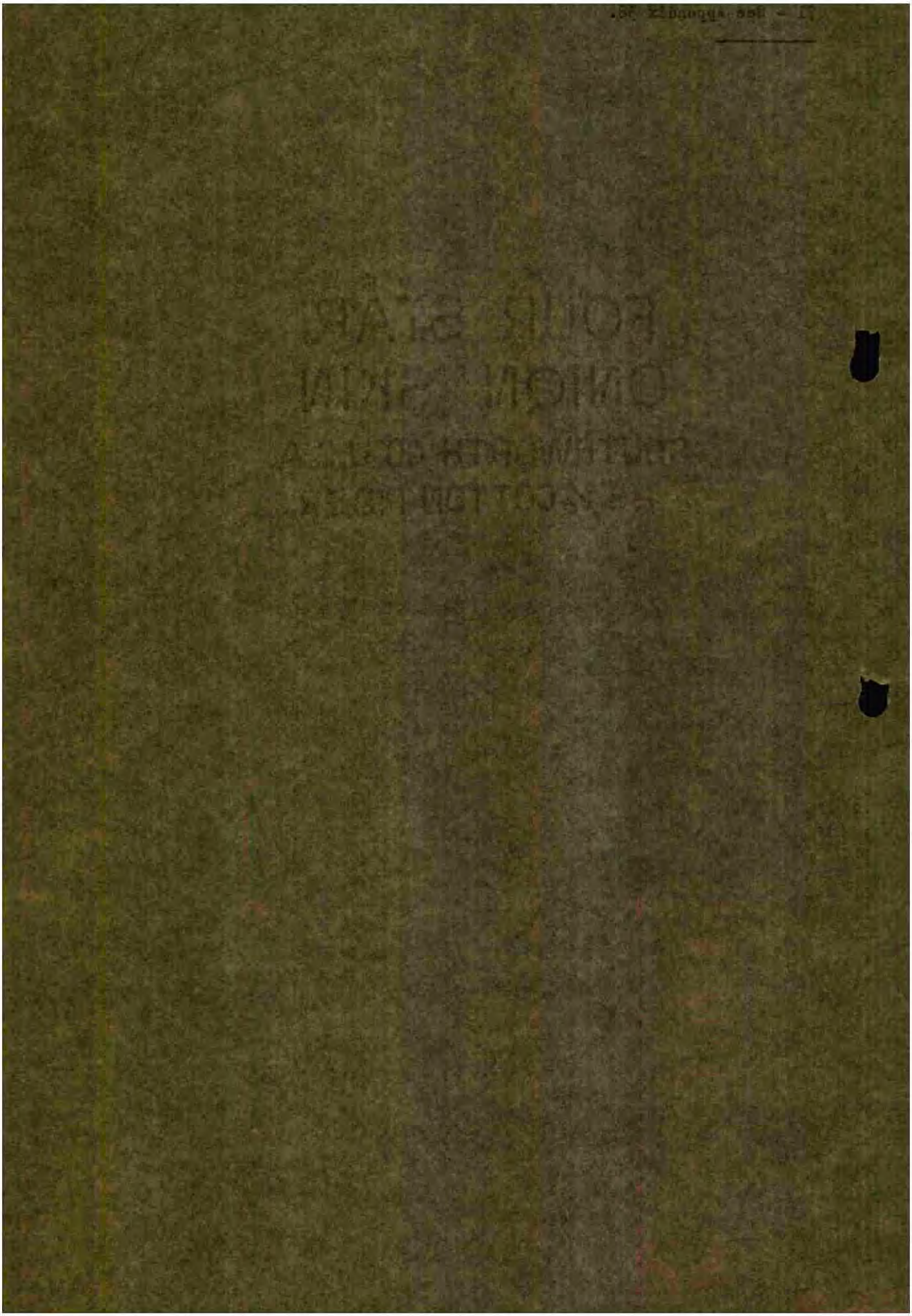
70 - Appendix 37 presents a detailed picture of the chain of command applicable to the individual staff members and between the school and the commander.

71 - See Appendix 38.



g) training group

the training group united groups a) through f) into a kind of "instructor community", which made certain that the available training aids and training areas were utilized in such a way as to ensure maximum effectiveness.

Barracks duty and troop duty were organized as follows:

a) the staff company included all general-duty personnel, clerks, administrative officers, etc.

b) the student company included all instructors and all students

c) the technical company included all maintenance and aerotechnical personnel

d) the repair depot company included all the personnel concerned with aircraft repair (this company was not an automatic feature of all the C schools; its establishment depended upon the initiative of the school commander, coupled with the cooperation of the Air District Commands).

As far as aerotechnical services were concerned, the schools were provided for by the local airfield area commands.

The air traffic control station was responsible for setting up take-off and landing schedules, for checking out aircraft taking off on cross-country flight, and for the maintenance of safe conditions at the airfield. In addition, it maintained a comprehensive reporting system for runway conditions throughout the Reich.

The meteorological station was responsible for maintaining weather maps, for keeping flying crews informed of weather conditions, and for issuingweather forecasts. In addition, station personnel were utilized as instructors for the pilot trainees in the field of meteorology.

The airfield area signal communications officer and his staff, the chief

of the direction-finding station being its most important member in this respect, were responsible for the smooth operation of all radio communications and radio navigation facilities.

The aircraft repair depot was the school work-shop for aircraft overhauling and repair jobs. Its industry, capacity, and ability had a great deal of influence on the school's supply of operable aircraft.

The Goal of Training

The goal of the C schools' training program was the preparation of pilots who were capable of the following:

a) mastery of all multi-engine aircraft used by the Luftwaffe (full mastery in daytime flight, mastery at the airfield in nighttime flight)

b) utilization of all navigational aids enabling them to reach an assigned target and return to their home airfield under normal weather conditions

c) penetration into limited bad weather areas by means of instrument flight

d) assignment to advanced training in instrument flight with sufficient preparation to enable them to complete such training successfully.

Provided that these goals had been met, as evidenced by successful completion of an examination administered by the military air experts, the student was awarded the Luftwaffe Advanced Pilot's License (Land Aircraft) with instrument flight category A. This training program was the longest, the most expensive (in terms of materiel and financial outlay), the most complicated, and the most significant (in terms of application to the actual needs of war) of all the training programs maintained by the Luftwaffe.

The immediate purpose of the C school program was to provide pilots for the multi-engine aircraft units planned for the various theaters of operation and

for the training schools. By 2 September 1939, the following units scheduled for activation needed pilots with the Advanced Pilot's License. At least 25% of these would have to have completed instrument flight training leading to the II Certificate, and 100% of them would have to have completed training at an ordnance branch school.

a) 10 bomber wings, requiring approximately 1,300 crews with Advanced Pilot's Licenses

b) 4 twin-engine fighter wings, with approximately 400 crews

c) 3 air transport wings, with approximately 450 crews (including the air transport groups provided by the C schools)

d) 13 long-range reconnaissance squadrons, with approximately 160 crews

e) 20 special-duty squadrons (seaplanes), with approximately 150 crews

f) 80 flight training schools of all categories, with approximately 1,500 crews (60% of whom would need to have Advanced Pilot's Licenses).

This meant a total of some 3,360 crews with Luftwaffe Advanced Pilot's Licenses.

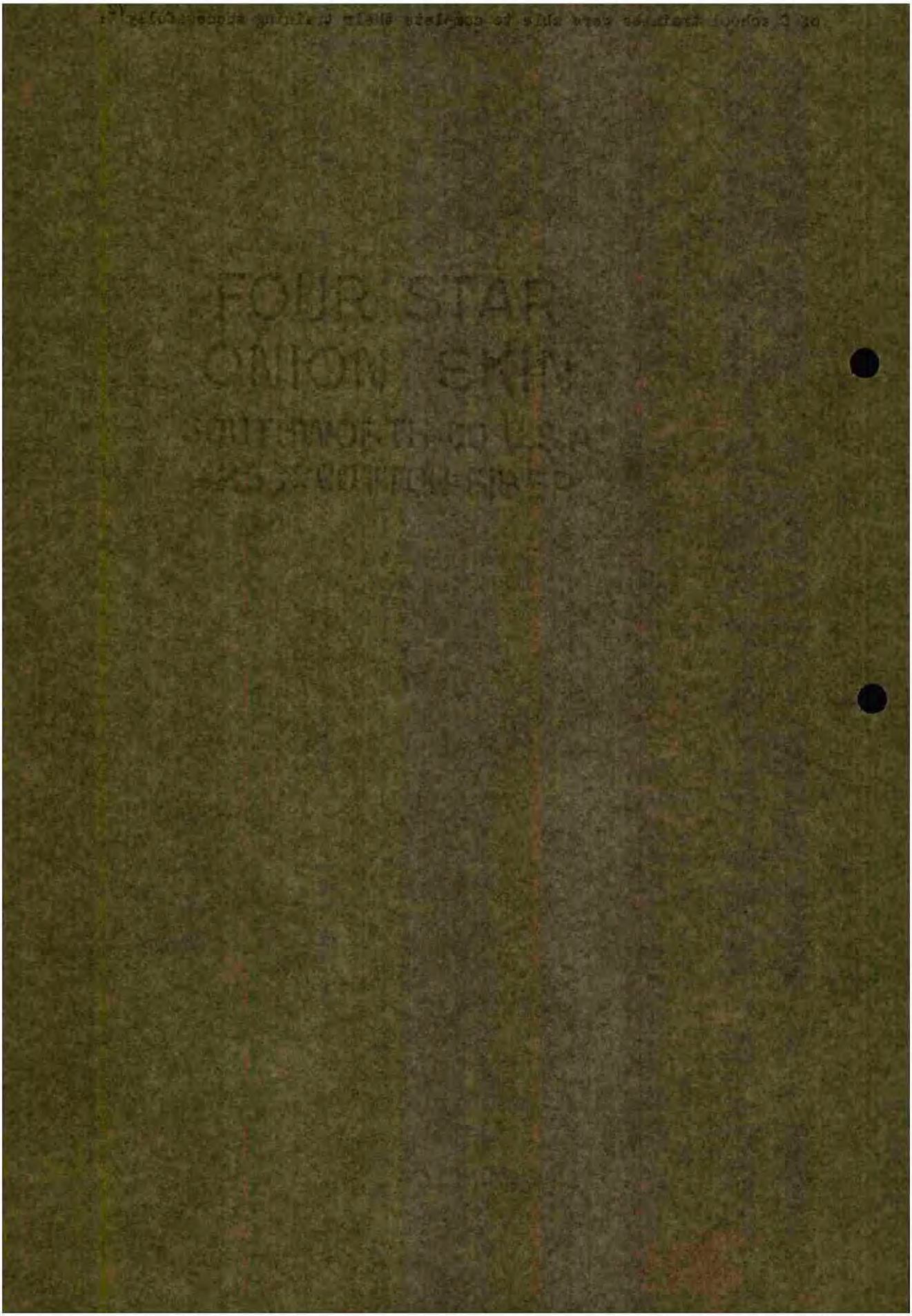
During the course of the war, as a result of the increase in the number of Ju-88 fighter units and air transport units and of the losses suffered, this requirement grew steadily.

It was the responsibility of the Quartermaster General of the Luftwaffe (Generalquartiermeister der Luftwaffe) to determine, broken down into the various aircraft categories, just what the Luftwaffe High Command's training program should be expected to accomplish (taking training potential into consideration) in terms of numbers and training periods at any given time.

It was only by means of the most careful coordination between these two top-level agencies that the training program was able to accomplish the maximum goal set for it. The increasing number of crises at the front and at home,

especially after the winter of 1942/43, were responsible for more than enough decisive cutbacks in the training program.

Nevertheless, during the period from 1939 to 1944, the following numbers of C school trainees were able to complete their training successfully[72]:



a) bomber pilots	11,329
b) transport pilots	4,320
c) long-range reconnaissance pilots	1,867
d) twin-engine fighter pilots	1,811
e) night fighter pilots	2,237
	21,564

The Course and Duration of Training

As was the case with the A/B schools, training towards the Luftwaffe Advanced Pilot's License was also made up of the following components:

a) troop duty (secondary)

b) flying duty (primary)

c) theoretical instruction as preparation for flying duty

Troop duty at the C schools had the sole purpose of maintaining military order and discipline. The emphasis was placed on the usage of hand weapons, particularly the machine-gun, the mastery of formal drill, and the accomplishment of small-scale combat exercises. Theoretical instruction within the framework of troop duty was limited to those subjects applicable to general field duty. The main subjects were:

a) organization of the Wehrmacht, with particular emphasis on the Luftwaffe

b) organization and missions of the flying units

c) organization and missions of the air defense forces

d) organization and missions of the Luftwaffe signal communications forces

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72 - Personnel Group B, Classified, dated 22 July 1944 (Karlsruhe Document Collection).

Instruction in the above subjects was carried out primarily by the company chiefs.

Flying duty at the C schools, in view of their advanced and almost fully independent flight program, was quite different from its counterpart at the beginners' schools. As early as during the second month of training, the pilot trainee was able to demonstrate his increasing independence. The brief period before the early-morning take-off was occupied with navigational and technological preparations, checking over the assigned aircraft, consulting the meteoroligical service, checking with the air traffic control station on flight formation, possible off-limit areas, unapproachable airfields, and flight discipline. In the beginning all this activity was carried out under the supervision of the flight instructor; later on it was left more and more up to the student. The smoothly functioning reporting network maintained by the air traffic control station guaranteed contact with the home airfield in case of emergency.

Luftwaffe Directive 21, "Die Flugzeugfuehrerausbildung (Land und See)" (Pilot Training - Land and Sea Aircraft), describes flight duty and the individual techniques to be mastered in great detail. Here it is only necessary to point out that it was divided into the following main phases:

a) conversion to the classic C school aircraft types, Ju-52, Ju-86, and Do-23

b) conversion to the front-type aircraft, He-111, Do-17, Me-110, and Ju-88

c) training in cross-country flights and navigation techniques

d) training in instrument and night flight

e) the final test flights.

On the average, assuming average weather conditions and an average supply of training aircraft, the Advanced Pilot's License required 75-80 flight hours, distributed over a period of four to six months.

Conversion to Front-Type Aircraft

When the bomber and long-range reconnaissance forces switched over to the He-111 and Do-17-Z shortly before the outbreak of the war, and a large percentage of the bomber force switched again to the new Ju-88 right after the campaign in France in 1940, the C schools were faced with problems. Conversion to and instruction in the operation of the new models had to be incorporated into the training program at once.

This meant an immediate adaptation to the new models on the part of the C schools. In other words, not only the instructional staff but also all the technical personnel had to become familiar with them.

Conversion to the He-111 and Do-17-Z was completed smoothly; any difficulties encountered were due to technical defects. The situation was quite different, however, with the Ju-88, a twin-engine version of a combination horizontal and dive bomber. As a medium bomber, the Ju-88 was quite a "find" for the Luftwaffe; its flight performance was excellent (including instrument flight), its potential employment as a tactical aircraft was almost without limit (especially in view of the armament activity going on), and it was extremely robust. The difficulty lay chiefly in its take-off and landing performance, the relatively complicated maintenance required,

the lack of space for the crew, its technical vulnerability, and its inability to stand up under winter conditions on the Eastern front.

As far as the schools were concerned, the first two factors were the most significant. Interestingly enough, these failings were soon common knowledge throughout the Luftwaffe. As a result, there arose a feeling of prejudice against the Ju-88, which had to be overcome.

With the conclusion of the campaign in France in 1940, the majority of the front units converted to the Ju-88, which, of course, created additional difficulties. Both personnel and aircraft losses had been high, and the front units had to be brought back to their authorized strength before the aircraft could be released to the schools.

In the beginning, improvisation ran rife and was highly successful. Training squads and test pilots from the aircraft industry assisted the front units in their conversion. The airfield at Barth, the home field of the Training Wing, served as a conversion center and was soon able to place the first instructional crews at the disposal of the front units. All this had no effect on systematic training in the schools, however. Unfortunately, there were very few Ju-88's available for training purposes in 1940.

In the summer of 1940, suspecting future developments, the Chief of Training ordered the conversion of the schools at Kolberg and Brandenburg/Briest to "Ju-88 schools".

Both schools were ordered to start immediately to gather experience in the conversion operation, to train additional flight instructors, to develop the most effective methods for maintenance of the Ju-88, and to work out conversion guidelines for the use of other C schools.

The numerous maintenance problems (with the hydraulic system, regulating the intake manifold of the otherwise excellent engines, the continual changes in the landing gear, flaps, diving brakes, and instrumentation) will be mentioned only briefly here. They did create a good deal of difficulty for the technical maintenance shops at the schools and disrupted their work considerably in the beginning. The reason, of course: a new aircraft model and a complete lack of maintenance personnel familiar with the vagaries of the Ju-88.

Nevertheless, in 1940 the schools were able to begin practical training with the Ju-88. As a matter of principle, training was limited to those students who had already completed C school training. In the beginning, the "top third" was singled out for Ju-88 training; later on this number was increased. Conversion was carried out without benefit of dual controls (machines with dual controls were not introduced until 1941) and depended upon visibility, intuition, and personal evaluation of the student's capabilities! At the student's request, the instructor demonstrated the machine from six to twelve times before the student took over by himself. Prior to this, of course, the instruments had been studied and every move practiced in a model fuselage, and the take-off, landing, and flight characteristics of the machine had been explained in detail. In order to avoid confusion in the operation of the instrument panel, each student was given a small card listing all the various operations in order. In addition, this card was attached to each instrument panel.

These measures proved to be extremely effective!

Soon all prejudice had been overcome. Despite its tendency to swerve slightly during the take-off, the Ju-88 soon was accepted without reservation by the students. Occasional control flights by the flight instructors served to bolster the confidence felt in the new model.

Forced landings remained within the established bounds; crashes were rare.

Beginning in the spring of 1941, the Ju-88 suddenly started to become popular, and with the appearance of the first Ju-88 with dual controls at the C school in Kolberg, the last vestiges of prejudice against the model as a whole disappeared completely.

Let us pause here for a moment to take note of the effects of wartime experience on the handling of flight duty.

As far as flight duty in the beginners' schools was concerned, there was very little that could be altered; it continued in almost exactly the same form as during peacetime. Nevertheless, the experience gained during the first years of the war (1940/41) had considerable influence, applied in the following forms:

a) an increase in the amount of time spent on instrument and night flight training

b) the introduction of practice in flying in the face of enemy searchlights

c) increased emphasis on aircraft-based direction finding

d) practice in circumverting off-limits areas and in reconnoitering the general air situation. Although these subjects were really the responsibility of the bomber pilot schools and of Group IV, the C schools were expected to handle preliminary training.

The purpose of the technological phase of training was to provide each student with the theoretical knowledge which he would need to operate a multi-engine aircraft under the conditions of war. Conducted by the flight engineers and maintenance supervisors, these courses familiarized the student with the over-all technological picture and with the integral operation of the various engine and fuselage parts.

Together with technological instruction, the student was trained in the other fields having a bearing on his flying activity, viz:

a) flight and radio discipline

b) meteorology and the techniques of bad-weather flying

c) geography and cartography

d) air-ground and aircraft-based direction finding

e) signal communications and air traffic control regulations.

The training period ended with the examination for the Luftwaffe Advanced Pilot's License, which consisted of a written test covering navigation, meteorology, and radio communications and an oral test in navigation, meteorology, signal communications, aircraft construction, aerodynamics, aircraft mechanics, aircraft models, and aircraft instrumentation.

Evaluation, Recommendations for Future Assignment, and Examination Procedures.

Evaluation and examination during training for the Advanced Pilot's License was guided by the same principles as during training for the simple Pilot's License. As in the case of the latter, the final evaluation was based in good part on the written performance ratings and evaluations provided during training by the flight instructors and their colleagues. The flight books, with their comments on performance and character by the student company chiefs, served to round out the picture of each student.

As a result, the final evaluation of a given student represented a carefully constructed mosaic of his ability and achievement. Its conclusion was a recommendation for the student's future assignment (eg. "suited for assignment as flight instructor", etc.), which was extremely important as far as his further training was concerned. Such further training could take the form of

assignment to the Railway Route School (Reichsbahn-Streckenschule) in Berlin-Tempelhof, to one of the special branch schools, or to the instrument flight school.

The evaluation sheet (see Luftwaffe Directive 21, pages 108/109) accompanied the student throughout his entire career and was added to continually by his various supervisors.

Examination Procedures

The "Luftwaffe air traffic experts" (Luftfahrtsachverstaendige der Luftwaffe) were responsible for administering the tests. These experts were appointed by the Air Area Commands, after 1938 by the Air District Commands. In order to qualify for appointment as a Luftwaffe air traffic expert, the applicant had to present evidence of outstanding flying ability and exceptional theoretical knowledge (officers only). At those airfields where flight training schools were located, appointment was dependent upon the concurrence of the local Senior Flight Training Command; in such instance, a particularly well-qualified technical sergeant or master sergeant could also be considered.

The requirements needed for appointment as a Luftwaffe air traffic expert were as follows:

a) possession of a Luftwaffe Pilot's License or Luftwaffe Advanced Pilot's License.

b) evidence of adequate familiarity with the subjects covered during training for the Advanced Pilot's License

c) at least three years' experience as a pilot (or two years as a flight instructor), including at least 200 flight hours.

d) qualification as a flight instructor or supervisor

The regulations governing the conduct of examinations prescribed a practical flight, a written test, and an oral examination. The practical flight

was carried out under the supervision of the Luftwaffe air traffic experts, while evaluation of the written and oral examinations was entrusted to an examining committee (Pruefungsausschuss) composed of the class leader (who served as chairman), the group flight instructor, the Luftwaffe air traffic expert, one instructor from a specialized field, and (optionally)one or two other flight instructors.

The candidate either passed or failed. In case of failure, he was permitted to repeat the examination within a time limit set by his disciplinary supervisor in concurrence with the air traffic expert.

Training for the Luftwaffe Advanced Pilot's License (Seaplanes)

The goals of seaplane pilot training were substantially the same as those applicable to the pilot training already discussed. The guiding principle in seaplane training was the need for providing an adequate number of trained pilots capable of meeting all the potential requirements of wartime naval flying duty and of handling the seaplanes and flying boats utilized by the Luftwaffe under both day and night flight conditions.

In order to attain this goal, a training period of two to four months (depending upon the season of the year) in a pilot training school (seaplanes) per pilot was necessary. The goal of this specialized training period was the preparation and assignment of qualified personnel to the seaplane units, ship-based air units, and seaplane schools in the numbers deemed adequate by the Quartermaster General, Luftwaffe. From 1935 until 1 September 1939, the following units had to be supplied with personnel and kept at authorized operational strength:

2 long-range reconnaissance groups

4 coastal reconnaissance groups

1 air transport group (seaplane)

2 ship-based groups (1 single-engine fighter and 1 dive-bomber)

1 sea rescue squadron

All together, these units required approximately 250 crews with B and C school training.

Beginning in 1936, the Luftwaffe had the following training installations at its disposal:

a) 1936: Pilot Training School (A/B Category) at Warnemuende

Pilot Training School (C Category) at Stettin

Luftwaffe Ordnance School (Seaplanes) at Parow-Stralsund

Luftwaffe Ordnance School (Seaplanes) at Bug on the island of Rügen

b) 1937: Sea Rescue Training Squadron at Kiel-Holtenau

c) 1938: Instrument Flight School (Seaplanes) at Püttnitz

d) 1942: Instrument Flight School (Seaplanes) at Schleswig.

Flight Duty (Seaplanes)

Training for the Luftwaffe Advanced Pilot's License (Seaplanes) required successful completion of training for the same license with land aircraft plus training in instrument flying. The seaplane training was supplemental and therefore more intensive; depending upon the season of the year, it took from two to four months.

Practical training consisted of 80-100 practice flights (comprising 40-50 flying hours) devoted primarily to conversion from standard land aircraft to the flying boats and seaplanes in use by the Luftwaffe.

The training program for seaplane pilots is described in detail in Luftwaffe Directive No. 21.

General Naval Training, Naval Flight Training, and Naval Signal Communications Training.

Since the seaplane units of the Luftwaffe were employed almost exclusively together with the Navy and were thus inextricably bound to over-water operations, coordination with the Navy in respect to duty stints, technology, and personnel assignment was inevitable. Inasmuch as the seaplane units were staffed primarily by former members of the Navy, there were none of those difficulties ordinarily attributable to heterogenous personnel composition.

General naval training and naval flight training soon became identical for the student in that he quickly grew familiar with the professional terminology involved and was able to make his needs known and to comply with the desires of his colleagues without resort to lengthy explanations.

In addition to the original Navy personnel, however, the seaplane units also contained personnel who had had no naval experience whatsoever, and these, of course, had to be made familiar with their new environment and its demands. Thus, a certain amount of basic naval training was needed to provide at least a rudimentary knowledge of the demands of service at sea.

This training program placed the greatest emphasis on the handling of row-boats, sailboats, and motor-boats, and on the acquisition of a general knowledge of the regulations applicable to traffic on sea and canal routes (see Luftwaffe Directive No. 21).

The naval flight training program included thorough instruction and practice in the handling of seaplanes on the water.

Naval training also encompassed signal communications at sea, i.e. semaphore and Morse techniques.

The Luftwaffe Naval School (Seefahrtschule der Luftwaffe) at Püttnitz was established to meet the requirement for Luftwaffe personnel with a knowledge of naval operations. During the war, the school was located at Lobbe - on the island of Rügen.

b. The Training of Observers and Auxiliary Observers.

In keeping with the missions of the bomber and reconnaissance units, the observer enjoyed a special status within the airborne crew. After all, the success of a bombardment or reconnaissance mission was due in large part to the ability of the observer or auxiliary observer. His tasks were the following:

a) to guide the aircraft to its target

b) to act as chief navigator

c) to direct the release of bombs on the target

d) to direct air-to-air defense against enemy fighter aircraft

e) to pinpoint enemy antiaircraft artillery batteries and guide his aircraft accordingly

f) to take aerial photographs and make notes on visual reconnaissance

g) to make the written and oral reports on each mission and to summarize the results attained.

The above list of the responsibilities of the observer are at the same time an indication of the content and goal of the observer training program.

It is clear, of course, that successful accomplishment of the observer's mission depended upon close cooperation with the pilot of the aircraft, whose ability had to match that of the observer.

Certain special conditions pertaining to the position of the observer in the Ju-88 crews will be discussed more fully later on in the present study.

Organization of Individual Training Leading to the Observer Certificate.

The training schedules for the individual aircraft branches were based on the experience gained during the Reichswehr pilot training period, supplemented by information collected during the period of the Luftwaffe's infancy. During the period from 1935 to 1944, tactical and technological developments made a number of alterations in the original schedules necessary.

The following aircraft branches needed observers as a part of their crews: bomber forces, long-range reconnaissance forces (land and sea), close-range reconnaisance forces (land and sea), air transport forces, and sea rescue forces.

As a result of difficulties in the administration of personnel, chief among them an acute shortage of officers, it happened that the majority of the bomber crews were assigned auxiliary observers only (i.e. bombardiers after 1940) (non-commissioned officers)[73]. The air transport units had only auxiliary observers.

The training of observer personnel of all categories was carried out in the following schools:

a) bomber schools

1 small bomber pilot training school

1 large bomber pilot training school (1942: converted to a bomber training wing; 1943: converted to a bombardier training school; 1942/43: 2 bombardier candidate companies).

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73 - Colonel Koester, "Der Bombenschuetze" (The Bombardier), a supplement to the study "Die Kampffliegerausbildung" (Bomber Pilot Training), Karlsruhe Document Collection.

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b) reconnaissance schools (land)

1 long-range reconnaissance training school (1942/43: reorganisation to the 101st Long-Range Reconnaissance Wing)

1 close-range reconnaissance training school (1942/43: reorganization to the 102nd Short-Range Reconnaissance Wing)

c) pilot training schools (sea)

2 schools (Parow and Bug, Rügen) (1943: conversion of the school at Parow-Stralsund to a bomber observer school)

The schools named above were subordinate to their local Senior Flight Training Commands until 1943; after that date, to the 3rd Pilot Training Division[74]. These command headquarters were fully responsible for directing the training of observer, airborne mechanic, and bombardier personnel.

In their internal structure, the schools followed the general pattern described in connection with the flight training schools. The school commander, as the responsible leader, had over-all supervision over the training activity of his course leaders.

The course leaders, who could be equated approximately with training group commanders, were directly responsible for training. They had a staff of instructors at their disposal, as well as special-duty officers to handle organizational matters and statistical reports.

The theoretical aspects of training were carried out, under the supervision of the class leaders, by the group leaders specializing in weapons, bombs, and explosives, navigation, flight duty, radio communication, air traffic control, meteorology, aerial tactics, etc.

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74 - See Chapter II.

Military basic and refresher training was carried out within the framework of the cadre companies and training units.

The Goal of Training.

The basic goal of observer training was to turn out reconnaissance and bomber aircraft crew members well trained in aircraft ordnance and aircraft navigation, who were also capable of acting as chief navigator in case of emergency. After the beginning of the war, however, the lack of time and of adequate numbers of aircraft precluded effective training for the last-named mission.

The demand for personnel was great - after all, the goal was set at enough observers and auxiliary observers to meet the requirements of approximately sixty air groups by 1 September 1939[75].

According to a report by Personnel Group B, Office of the General of Pilot Training, dated 22 July 1941, a total of almost 22,000 observers of all categories were trained from the beginning of the war through the summer of 1944. This number, of course, includes the personnel trained to replace the losses suffered and to supply the needs of freshly activated units.

Length of Training and Subject Matter.

Dependent upon weather conditions, and thus on the season of the year, observer training for bombardier personnel took approximately six months before the war, and from eight to ten months during the war. The training period was made up of the following:

a) 4 months of flight training as observer

b) 2 months of observer duty with the pilot trainees at the C schools.

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75 - See Appendices 14 and 15.

During the war, the training period was lengthened to include the following:

a) 2 months of preliminary, selective training within the framework of the observer candidate companies

b) 2 months of observer training at a bomber flight school

c) 2 months of observer duty at a C school

d) 4 months of bombardier/observer training.

The following subjects were covered during this training period:

a) organization of flying units and aerial tactics

b) basic aerotechnology

c) aircraft armament and bombs

d) navigation and radio communication

e) practical training, including drill in bombardment, air-to-ground firing, aerial combat, and aerial reconnaissance.

Observer training for the reconnaissance forces was divided into long-range and close-range reconnaissance, each of which was subdivided into training with land aircraft and training with seaplanes. The training period for both long-range and close-range reconnaissance observers took about six months, depending upon weather conditions and the season of the year. During the war, this was augmented by two months of preliminary training with an observer-candidate company.

The training period covered the following subject matter:

a) principles of employment and tactics applied by the Army and the Navy on the battlefield, at sea, and in the air,

b) theory and practice of the interpretation of aerial photographs, visual reconnaissance, and the evaluation of reconnaissance results,

c) radio communication, both in the air and on the ground,

d) the subjects listed above for bombardier observers (a) through d)),

e) aerial gunnery and aerial combat.

The vital importance attached to the aerial reconnaissance field was apparent in the fact that the reconnaissance observers were always recruited from among those officers with war academy training.

c. The Training of Airborne Radio Personnel and Aerial Gunners[76].

As the "wireless" contact with the ground and the best-qualified navigation assistant, the airborne radioman often assumed the role of airborne gunner during aerial combat.

The airborne radioman was responsible for air traffic control tasks, radio navigation, radio direction finding, and tactical radio communication. The fact that the crew member with the longest service was automatically the aircraft commander did little to relieve him of his tremendous responsibility.

He worked closely with the observer and the pilot as far as navigation and landing approaches were concerned. In defensive aerial combat, he acted as aerial gunner, operating the cockpit or tail cannon, as necessary.

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76 - The data in this subsection are based on a study by General der Luftnachrichtentruppe a.D. Fahnert, "Die Ausbildung der Luftnachrichtentruppe" (The Training of the Luftwaffe Signal Communications Forces), Karlsruhe Document Collection.

The following Luftwaffe units had airborne radio operators in their crews:

a) long-range reconnaissance units

b) twin-engine fighter units

c) night fighter units

d) bomber units

e) dive-bomber units

f) ground-support units (some of them)

g) seaplane units

h) air transport units

Organization of Airborne Radio Operator Training.

The category "Luftwaffe airborne radio operator" did not come into being as a separate entity until 1934. At that time, the newly established training centers were staffed (in point of both instructors and students) by recruits from the Army, Navy, and State Police signal communications forces[77]. In order to meet the officially established goal, some 6,000 airborne radiomen were to be trained by 1 September 1939[78]. The training program developed as follows:

1934/35: In conjunction with the Army signal communications school at Jueterbog, the first steps were taken towards independent Luftwaffe signal training. By 1935 the first courses, made up of volunteers from the Army, Navy, and State Police,

77 - See Appendix 16.

78 - See Appendix 14.

were gotten under way. Their goal was the mastery of air traffic control and tactical radio communication techniques. Originally, the course lasted six months and was attended by approximately 150 students.

1936: Luftwaffe Signal Communications School (Halle):

a) number of courses per year - 4

b) length of course - 6 months

c) number of students per course - 150

d) number of graduates per year - 600

1937: Luftwaffe Signal Communications School (Halle):

a) number of courses per year - 4

b) length of course - 6 months

c) number of students per course - 250

d) number of graduates per year - 1,000

Air Fleet Signal Communcations Schools (Luftflottennachrichtenschulen 1 and 3:

a) number of courses per year - 8

b) length of course - 6 months

c) number of students per course - 150

d) number of graduates per year - 1,200

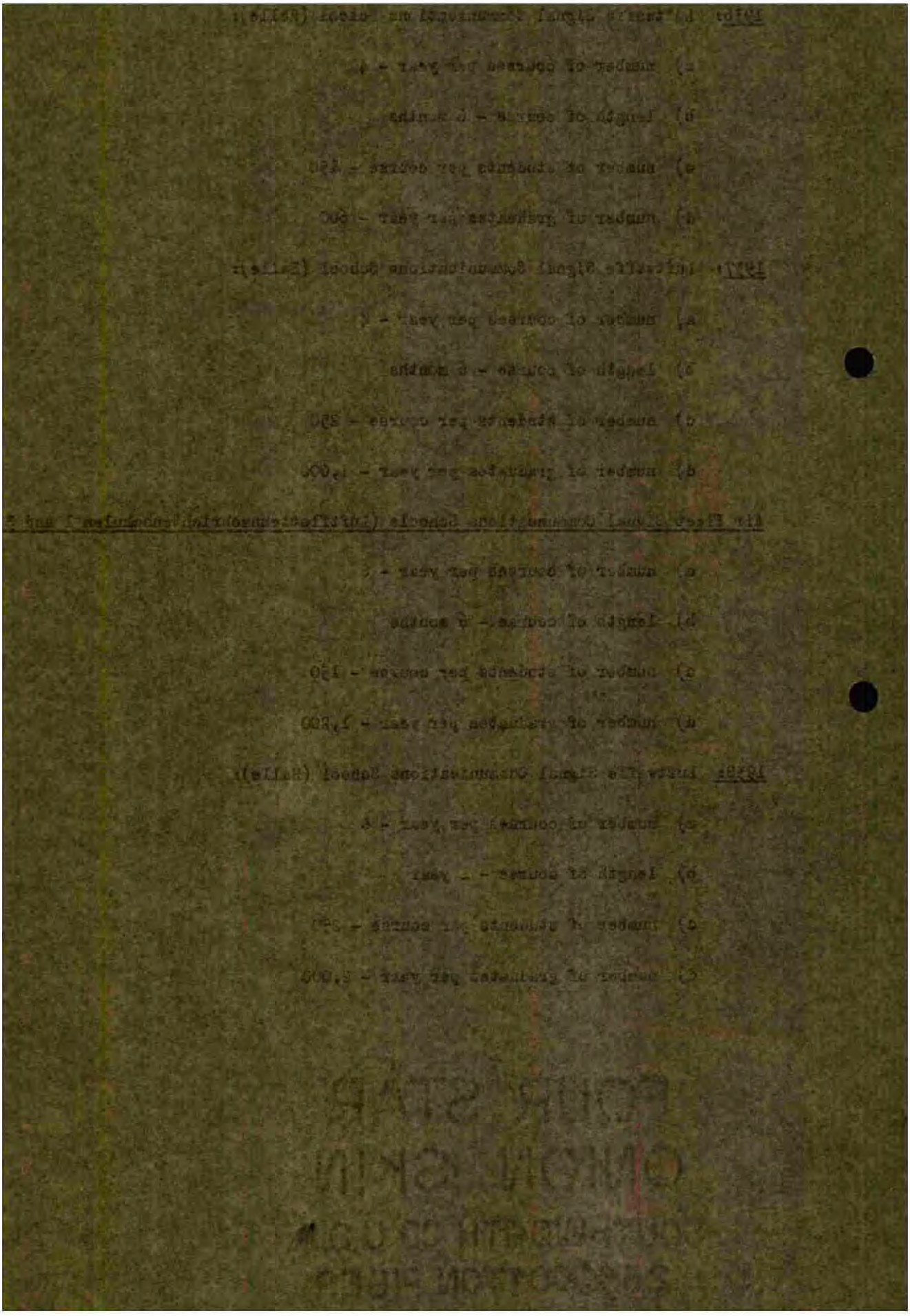
1938: Luftwaffe Signal Communications School (Halle):

a) number of courses per year - 8

b) length of course - 1 year

c) number of students per course - 250

d) number of graduates per year - 2,000



Air Fleet Signal Communications Schools 1 and 3.

a) number of course per year - 8

b) length of course - 1 year

c) number of students per course - 250

d) number of graduates per year - 2,000 or 6,000for all three schools.

During the period from 1939 until the beginning of the war, the schools named above were able to increase their end effectiveness by 50% of the results achieved during 1938 - i.e. a final figure of approximately 4,000 airborne radiomen - so that some 17,000 radiomen should have been available by the time the war broke out.

This goal was attained, but not by the time the war broke out. The reasons were the following:

a) Those training installations established to meet particular crises could not be expected to operate at full effectiveness in the beginning but needed a certain amount of time before they had reached the point where they could meet the goals established for them.

b) The preparations for the annexation of Austria in 1938, the annexation operation itself, and the crisis in the Sudeten Land resulted in considerable inroads in the training program in that they required the temporary detachment of personnel and materiel.

c) The annexation of Bohemia and Moravia and the agreements with Czechoslovakia also interfered with the training program for the same reasons as indicated in b), above.

If one adds to the above factors a normal attrition of 10-20% (due to lack of suitability, illness, and other losses of personnel), then the actual number of trained airborne radiomen available at the outbreak of the war was far more likely to have been 10,000 than 17,000.

[redacted]

Of these 10,000, from 5,000to 6,000 were arbitrarily committed to assignment to various flying units; the remainder were either a part of the personnel reserve or were undergoing advanced training to prepare them for assignment to one of the many training schools.

Of the 5,000 to 6,000 radiomen assigned to the flying units at the outbreak of the war, approximately 20% were well-qualified in all respects, 25% qualified for limited commitment, and the rest employable only in routine daylight missions.

The Goal of Training.

The goal of training was the establishment of a reserve of personnel fully qualified for employment as airborne radiomen and as aerial gunners. The successful completion of training was evidenced by the airborne radioman certificate, awarded at the time of the student's assignment to a flying unit. As has already been explained, the training goal was just barely met even before the war. As the war progressed, the number of available airborne radiomen increased steadily. One factor remained unchanged, however; the young radiomen still had to achieve full proficiency on their own, by dint of independent performance and practice in active commitment.

The Subject Matter Covered in Training.

Theoretical training: organization and missions of the Wehrmacht in general and the Luftwaffe in particular; aerial tactics; unit organization and commitment.

Radio duty: training in radio technology; practice radio duty; aerial navigation; air traffic control; the various approach and landing methods; direction finding; meteorology; tactical radio communication; operation of radio instruments; sending and receiving up to 100 signals per minute.

Flight duty: depending upon the availability of "flying classrooms", each student was supposed to have at least fifty flying hours; in reality, this number

was usually considerably reduced. Flight duty was intended to acquaint the student with ground-air communication in all its various aspects, the carrying out of landing approaches in good and bad weather (landing through clouds, combined direction finding, and utilization of the ZZ-procedure*), ground-to-air direction finding, and air-based direction finding.

Gunnery: theoretical and practical instructions in the operation of airborne weapons; 3 gunnery practice sessions from a machinegun ring on the ground; 3 sessions in the air, one of them using ground targets and the other two towed targets.

d. The Training of Airborne Mechanics and Aerial Gunners.

The airborne mechanics - also called airborne maintenance men - were responsible for the immediate operability and technological maintenance of their aircraft in the air. In addition, they were expected to be versed in terrestrial navigation in order to be able to assist the airborne observers and to be sufficiently acquainted with the operation of aircraft to be able to assist the pilot in taking off and landing and in checking the instrument panel. In the event of aerial combat, the airborne mechanic took his place as gunner in the tail or in the ventral gunmount.

The course of training was designed to prepare the student for his future missions. Normally, it included the following (figures in parentheses indicate the length of each training phase during wartime):

a) basic military training - 3 months (2 months)

b) technological training at an aerotechnical school - 4 months (3 months)

c) practical training at a C school - 2 to 3 months (none),

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* - Translator's Note: ZZ-procedure = method of radio approach landing (the main let-down signal is ZZ with last letter of airport station signal in between). War Department Technical Manuel TM 30-506, 20 May 1944, page 219.

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d) practical training at a bomber school - 2 to 3 months (2 to 3 months), and

e) aerial gunnery training - 2 to 3 months (3 to 4 months).

The airborne mechanics were recruited from the ranks of technically qualified aircraft mechanics and aircraft engine mechanics, provided, of course, that they were able to pass the pre-flight physical examination. There were two possible avenues of approach - either the selection was made by the aerotechnical schools, or the flying units and schools, within the framework of their internal training programs, picked out particularly well-qualified aircraft mechanics from their own ground maintenance force for further training. Prior to the war, before there were enough aerotechnical schools available, the last-named method was applied with considerable success by the "mother-units" already discussed in Chapter II.

It was the purpose of the airborne mechanic training program to train sufficient personnel to meet the requirements of all those units whose crews included mechanics, as follows:

bomber units

long-range reconnaissance units

seaplane units

air transport units

special-duty flight units

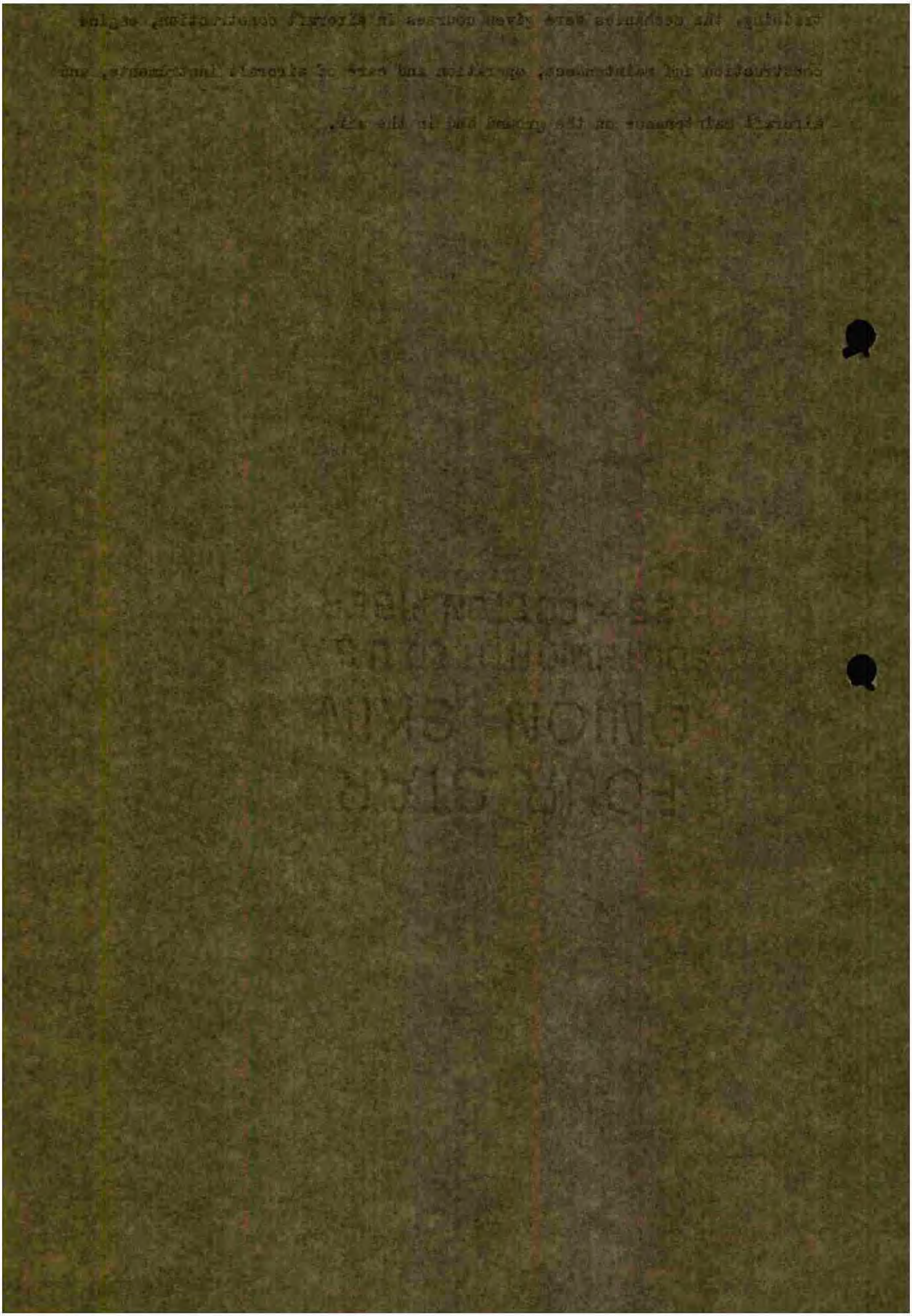
C schools and instrument flight schools

the various branch schools.

Prior to the start of the war, a total of 6,000 to 7,000 airborne mechanics was sufficient to meet the established requirements. During the war, however, as a result of the increase in the number of units and of personnel losses, the need grew steadily. During the five years the war lasted, the number of trained

mechanics rose to approximately 20,000.

Except for radio training, the general subject material covered was the same for the airborne mechanics as for the airborne radiomen. Instead of radio training, the mechanics were given courses in aircraft construction, engine construction and maintenance, operation and care of aircraft instruments, and aircraft maintenance on the ground and in the air.



3. Combat Training of Aircraft Crews at the Luftwaffe Branch Schools (Training Wings after 1943)

a. Bomber Training[79].

Before the war, individual training of the member of a bomber crew gave way to combat training on a crew basis during the last third or last quarter of the over-all training period, depending, of course, on the training capacity of the individual schools.

The aim of crew training was to bring the student out of his own specialized technological and tactical fields and to accustom him to thinking and acting as part of a larger group. As a matter of fact, even the individual portion of his training prepared him to a certain extent, in that the students automatically formed crew-like groups during their practice flights as the simplest method of coordinating the tasks at hand. These improvised "crews", of course, were subject to constant change, and this - in turn - gave each student the opportunity to become used to adapting himself quickly to new personality factors. Moreover, it

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79 - The data contained in this subsection are based on the following sources:

1) Colonel a.D. Koester, "Kampffliegerausbildung" (Bomber Training), Karlsruhe Document Collection;

2) The personal experiences of Colonel Koester in his capacities as school commander and training wing commander;

3) "Lehrbuch ueber Luftnavigation, Teil 8 - Blindflug und Schlechtwetterlandungen" (Manual of Aerial Navigation, Part 8 - Instrument Flight and Bad-Weather Landings), issued by the Reichs Air Ministry, Luftwaffe Inspectorate No. 21;

4) "Ausbildung im Bombenwurf und Bombenzuendwesen und Stellungnahme zur Taktik des Sturzkampf- und Horizontalbombenabwurfs" (Training in Bombardment Techniques and the Techniques of Detonating Explosives; A Comparison of the Tactics of Dive-Bombing and Horizontal Bombardment), by Generalmajor Krauss, former commanding general, 101st Bomber Group, 1 November 1945, Karlsruhe Document Collection.

seemed to intensify and solidify his theoretical and practical understanding. This was a definite advantage during the training period, but the method was hardly applicable later on, in the personnel replacement groups and in the units.

During the course of the war, after the winter of 1941/42, the bomber schools all switched over to the systematic training of complete crews and, at the same time, lengthened the total training period at the school to four months. Every effort was made to avoid any change in the composition of the crew during the training period. The ultimate goal was to provide the Replacement Groups with pre-trained crews, thus facilitating the advanced theoretical training program carried on within the groups and permitting more intensive concentration on practical crew training.

The Goal of Crew Training.

According to the appendices ("Ausbildungsschema im Frieden und Krieg" (Training Schedule, Peacetime and Wartime)) of the study "Kampffliegerausbildung" (Training of Bomber Personnel), the individual members of a bomber crew were given their first joint training at the bomber schools (later with the bomber training wings). Here the individual basic training provided by the previous schools was coordinated with a view to establishing the foundation for a competent crew. The replacement group of each training wing was responsible for putting the finishing touches on crew training.

The individual bomber personnel were consolidated into crew units of three or four, which were expected to handle tactical missions at flight or squadron strength. This goal was apparent in

the organization of advanced training. All missions were discussed in detail beforehand with the participating crews as a part of the routine flight preparations. After each mission was completed, a joint post mortem session was held, sometimes with and sometimes without instructors, during which failures and successes were analyzed in detail. These critical sessions did much to keep the students alert and interested.

The main objective of advanced training at the schools was the assignment of well-trained aircraft crews to the units. It should be stated right here that the effectiveness of such training was a constant source of contention between the schools and the units. The units complained of inadequate training on the part of the schools, while the schools reproached the training groups and units with failure to employ trained crews in such a way as to make use of their specialized training.

Most of these difficulties, usually based on assumption rather than fact, were peaceably resolved by closer coordination between the training agencies - especially their highter headquarters and the Luftwaffe branch inspectorates - and the units.

Combat Training in Groups of Two and Three Aircraft, (in Peacetime and after the Outbreak of the War).

Combat training for flying personnel included the following subject matter fields:

aa. the preliminary planning of the combat action and the preparations necessitated by it had to be discussed thoroughly before the take-off. Each crew member had to be aware of the over-all mission and, in general, the method of its accomplishment. This implied, of course,

joint study of maps and charts to determine the approach and return routes to be used, joint study of target pictures, obtaining information on off-limits air areas and the penetration of enemy aircraft for the air traffic control offices, and setting up the daily secret code for tactical radio communication. Checking on the weather forecast and mapping the flight course rounded out the necessary preparations.

b. Formation flying in groups of two or three aircraft was of great importance. The pilots had to learn how to maintain the proper distance and altitude by throttling their engines or by regulating the manifold pressure. Their assistants in these maneuvers were the airborne mechanics, who also doubled as aerial gunners (air-to-air or air-to-ground, as needed). The observers and radio operators were responsible for navigation. By means of an intercom, the observer coordinated the work of his fellow crew members; he kept watch on the surrounding sky area and directed defensive air-to-air fire. His chief mission was to guide the aircraft to its target and to supervise the release of the bombs during horizontal flight. In the case of diving or gliding attacks, the pilot himself took over the job of guiding the aircraft to its target and releasing the bombs (with the Ju-88 and the Do-17-Z, for example).

cc. The accomplishment of fairly long navigational practice flights, during the day and at night, was a significant part of training. At least 50% of the theoretical training given in preparation for these extremely important flights was the responsibility of the navigation instructor. (A poorly prepared navigational flight was no better than a recreational flight - worthless, as far as training was concerned).

These pre-flight training sessions covered all the possible route variations, including thorough discussion of all the available navigational aids and the method of their utilization. The greatest emphasis was placed on aircraft-based direction finding. The students, as a part of their navigational training, were expected to draw up special radio navigation charts indicating the position of radio beacons and pre-arranged direction-finding contact points. The main responsiblity was borne by the observer and the radio operator. During cross-country flights, even the pilot had a role to play in navigation, since he was responsible for evaluating (by means of the pilot model (V) direction-finding device) the data prepared by the radioman and comparing them with those determined by the observer.

Practical navigational training included beacon-approach exercises as well as airfield approach flights in accordance with the various methods utilized by the Luftwaffe[80].

dd. Bombardment training under simulated combat conditions was carried out in crew-units, each member utilizing the skills learned during individual training. All in all, it might be compared with the training of a gunnery crew. The activity of each individual crew member had to be carefully coordinated with that of his fellows. The individual assignments were approximately as follows:

Target reconnaissance: observer and pilot;

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80 - See "Lehrbuch ueber Luftnavigation und Blindflug" (Manual of Aerial Navigation and Instrument Flight), Part 8, "Blindflug und Schlechtwetterlandungen" (Instrument Flight and Bad- Weather Landings), published by Luftwaffe Inspectorate No. 2, Reichs Air Ministry.

Flight reconnaissance: radioman and mechanic, each from his assigned gunnery station;

Centering the target in the telescopic bomb sight, setting the aircraft's course to the target, and releasing the bombs: observer.

The vital significance of bombardment techniques justifies our repeating here the fields of knowledge in which observer personnel were expected to be adept under any and all circumstances during both day and night commitment. They had to possess thoroughgoing familiarity with the various aiming devices and bomb release mechanisms (the Goerz-Visier -219, the optical aiming devices of the Lotfe 7-C and 7-D types, and the BZ.G.2 for horizontal bombardment and the reflector sight and the BZA-2 for bombardment in a dive). In addition, they were expected to be familiar with the various types of bombs and fuses and to have had thorough training in bombardment techniques.

Either the radioman or the mechanic was responsible for taking the photographs needed in order to evaluate bombing effectiveness later on. The senior crew member had the task of reporting the successful accomplishment of the mission.

Bombardment training prior to 1939 included only horizontal bombardment from varying altitudes (high-altitude 9,840 feet and above; medium-altitude up to 6,560 feet; low-altitude between 150 and 330 feet) under all possible wind conditions. The standard bomber aircraft utilized were the various series models of the Heinkel 111 and the Dornier 17.

The techniques of the diving attack (or to be more specific, of the semi-diving attack and of the gliding attack) could not be incorporated into the training program until the various models from th Ju-88 series made their appearance during 1939/40. The effectiveness of this training could be put to the test very soon, in dive-bomber attacks on ships and pinpoint targets in England. As a result of the shortage

in instructors, training in diving and gliding bombardment attack techniques could not be turned over to the bomber schools until 1942. Thus diving techniques, as an aeronautical problem per se, were practiced very little and with extreme caution on the Ju-88's in use at the C-schools. This was an aspect of training which was to be taken up at the bomber school later on. The time and practice devoted to it there, however, was insufficient to meet the requirements of combat at the front. In order to remedy this lack, the air fleets set up special dive-bomber courses for unit commanders as early as the beginning of 1942. The goal of this program was the training of units capable of diving in formation and, ultimately, of diving bombardment in formation. The commanders trained in these courses were expected to train their Ju-88 units in the proper diving techniques and in the use of the B.Z.A.2 as a bomb sight. Later on these courses were transferred to the bomber commanders' school (Verbandsfuehrerschule der Kampfflieger) at Tours, where they were expanded to include the use of the Lotfe 7-D in horizontal bombardment. By training unit commanders in the use of the latter bomb sight, it was hoped that the techniques of high-altitude horizontal bombardment could be reintroduced in the Ju-88 units.

ee. Coordinated training with the single-engine fighter forces; flying in the face of searchlight illumination.

Even before the war, the schools began to introduce training in these fields, and the scope of such training increased, of course, as the war progressed. The bomber schools, single-engine fighter schools, and searchlight training units were instructed to instigate a program of joint exercises.

Beginning with individual aircraft and progressing to groups of three, these exercises proved to be of great value to participants from all three training groups. In joint exercises with single-engine fighter training units,

activity on board the bomber aircraft was coordinated in such a way that all crew members were in constant contact with one another via an intercommunication telephone, so that each one could report an approaching fighter immediately. Thus the airborne machine-guns and cannon could be brought into position without delay.

ff. Training units in combat duty on the Eastern front.

The purpose of the orders directing the commitment of training units on the Eastern front during the winter 1942/43 was twofold. In the first place, their employment, chiefly against enemy guerilla units, was to strengthen the sadly depleted flighting power of the Luftwaffe; and in the second place, they were to acquire valuable combat experience. Despite isolated instances of highly effective performance, the expenditures in terms of materiel and personnel were not justified by the results achieved. Training units simply do not belong at the front![81]

Instructional Personnel.

In the beginning there were very few qualified and experienced instructors available to the bomber training program. The schools and units had to get along as best they could.

The few available experts were men who had been trained at Lipezk. From 1934 on, the newly established schools at Lechfeld, Tutow, and Fassberg began to furnish additional personnel, recruited chiefly from the ranks of World War I bomber pilots or from among the more promising flight trainees. The lack of trained instructors was inevitably apparent in the standard of training achieved; nevertheless, the standard improved

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81 - Colonel a.D. Koester, "Kampffliegerausbildung" (Bomber Training), Karlsruhe Document Collection.

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perceptibly from year to year. Training at the bomber schools was influenced, of course, by close coordination with the bomber units, the Training Wing at Greifswald, and the Luftwaffe Bomb School (Bombenschule der Luftwaffe), established in 1939.

In addition, from 1937 on, the schools and units acquired a sprinkling of experienced bomber crews returning from service in the Spanish Civil War.

At the close of the campaign in France in the summer of 1940, a number of combat-seasoned crews were to be assigned to the schools as instructional personnel. This plan met with violent opposition from the front units, since front commanders were understandably reluctant to lose their experienced crews, and the intervention of top-level agencies was necessary before the exchange between front and home area, so vitally important to both in the long run, could be effected. During the further course of the war, this exchange program between experienced front unit crews and training crews became a routine thing - much to the benefit of the training program.

b. Single-Engine Fighter Training[82].

Let us begin with a brief survey of the secret fighter training program carried out by the Reichswehr prior to 1 March 1935.

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82 - The data discussed in this sub-section are based on the following sources:

1) "Jagdfliegerausbildung in der ehemaligen Deutschen Luftwaffe 1925-1945" (Fighter Training in the Former German Luftwaffe, 1925-1945), by Generalleutnant a.D. Gerd von Massow, last commander of the Single-Engine and Twin-Engine Fighter Schools, of the 4th Air Division (Training Division), and successor of the General of Pilot Training, Karlsruhe Document Collection;

2) Other material from the Karlsruhe Document Collection:

a) the report "Personalbewirtschaftung und Ausbildung" (Personnel Planning and Training), from the fighter commander conference of 3 July 1944.

b) statistics based on data from the office of the Quartermaster General of the Luftwaffe and reflecting the vacancies in front unit air crews from 1 August 1938 through 31 December 1944.

As was the case in all the other air force branches as well, the secret fighter training program began from scratch under the auspices of the Reichswehr in 1925.

All that was available to serve as a basis for a new fighter aircraft force was the tradition surviving from World War I and a small nucleus of active and inactive fighter pilots (see Chapter I).

Beginning in 1925, the following agencies were set up:

aa. Sport pilot schools and flight training schools whose task it was to see that former pilots kept in practice and to train a new generation of pilots. These schools were to provide the first cadre of fighter pilots and fighter instructors, the result of extremely careful screening, for further training in Russia after 1928.

bb. In 1926 a fighter training squadron was organized at Lipezk (in Russia). Its mission was twofold - the training of fighter instructor personnel in the operation of new combat-type aircraft and the testing and developing of training guidelines.

cc. From 1928 until 1933, Lipezk was also the headquarters of a systematic fighter pilot training program, its goal being to familiarize pre-trained fighter pilots with the most modern fighter aircraft, at that time the Fokker D-XIII and the Heinkel H-D-17.

dd. Beginning in 1931, the German Commercial Flight School at Schleissheim, near Munich, set up a systematic (though still secret) fighter training program. The trainees were the so-called Haehnelt-Trainees, young Reichswehr officer candidates who were completing their flight training first. As of 1933/34,

these pilot training courses were augmented by the first Reichswehr training program for non-commissioned officer personnel.

ee. During 1933/34, there was a small fighter training program in operation at Taranto in Italy; it trained two groups of eight Reichswehr officers each.

ff. In 1933 the Commercial Flight School at Schleissheim was converted to a fighter training school secretly under military administration and until 1935, assigned responsibility for the discontinued Lipezk and Taranto programs.

The results of these preliminary efforts to establish a training program were as follows:

aa. A tangible revival of the fighter pilot tradition;

bb. The creation of a well-trained core of fighter personnel for assignment to the schools;

cc. The training of all the key personnel needed to man the first fighter units up to the occupation of the Rhineland in 1936 (three groups);

dd. The provision of an adequate reserve of squadron captains and unit and school commanders.

The Organization of Fighter Training in the Luftwaffe from 1 March 1935 until the Outbreak of War in 1939.

Of necessity, effective planning for the creation of a fighter training program could be based only on a clear concept on the part of the Commander in Chief, Luftwaffe, regarding the following points:

aa. how much importance the future Luftwaffe High Command was willing to attach to the projects of home air defense and fighter protection at the fronts;

bb. to what extent the Luftwaffe High Command planned to meet these requirements by the activation of fighter units;

cc. whether the Luftwaffe High Command intended to place the main emphasis on the tactical and strategic air arms; and

dd. what goals could be achieved within the framework of the German Reich.

In 1933, of course, it was extremely difficult for Luftwaffe leaders to reach any exact determination as to the most desirable proportion of the various Luftwaffe weapons branches, particularly since German war potential was limited. The problem was aggravated still more by the fact that Goering, like many of Europe's military leaders, was deeply impressed by the ideas of Douhet[83].

In the end Hermann Goering, the successful fighter pilot from World War I, decided in favor of establishing a tactical air force based on bomber aircraft. Nevertheless the fighter forces, by virtue of their "offensive defensive" role, were assured of a significant place in the planning. As a matter of fact, the advocates of a strong fighter arm were premised near parity for their branch as compared with the bomber branch[84].

However, the rather unfortunate fate of the first fighter school at Schleissheim (which was utilized intermittently as an A/B pilot school for some two years) resulted automatically in a decrease in fighter squadron strength.

Thus in 1936, when the sudden demand for fighter units to participate in the Occupation of the Rhineland arose, there was no alternative but to commandeer school personnel to man the required forces[85].

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83 - During the thirties of this century, the Italian Douhet, well-known for his copious military writings, was the most important advocate of the theory of tactical and strategic aerial warfare. Even then, Douhet's theories envisioned the employment of twin-engine fighters as escort aircraft.

84 - See Appendix 14.

85 - Unfortunately, the same thing happened again in 1938 in connection with the Sudeten crisis, when the fighter school at Werneuchen (the only one in operation at the time) was plundered to staff a fighter group (IV Group, 132d Single-Engine Fighter Wing) and thus rendered useless for the training program for a considerable time.

An immediate, but unfortunately unsuccessful attempt was made to replace the Schleissheim school by setting up a fighter school at Oldenburg; in the winter of 1937/38, the fighter school at Werneuchen came into being; and finally in 1939, the Schleissheim school was turned back to the fighter training program. We cannot, of course, condemn these ineffective measures as evidencing a total lack of interest in the fighter training program, yet they surely reflect a certain lack of understanding for the urgency of training in this particular branch. The nucleus of trained fighter pilots was far too small to begin with, and there was no way of expanding it - at least not in time, i.e. before the successfully concluded, localized campaign had had a chance to develop into a war on several fronts.

Prior to the outbreak of the war, the existing fighter training program was justifiably considered perfectly adequate for the following reasons:

aa. The capacity of the existing fighter training schools (two in number) compared favorably with that allotted to the other branches, taking into consideration the fact that a fighter pilot could be trained in one-half the time it took to train a bomber pilot and that fighter training required far less materiel outlay.

bb. The nucleus of trained fighter pilots taken over from the Reichswehr was larger than that taken over by any other branch.

cc. Combat training in the fighter program was much simpler than the combat training of larger crews which was required in the other branches.

dd. The training squadrons, set up within the fighter units as a partial substitute for the disbanded Schleissheim schools, represented a useful additional

source of trained personnel, although there were a number of disadvantages inherent in the system. These training squadrons were the forerunners of the replacement groups.

Briefly, the development of the fighter training organization may be summarized as follows:

From the summer of 1933 on: Inspectorate No. 1 of the Reichswehr Ministry, under the command of General Ritter von Mittelberger and Colonel Bohnstedt (GSC), was in charge of camouflaged fighter training.

From 1934 on: The Reichs Ministry of Aviation, through its Air Command Office, assumed responsibility for training. For reasons of security, the responsibility was officially delegated to the German Commercial Flight School, Colonel Felmy (GSC) being appointed as military advisor to the school[86].

Prior to 1939 there existed the following fighter training installations:

1933-1935: German Commercial Flight School (Schleissheim)

1935/36: Air Group S (Fliegergruppe(S)) (Schleissheim)

1936-1938: A/B Flight School (Schleissheim) (reorganization)

1936: Fighter Training School (Oldenburg) (planned as a replacement for the Schleissheim school; plans never realized)

1939: Fighter Training School (Schleissheim) (reversion to original mission).

Selection of Trainees

During the very first refresher courses given at Lipezk for former fighter pilot personnel (from World War I), it became apparent that

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86 - See also Chapter II.

as a general rule only younger men could be of real use in building up a successful fighter arm. In recognition of this fact, from 1925 on only young, highly qualified members from the state-subsidized sport fliers' organization, who could also be expected to meet the requirements established for officer candidates, were selected for free pilot training. After preliminary screening, the applicants were subjected to physical and psychological examinations to determine their fitness for a flying career; failing to pass any phase of these examinations automatically disqualified a participant. In the beginning, successful accomplishment of the examinations and subsequent acceptance for pilot training placed the trainees under no obligation, unless, of course, they were already members of the Reichswehr. After 1928, there was no longer any doubt regarding the connection between the two. From then on, the only applicants accepted were the so-called Haehnelt-Trainees[87], volunteers who pledged themselves to serve in the Reichswehr.

The Haehnelt-Trainees numbered approximately thirty officer candidates each year, and all of them completed pilot training up to the B-2 category before their induction. The top fifteen of each year's class were sent to Lipezk for further training as fighter pilots.

During the years of secrecy, the Haehnelt-Trainees represented the best source of replacement personnel in every respect. The validity of this statement was borne out later on in connection with the employment of German fighter pilots in the Spanish Civil War.

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87 - Lt. Colonel a.D. Haehnelt, who, as a General Staff officer, served in the Inspectorate for the Air Forces (Inspektion der Fliegertruppen) during World War I, was assigned by the Reichswehr Ministry (Troop Office) in 1927 to take over the training and guidance of the younger generation of pilots, especially the fighter pilots.

Assessed in terms of numbers, the fighter training programs must have produced approximately 450 fully-qualified pilots by 1934[88].

With the increase in demand which suddenly made itself felt after 1 March 1935 (restoration of Germany's military sovereignty), the selection of fighter pilot trainees was carried out within the framework of the general personnel replacement program - the source being the flight schools of the A/B category. In addition to proving himself totally fit for pilot duty, each candidate was subjected to a special psychological examination designed to test personality factors and technological aptitudes as indications of suitability as a fighter pilot. The final evaluation received from the A/B school had to contain the phrase "fully suited for fighter pilot assignment" if the candidate was to be considered for further training.

At that time there were no serious difficulties in the procurement of replacement personnel - not even in regard to the moral fitness of the available applicants.

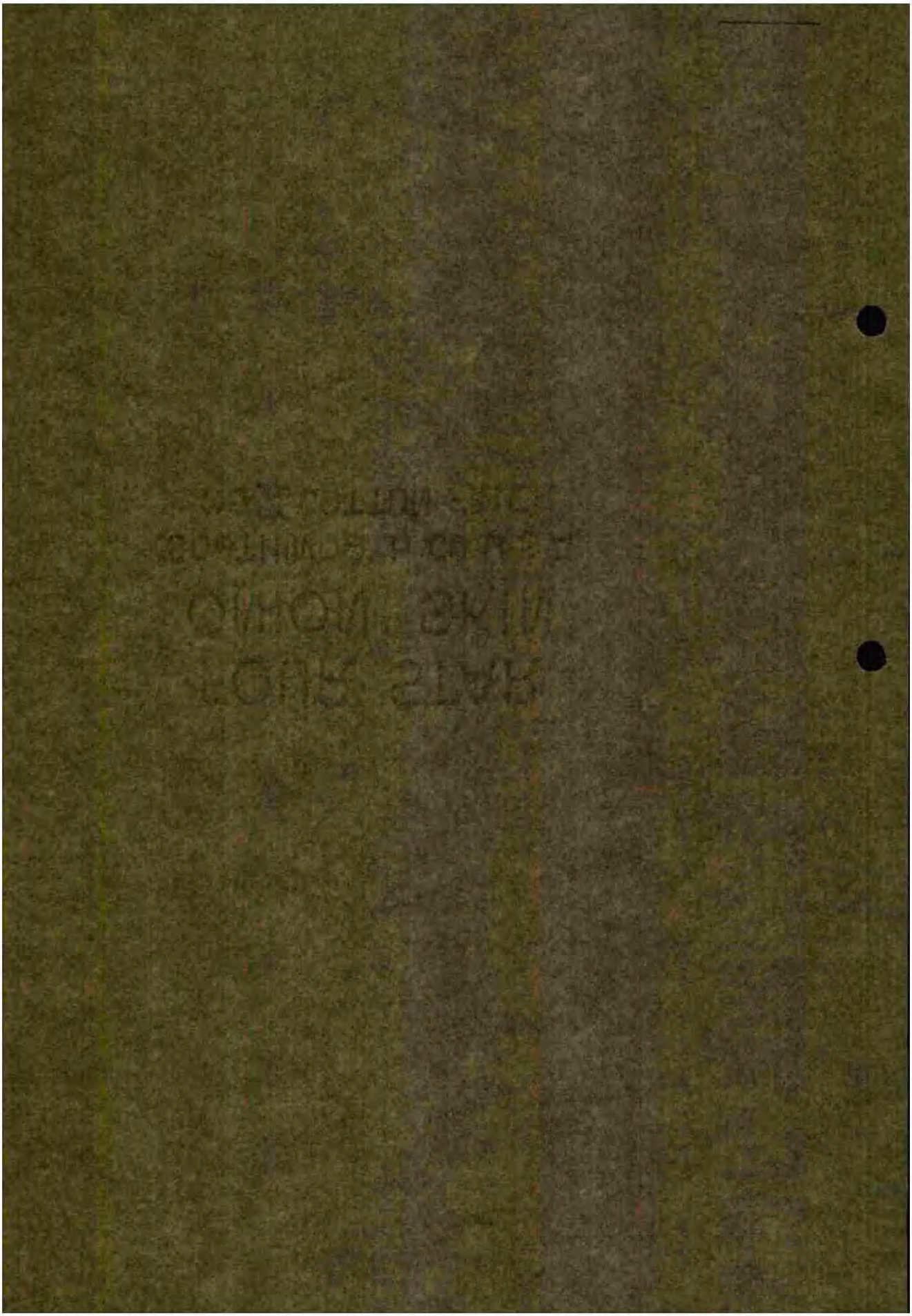
Although there was a shortage of fighter pilot reserve personnel at the time the war began, this was due exclusively to the scope and speed of the expansion program. The Commander in Chief, Luftwaffe, cannot be accused of having neglected the fighter training program due to any failure to recognize its significance.

The principle of selection was basically right. Nevertheless, as the war progressed and the personnel shortage grew more and more acute, the psychological testing requirements (which had greatly restricted the field available for selection) had to be dropped; this was done in 1942[89].

It is alleged that Goering's order abolishing the psychological tests had no detrimental effects; in any case the fighter commanders drew a breath of relief! Before we leave the problem of replacement personnel,

88 - See also Appendix 5.

89 - This was an explicit order issued by the Reichsmarschall in 1942. See Appendix 39 for the order discontinuing the tests of technological aptitude.



it should be pointed out that there was no shortage of fighter pilots prior to the crises which began in 1943 both at the front and in the home air defense program. Although a serious lack in fighter pilots trained for night operations soon became apparent, the equally serious lack of fighter pilots was masked by the fact that the production of fighter aircraft was still far below the level actually required. In the spring of 1944, however, with the sudden growth of industrial production, the need for drastic remedial measures became very clear[90].

The reasons behind the shortage were the increasing lack of qualified personnel in general, and the factors which combined to jeopardize the training program in the home area (the effects of the air war, shortage of gasoline and training aircraft, lack of time to achieve adequate mastery of night and instrument flight).

Subject Matter and Goal of Training.

The subject matter involved was primarily restricted to those aspects of aeronautics and tactics inherent in perfect mastery of the aircraft, on the one hand, and in the techniques of aerial combat, on the other. In this connection, of course, one cannot overlook the fact that the guidance of the student's agressiveness into the proper channels and the insistence upon perfect mastery of gunnery techniques were two of the most vitally important aspects of a fighter pilot's training. Tactical training, in groups of two up to squadron strength, and training in aerial combat in formation were accorded just as much significance as training in aerial combat against ground targets.

Except for the official conversion training to fighter aircraft models, there was little difference in the training of pilots in single combat or in group combat. As soon as

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90 - See Chapter IV, Section 2, Paragraph 6.

the trainees had mastered the elementary techniques of attack and evasion in groups of two aircraft, intensive combat training began at once.

During the course of the war, the relatively uncomplicated system of training changed a great deal! The experience gained during the first years of the war and the ever-widening scope of aerial combat brought far-reaching changes. The fighter aircraft gradually took their place as the backbone of the tactical Luftwaffe on the field of battle and as the primary weapon in home air defense operations.

From 1942 on, home air defense agencies began to intervene in the basic structure of the training program in that they were forced to require not only complete mastery of night and instrument flight techniques in single-engine aircraft but also thorough familiarity with the various fighter control and night fighter guidance methods. The inevitable result was the establishment of a number of additional training installations.

The Course and Duration of Training (Peacetime and Wartime)

Once the fighter pilot candidates had successfully completed basic military training and the training course for non-commissioned officers, they were assigned to a pilot training school of the A/B category for further training leading to the Luftwaffe Pilot's License. The two training periods were supposed to last for a total of nine months. Officer candidates completed all this preliminary training at the air war academies. Due to the more extensive training required in military subjects, the over-all training period was approximately eighteen months. After its completion, the officer candidates destined for the fighter arm were sent either to a fighter school or to one of the fighter training squadrons for specialized training in their field. This specialized training took approximately four months and qualified those completing it successfully as fighter pilots. Specialized fighter training

comprised about fifty flight hours.

Aeronautical and gunnery training for the fighter pilots consisted of the following specialized subjects:

aa) Conversion to and training in the operation of training aircraft of the Arado-76 and Fockewulf-56 types, the majority of flight hours being spent on the model most prevalent at the front (1935/36 the Arado-65; 1936/37 the Heinkel-51 and the Arado-68; 1937/38 the Messerschmitt Bf-109, series B through D and E, together with the Bf-108 (Typhoon)).

bb) Throrough training in formation flight in groups up to six aircraft in number.

cc) Aerial combat practice, including attack and defense techniques for single aircraft and for aircraft formations.

dd) Aerial combat practice under varying cloud conditions.

ee) Coordinated operations with antiaircraft artillery.

ff) Mastery of radio communication techniques.

gg) Gunnery practice on the ground, from the air against ground targets and towed targets, against target balloons in the air, as well as aerial combat practice checked by camera guns.

The performance of German fighter pilot personnel in the Spanish Civil War (1936-1938) gives ample testimony of the type of fighter pilot training practiced in Germany prior to that time.

Once the war got under way, however, the experience gained soon made it clear that the Luftwaffe could not hope to subdue the enemy with the single type of fighter pilots then available. Consequently, the training programs - and above all - the

length of the training period would have to be modified accordingly.

Germany's defeat in the Battle of Britain, the beginning of hostilities in the Mediterranean and in North Africa, the campaign in Russia, and the increasingly desperate need for home air defense measures all served to substantiate the desirability of a modification.

The result was an increasing tendency towards specialization within the fighter units, in both tactical and technological respect. For example, there were close-range ground support fighters (especially on the Eastern front), day fighters for coastal missions and for routine coastal patrols, fighter escorts for the bomber units flying against England, antitank fighters to support the operations of the dive-bomber and ground support forces, fighter-bombers for employment against battlefield, highway, and railway targets, daytime home air defense fighters, and night home air defense fighters (both single-engine and multiple-engine types).

It was obvious that these numerous new methods of employment were bound to play an important role in both preliminary and advanced training. Late in 1940, the richer by a number of painful experiences, General Jeschonnek, Chief of the Luftwaffe General Staff, finally accepted the consequences and ordered an immediate expansion of the fighter training program. His order was followed at once by appropriate directives from the Chief of Training affecting the course of fighter pilot training. In 1941 Luftwaffe Inspectorate No. 3 (as the Inspectorate for Fighter Forces was called after 1938) was reorganized into the Senior Command, Single-Engine and Twin-Engine Fighter Schools (Munich and Strassburg).

As has already been described, there followed a comprehensive reorganization and thorough modification of training methods under the aegis of the General of Pilot Training in 1943. The 4th Training Division in Strassburg was made responsible for

training as a whole. The General of the Fighter Aircraft Forces functioned concurrently as Inspector and was thus responsible to the Luftwaffe High Command for the efficacy of his particular force.

The primary goal was the modernizing of the training program to fit it to the newly arisen requirements. To the honor of the schools and units, however, it should be stated that they had already undertaken the necessary modifications on their own initiative.

The following modifications went into effect:

aa) Increase in the number of trainees graduating from the A/B schools and fighter schools.

bb) Increase in the number of flight hours to be spent in front aircraft models.

cc) Initiation of intensive night and instrument flight training for both night and daytime fighter pilots.

dd) Expansion of the gunnery training program, including increased coordination with the antiaircraft artillery units engaged in home air defense operations.

ee) Practice in the offensive and defensive techniques to be employed against strong enemy bomber units.

After 1943 (the peak in fighter training in Germany), the exigencies of the war led to certain changes in the course and duration of fighter pilot training.

In keeping with the relentless aerial warfare carried on against Germany's home area, the main emphasis in the training program was placed on night and instrument flight techniques. The number of students completing preliminary training was pushed to an all-time high of 1000 fighter pilots per month in the summer of 1944.