APPENDIX A

Declassified Report on Combat Crew and Unit Training in the Army Air Force from 1939-1945

ARMY AIR FORCES HISTORICAL STUDIES: NO. 6

COMBAT CREW AND UNIT TRAINING IN THE AAF

1939 - 1945

The original of this monograph and the uments from which it was written are in USAF Historical Division, Archives Branch, . 914, Maxwell Air Force Base, Alabama.

AIR HISTORICAL OFFICE
Headquarters, United States Air Force
Department of the Air Force
August 1949

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Air Historical Office
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FOREWORD

The vast expansion of the Army Air Forces, particularly after the outbreak of war, necessitated intensive training so that the new manpower could be processed into effective organizations. This training consisted of two phases, individual training and operational (crew and unit) training. The latter phase is discussed in this study, which was written by Dr. Jerry White.

Historical studies which relate to individual training are: No. 5: Individual Training of Bombardiers; No. 8: Bombsight Maintenance Training; No. 18: Pilot Transition to Combat Aircraft; No. 26: Individual Training in Aircraft Maintenance in the AAF; No. 27: Individual Training of Navigators; No. 31: Flexible Gunnery Training in the AAF; No. 48: Pre-Flight Training in the AAF, 1939-1944; No. 49: Basic Military Training in the AAF, 1939-1944; and No. 60: Individual Training in Aircraft Armament, 1939-1945.

Readers familiar with the subject matter are invited to furnish the Air Historical Office with criticisms and additional facts.

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COMBAT CREW AND UNIT TRAINING IN THE AAF

1939-1945

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CHAPTER I

ORIGINS AND STRUCTURE OF OPERATIONAL TRAINING

Crew and Unit Training Prior to Pearl Harbor

At the beginning of the great expansion of the Army's air establishment in 1939, that arm consisted basically of two main branches, the Office of Chief of the Air Corps and the GHQ Air Force. The former organization, commanded by Maj. Gen. Henry H. Arnold, directed the supply and individual training functions of the Army's air arm. The GHQ Air Force, commanded by Lt. Gen. Delos C. Emmons, had as its sphere the command of all air combat units. It prescribed training for its subordinate units and had as its main responsibility the air defense of the continental United States and its possessions.

The rapid introduction of new personnel into the Air Corps created a major training problem. It consisted not alone of giving training to individuals in the various air specialties but also in making those individuals effective members of combat units. The individual training of pilots, aircrew, and ground crew was conducted primarily by the antecedent organizations of what ultimately became the AAF Training Command. Crew and unit training, generally referred to as "operational" training, was conducted by the subordinate organizations of the GHQ Air Force (Air Force Combat Command after 20 June 1941).

The extent of the unit training problem in the period following 1939 may be indicated in stating the goals of the various combat-group programs which came into being prior to the date of Pearl

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Harbor. In April 1939, the first of these programs provided for an enlarged air force of 25 combat groups in November 1940 and to 84 in August 1941. During the same period the total number of air personnel increased from 21,728 to 219,263.[1] A many-fold expansion thus was authorized in a period of little more than two years.

The new groups called into being under these various programs were fractioned off older established groups. Thus the 20th Group, one of the older pursuit (fighter) groups, supplied the initiating cadre for the 35th Pursuit Group at the time of its organization early in 1939. When the air arm was still further expanded by the 54-group program, the 20th Group in turn provided cadres for the 14th and 51st Pursuit Groups. These groups were then brought up toward full strength by the addition of new personnel.[2] Similar examples could be cited for new bombardment groups and for reconnaissance squadrons.[3]

A few aircraft were lent in some instances by the group supplying the cadre to assist the new group in its training. This could be done the more easily since usually both the old and the new group were located, temporarily at least, at the same field. A permanent complement of aircraft had, however, to be supplied through regular Air Corps channels. The supply of aircraft was even a greater problem than the supply of additional personnel. New combat aircraft, for example, during 1940-41 were being diverted in great numbers to assist Britain in its grim stand against Germany.

Training of both old and new groups was carried on simultaneously under the direction of annual training directives emanating from the G-3 Division of the GHQ Air Force. As the possibility of American involvement in war increased, and consequently the need for highly trained

air units became more urgent, these training directives became more exacting in the time allotted for achieving maximum unit proficiency. The GHQAF Training Directive for /the fiscal year/ 1940-41 specified that the "GHQ Air Force Must Reach a State in Its Organization, Training, and Equipment Whereby All Units Will Be Completely Ready for Field Operations by April 1, 1941." It coupled with this statement of urgency a series of training requirements similar to those of past years, which reflected the normal peacetime desire to train pilots and other combat members over a sustained period of time to a status approaching perfection.[4] Unfortunately, the two statements were not compatible, for it was not possible to accomplish so much in so little time.

The giving of additional individual training to recent graduates of the Air Corps Training Center was made the first priority of GHQAF tactical units for 1940-41 as the necessary first step in the attainment of combat proficiency. These graduates were pouring forth from the Training Center to tactical units in increasing number in conformity with the expansion program of the Air Corps. They had received their wings as a result of completing successfully the Army pilot training program; they had yet to fly combat aircraft. All tactical units of the GHQ Air Force regardless of type, had as a common problem the preparing of these trainees to pilot combat aircraft.

The GHQAF Training Directive for 1940-41 continued the already existing pattern of training for recent Air Corps Training Center graduates. It outlined in detail a twelve-week training period in accordance with the particular specialties to which the trainee pilots

had been assigned. The directive provided a common core of 168 hours' ground instruction and 48 hours' air instruction for the trainee pilots in pursuit, light bombardment, medium and heavy bombardment, and reconnaissance aviation. The courses in ground and air instruction were as follows:

Ground Instruction:	Hours
Tactical Orientation	3
Military Training	60
Indoctrination and Familiarization	15
Airplane and Engine Maintenance	20
Signal Communications	15
Armament	15
Instruments	7
Link Trainer	5
Meteorology	6
Dead Reckoning Navigation	12
Chemical	10
	168

Air Instruction:	Hours
Familiarization and Transition	20
Individual Navigation (day)	12
Formation	4
Night Flying	6
Instrument Flying	6
	48

In addition, a few hours of ground and air instruction were given in courses particular to each of the four specialties. These courses ranged in duration from 4 hours of ground instruction and 12 hours' air instruction in pursuit aviation to 16 hours' ground instruction and 20 hours' air instruction in reconnaissance aviation. Pilot trainees who finished this 12-week curriculum in the type of aviation to which they had been assigned were then given additional individual and unit instruction over a much longer period of time to assist them in attaining combat proficiency.

The GHQAF Training Directive for 1941-42 reflected even more than

had the directive of the preceding year the tension of the times. Though the directive referred to the 12-week program outlined in prior GHQAF training directives, it expressed the hope that in many instances this training could be accomplished in a shorter period. "Time is pressing and it is not available for turning out individuals who meet the standards of perfection which have been set up in the past under a peacetime program." In this directive air intelligence training, instrument flying, night flying, and high-altitude flying were particularly emphasized, as well as the value of cooperative missions between tactical units of different types and with ground forces and the Navy.[5]

Because of the pace of expansion in the later 1930's, the shortage of airplanes and equipment, the low experience level of most pilots, the relative inexperience of maintenance personnel, and the rapid changes in air tactics, even the older groups had difficulty in approaching the level of proficiency desired. During 1935 and 1936, for example, the 3d Attack Group, which on 15 September 1939 was redesignated the 3d Bombardment Group, received training in gunnery bombing and navigation. This training was meant to be inclusive. It involved carrying on tactical maneuvers by night and by day and the study of problems of supply as well as of tactics. During these operations 18 planes per squadron were used. By the end of 1937 the number had been reduced to 9. The imperfect character of this training and of these operations is attested by the fact that in 1939, in order to transform the 3d Attack Group into a medium bombardment group, it was necessary to provide navigation training equipment.[6] In the same year light bombardment unit training was conducted at Barksdale Field, La., without

requirements as to "attack gunnery, bombing, and chemical operations" until aircraft of the necessary type could be secured and doctrines for its employment established.[7] Another group, the 20th Pursuit Group, reported in September 1938 that it had 53 pilots and only 1 combat plane on hand.[8]

As one could presume, the status of unit training was not helped by the large increases in the number of groups after 1939. The Second Air Force, according to its history, gave training during 1940 and 1941 to the extent possible in the face of numerous impediments "such as shortages of personnel and equipment, necessary preoccupation with the many administrative details incident to the organization and development of the Air Force, and lack of training facilities, e.g., bombing and gunnery ranges." A substantial number of pilot personnel, moreover, were on detached service for such purposes as ferrying planes to nations fighting the Axis and conducting service tests on new equipment.[9]

On 13 August 1941, the Third Interceptor Command, which during that month had been assigned responsibility for the tactical training of all pursuit units assigned to the Third Air Force, issued its first training directive. Modeled on the directives from higher headquarters, it outlined a course of 8 to 12 weeks in duration, which included 172 hours of ground instruction and 60 of air instruction. The extent to which this program was carried out is suggested by the report of a pursuit group in December 1941, which stated that because of the condition of the runways and the character of equipment, no night flying was scheduled for that month. It also stated that the ground gunnery

range was available for only four days during the month, and that there were no tow-target airplanes at its disposal for aerial gunnery.[10]

During the fall of 1941 important maneuvers were held in the Carolinas which were in part designed to test the proficiency of certain picked pursuit groups. Three groups, which were borrowed from the I* and IV Interceptor Commands, were used as III Interceptor Command pursuit intercept forces. Brig. Gen. Clarence L. Tinker of the latter command remarked during the exercises upon the "very sad deficiency" of all pursuit units in the essentials of combat. He urged that pilots be better trained in gunnery, night flying, instrument flying, and collective combat operations. General Tinker believed that the lack of equipment, particularly combat aircraft, and of other flying essentials was in great part responsible for the unsatisfactory status of the pursuit units.[11]

The vast gap between the desired status of training in combat units and their actual status immediately prior to the date of Pearl Harbor can perhaps be indicated no more forcefully than by describing the condition of the Fourth Air Force units. On 1 December 1941 this air force consisted of three pursuit groups (20th, 14th, and 51st), one medium bombardment group (41st), two light bombardment groups (12th and 47th), and one medium reconnaissance squadron (6th). In brief, the status of these units was as follows:[12]

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* The later roman-numeral designation will be used for commands, as a matter of convenience.

Unit	Personnel: As of		Aircraft		
	Off.	EM	Auth.	Available	In Commission
20th Pur Gp	62	96	80 P-39	75 P-40 (?)	60 P-40 (?)
14th Pur Gp	49	89	80 P-38	12 P-40	6 P-40
				5 P-38	2 P-38
				5 P-36	1 P-36
51st Pur Gp	46	85	80 P-38	13 P-40	6 P-40
				4 P-38	2 P-38
				1 P-36	1 P-36
41st Bomb Gp	27	110	44 B-26	6 B-18	5 B-18
12th Bomb Gp	do	104	57 Medium Bomber	10 B-26	?
				3 B-18	?
47th Bomb Gp.	74	101	57 B-25	4 B-18	3 B-18
6th Recn Sq	21	?	13 B-26	2 B-18	2 B-18

Establishment of the CTU-RTU System

The event of Pearl Harbor emphasized in dramatic fashion the need for an even larger air force than then planned and for more efficient means for bringing the units in that air force to a satisfactory level of combat proficiency. In February 1942 the goal in number of combat groups was raised to 115. By Jul 1942 the goal had been further increased to 224 groups and in one more month to 273 groups.[13] On the latter date approximately 54 groups were considered adequately trained for combat--or roughly equal to the number authorized for the total air arm of the Army in November 1940.[14]

In seeking to establish a combat-proficient air force of this size, it was necessary to procure the raw materials for such an air force--men, instructional staff, aircraft, facilities, and equipment. It was also necessary to establish a satisfactory procedure for converting personnel into effective combat units. This required close

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integration of both "individual" and "unit" training.

An improved system of unit training seemed particularly necessary to the achievement of the training goal. No longer could the system of splitting off cadres from old groups and the traditional method of "self-training" within each unit be relied on to meet training needs. For one thing, old groups needed to be maintained at full strength and trained to high proficiency that they would be so available for shipment overseas as soon as possible. Again, during the early months of 1942 many of the most highly trained units were needed to perform defense duties along the Atlantic and Pacific coasts. First and Fourth Air Force units, which were stationed along these coasts, thus had little time for training activities.

In seeking an improved system of training it was possible to consider the unit phase as conducted during the period of the first world war. This training was not accomplished in the United States but in France. It consisted in part of instruction in the technique of night flying, in the methods of attacking bombers, and in the art of formation flying.[15] The developments in aviation in the period between the two wars were, however, too great and the situation in Europe itself too different from that of the last war to make reference to the past very fruitful of suggestions for the conduct of unit training.

The operational training unit system established by the British early in World War II as a procedure for preparing their units for combat was of far greater influence in determining American policy. As early as April 1941 a report from an American military observer in Great Britain was submitted to the Training and Operations Division

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of the Office, Chief of the Air Corps, suggesting the advantages of such a system. The report stated that prior to the adoption of the operational training unit (OTU) plan, British tactical units, like American units, tended to self-training. So many difficulties were encountered in the endeavor to attain combat proficiency in these self-training units, however, that it was decided to send the prospective combat crews to an OTU upon completion of the individual training phase. In the OTU the British students were given instruction for 8 to 12 weeks as a team on the type of aircraft used in the tactical unit for which they were destined; squadron and group operations were also practiced. In the American system, by contrast, the report emphasized, there had been little time for squadron or group operations. It stated that "in our tactical units for the last few years a disproportionate amount of time was necessarily spent in training pilots fresh out of the flying school and crew members."[16] In such a situation it was difficult indeed to build up a high unit proficiency.

Training in accordance with an OTU system was advocated with increasing vigor soon after Pearl Harbor. In the Fourth Air Force in mid-December Brig. Gen. William O. Ryan, the commanding general of IV Interceptor Command, urged the creation of a central establishment to conduct transition training for all new pilots assigned to IV Interceptor Command pursuit groups. This projected plan he called mistakenly an OTU plan, for basically it was merely an attempt to centralize one phase of training rather than to set up a system for the orderly and systematic training of new units. The plan unfortunately came to nothing because of lack of personnel to administer such an establishment.[17]

Of far greater consequence to the evolution of the OTU system was the thinking of Brig. Gen. Follett Bradley, commanding general of the III Bomber Command. On 18 January 1942 he sent a letter to his superior headquarters, the Third Air Force, arguing earnestly for the establishment of an OTU system so as to utilize the experience of older groups in training additional new groups. To concentrate merely upon getting the older groups overseas, he maintained, would result in losing the limited experience available and in throttling "the goose which could lay the golden eggs." It might also, he stated, result in the eventual stultification of the Army Air Forces and in the consequent loss of the war. General Bradley submitted with this strong letter a detailed plan for the operation of an OTU system.[18]

The plan of General Bradley, slightly modified, was issued by Headquarters, Air Force Combat Command in early February to govern training in the Second and Third Air Forces. This directive did not affect the First and Fourth Air Forces, for they were no longer under the jurisdiction of the Air Force Combat Command. These two air forces had been detached from that command in the previous month and had been assigned to the Eastern and Western Defense Commands respectively to fulfil defense functions in the protection of the Atlantic and Pacific coasts. At this time it was hoped that the Second and Third Air Forces would be able to handle adequately the operational training requirements of the Army Air Forces.

According to the OTU plan of the Air Force Combat Command, new combat units were to train for 12 weeks, 6 weeks of which were to be devoted to the development of individual proficiency and 6 to unit

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instruction. Prior to the beginning of the program, the AFCC was to designate older "parent units" and to bring them to full strength in personnel and equipment. For each parent it would also activate a new "satellite" unit and would also bring it to full strength in personnel. Six weeks after training had begun, and at six-week intervals thereafter, a new unit would be activated for each parent unit and brought to full strength. Thus after the initial 12 weeks a combat group would be released for service overseas by each parent group every 6 weeks.

The relationship between the old or "parent" group and the new or "satellite" group was established in the following manner. Each parent group was to be split so as to form two combat training units (CTU), and new personnel were to be distributed equally between each CTU. After training had progressed for six weeks, a combat group was to be selected from both combat training units, 20 per cent of the group to consist of experienced personnel from the parent organization. The gap thus created in that organization was to be filled by new personnel, some partially trained and some untrained. The requirement of 20 per cent seasoned personnel in the combat group and the retention of 80 per cent in the original unit would, it was felt, "maintain the experience level of units going to a theater of operations at the highest figure consistent with the maintenance of this same experience level in subsequent units."[19]

The Air Force Combat Command did not long outlive the issuance of its plan, for on 9 March 1942 its existence was terminated in a sweeping reorganization of the War Department. The Second and Third Air

Forces continued, however, to seek to establish an effective OTU system in line with the directives of Headquarters, Army Air Forces, to which they had now become directly subordinate.

In time, the units of the First and Fourth Air Forces were also brought within the structure of the evolving OTU system. Despite the original intent of confining training activities to the Second and Third Air Forces, with perhaps occasional levies upon personnel from the First and Fourth Air Forces to provide individual replacements, it was soon found that the units of the First and Fourth Air Forces were also needed if an effective OTU system were to be created. Too large a proportion of the pilot and aircrew experience of the Army Air Forces, as well as aircraft, was concentrated in the First and Fourth Air Forces to permit those units to forego training responsibilities.

On 2 May 1942, Headquarters, Army Air Forces, informed the First and Fourth Air Forces that the pursuit units of those air forces were to be integrated into the OTU system. All pursuit groups in these air forces were to be brought to full strength and a satellite group placed in association with each. As needed, according to the instructions, the full-strength group was to be transferred overseas. Concurrently, the satellite group was to be brought to full strength and to continue operations, including the training of a new satellite group.[20]

Because the expansion of the Army Air Forces was so vast and so rapid, because the developments in aerial warfare and the needs of the theaters could not always be foreseen, and because it was not always possible to keep the flow of manpower, aircraft, facilities, and equipment properly coordinated, the OTU training story, particularly in the

early period, is one of hectic endeavor and frequent improvisation. The mere announcement by Headquarters, AAF that an OTU system was in effect was hardly enough; it had to be worked out at that headquarters and at the various subordinate headquarters slowly and painfully over a period of months.

The experience of the Fourth Air Force in establishing fighter OTU's may be cited as an example. Although the fact that OTU's were to be instituted in the Fourth Air Force was announced on 2 May 1942 and the designation of the original parents and satellites was made by Headquarters, AAF a few days later,[21] the Fourth Air Force did not submit a plan for the operation of an OTU until early October.[22] The first group to train under a fully operative OTU system was the 354th Group, which began the individual phase of its training at Tonopah Bombing and Gunnery Range, Nev., on 18 January 1943. Even thereafter the progress of training in this group was in jeopardy, for the shipment of P-39's to the hard pressed Russians and the withdrawal of numerous instructors for use as replacements overseas almost resulted in the termination of the training of the group.[23] The difficulty in getting the OTU system under way is also suggested by the number of "clarifying" directives governing OTU training, which Headquarters, AAF felt required to issue. Between 2 May 1942 and 25 November 1942, no fewer than six such OTU fighter training directives were issued.[24]

Gradually and ultimately, however, the OTU system did accomplish in all the continental air forces what it was designed to do--to provide a means whereby the experience of older fighter groups might be made available to newly activated fighter groups in the conduct of

their training. Under this system it became the responsibility of the older group, the parent, to provide the newly activated group, the satellite, with experienced personnel as cadre and to direct and supervise its training. Additional flying personnel to bring the satellite group to authorized strength was supplied primarily from recent graduates of the training centers, as was also flying personnel to restore the parent group to its full size--an authorized overstrength. Other additional personnel, for administrative and maintenance duties, was provided both parent and satellite groups from replacement depots and other sources.

The time between the date of activation of a satellite group and the completion of its training was approximately six months. Three months were spent in organizing and bringing the unit up to full strength. The last three months were devoted to flying training, and were further divided into two periods of six weeks each. The first of these, during which training was conducted largely on an individual basis, was designed to give the individual pilots and crews necessary transition training on combat aircraft; the second consisted of unit training, during which the satellite learned to function as a more or less self-contained unit. In this way Headquarters, AAF was able to turn out fairly well-trained groups for overseas service, although at times with something less than the assembly-line regularity desired. It should also be added that as the war progressed the OTU system became increasingly effective.

An RTU (replacement training unit) system to supply replacements for combat units overseas also evolved in conjunction with the OTU system. Originally, replacements for overseas units were secured by

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the simple expedient of withdrawing qualified personnel from units stationed in the United States for training and for other purposes. This policy was undesirable for the withdrawals of experienced personnel had a harmful effect upon the efficiency of the groups from which the withdrawals were made.[25] Gradually a specialized system was established to supply well-trained personnel in various aircrew specialties as replacements for overseas.

At the same time that the Fourth Air Force was officially notified in May 1942 that it was to be a part of the OTU system it was also informed that one of its pursuit groups would be maintained at a 50 per cent overstrength to train and supply replacement pilots.[26] This plan was subject to modifications in later directives from Headquarters, AAF, and the quotas for replacements were progressively raised as more units went overseas and became engaged in combat operations.

As in the case of the establishment of OTU's, a considerable gap in time occurred between the announcement of the RTU's and the operation of the first RTU according to a specific plan. The first plan for the operation of an RTU in the Fourth Air Force was not submitted by that headquarters to Headquarters, AAF until early October, which was approximately the same time at which it submitted the OTU plan.[27]

RTU training was, however, much simpler than OTU training, for it involved no major new departures in the organization and administration of training but merely sought to regularize a practice which had been carried on spasmodically for some months. Under the RTU system, trainees designated as future replacements were sent to an RTU group for training. There they received a similar, though briefer, course

to that received by pilots and other aircrew members in an OTU. In the fall of 1942, for example, Fourth Air Force P-38 replacement pilots were receiving five weeks of preliminary flying training at the Muroc Bombing and Gunnery Range, Calif. Training was completed by three additional weeks (corresponding to unit training) in the Los Angeles area.[28]

In time, RTU training became the major type of training in all the continental air forces. As more and more units were sent overseas, the problem became less that of supplying new units to the theaters than of supplying the increasing numbers of replacements needed by units already overseas. Recognition of the change with respect to fighter units may be seen as early as September 1943. In that month, Brig. Gen. R. W. Harper, Assistant Chief of Air Staff, Training, announced that since 59 fighter groups were soon to be overseas no more OTU groups would be trained in the continental air forces.[29] As the last OTU fighter groups were finishing training early in 1944, the emphasis changed sharply from the training of groups to the training of replacements.

A similar change occurred in bomber training of all kinds except very heavy bomber training. B-29 and B-32 groups were being trained until the end of the war, but even in this type of training the emphasis was shifting to the training of individual replacement crews. In heavy, medium, and light bomber training, the shift to replacement training had occurred much earlier and had parallelled the shift in fighter training. After August 1944, by which time RTU's were thoroughly predominant, the designation for this type of training for both bomber and fighter crew replacements was changed to CCTS (Combat Crew Training School or Station).[30]

The types of OTU and RTU training conducted varied with the individual Air Forces and were subject to change from time to time. Ultimately both bomber training and fighter training were conducted in each continental air force, so that personnel in both types of training might have the advantage of participating in joint fighter and bomber exercises during the latter stages of training. This change occurred in the latter months of 1943 and early 1944. The Second Air Force remained, however, the prime training center for heavy and very heavy bombardment; the Third Air Force for medium and light bombardment as well as reconnaissance training; and the First and Fourth Air Forces continued to be primarily fighter training air forces.

The following summary as of May 1943 suggests the division of the OTU-RTU program between the continental air forces during the earlier period:[31]

a. First Air Force

(1) Fighter OTU training--P-47. (The P-51 was also used for training in this air force before the end of 1943.)

(2) Tow-target missions for antiaircraft--O-46, O-47, and liaison aircraft.

b. Second Air Force

(1) Heavy bombardment RTU and OTU--B-17, B-24, and B-29.

c. Third Air Force

(1) Fighter RTU--P-40, P-39, P-47, and P-51.

(2) Medium bombardment RTU and OTU--B-25 and B-26.

(3) Dive bombardment RTU and OTU--A-24 and A-36.

(4) Light bombardment OTU and RTU--A-20.

(5) Reconnaissance OTU and RTU--A-20, B-25, P-43, P-40, P-39, and P-51, plus liaison and rotary-wing types.

[redacted]

(6) Tow-target missions using same planes as First Air Force.

(7) Air Support Command training with ground units.

d. Fourth Air Force

(1) Fighter OTU--P-38 and P-39.

(2) Fighter OTU--P-[illegible].

(3) Some P-39 replacements in conjunction with OTU.

(4) Tow-target missions for antiaircraft--P-34, O-46, O-47, and liaison aircraft.

Administration of OTU-RTU Training

Although OTU training was assigned to the Second and Third Air Forces by the Air Force Combat Command early in February 1942, the OTU system did not become fully operative until after the major reorganization of the War Department on 9 March 1942. In that reorganization, the Second and Third Air Forces were assigned directly to Headquarters, AAF. Supposedly, training instructions and directive material were to be received by the First and Fourth Air Forces through the Eastern and Western Defense Commands respectively;[32] in point of fact, however, Headquarters, AAF usually communicated with these air forces directly. On 10 September 1943, by which time the possibility of an attack upon either coast had become exceedingly remote, both the First and Fourth Air Forces were released from assignment to the respective defense commands and became directly responsible to Headquarters, AAF.[33]

In the period following the reorganization of 9 March 1942, the Directorate of Air Defense and Directorate of Bombardment, which were themselves subordinate directorates of the Directorate of Military Requirements, were the prime directing agencies for OTU-RTU training.

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The first mentioned of these directorates, administered by Brig. Gen. Gordon P. Saville, was concerned with the conduct of fighter training, while the second, administered through most of this period by Brig. Gen. Eugene L. Eubank, was concerned with heavy and medium bombardment training. The third directorate, the Directorate of Ground Support, administered light and dive bombardment and observation training. Its activities were less important, however, because of the confused and backward status of light and dive bombardment and observation aviation during the period of the directorates. These directorates were a part of what was known as the "operational" level of Headquarters, AAF. In addition, the conduct of OTU-RTU training was also influenced by the A-3 division which was on the "planning" level of Headquarters.[34] Because of the deficiencies in coordination and cooperation between the operating and planning levels, the organization of Headquarters, AAF was again subject to a major reorganization on 29 March 1943.[35]

At this time the directorates were abolished and their functions absorbed by the various air staff offices. AC/AS, Training, which was the resultant staff office particularly concerned with training, was comprised of five major subordinate divisions. Of these, the Unit Training Division was directly concerned with OTU-RTU training. In that division both the operational and planning functions, formerly divided between the directorates and A-3, were now concentrated.[36] This situation continued until May 1945, at which time the divisions in AC/AS, Training, were somewhat reorganized. Most of the functions of the former Unit Training Division were transferred to a new Flying Training Division--so many, in fact, as to suggest merely a redesignation of the former division.[37] The name does indicate, however, the

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shift in emphasis from unit to individual pilot and aircrew training which had occurred during the last eighteen months of the war.

The conduct of training was also influenced by other staff offices and various of their divisions, chiefly AC/AS, Operations, Commitments, and Requirements, AC/AS, Materiel, Maintenance, and Distribution (subsequently, AC/AS, Materiel and Services), and AC/AS, Personnel. Of these, the first was the most important, for it established the detail necessary for translating "approved AAF plans into an integrated AAF program." The second supervised maintenance and supplied the aircraft, equipment, and facilities designated as necessary for training purposes by AC/AS, OC&R, while AC/AS, Personnel supplied the personnel necessary to the success of the training programs as established by AC/AS, OC&R.

Until the newly established Continental Air Forces became fully operational on 16 April 1945,[38] Headquarters, AAF communicated directly with each of the four continental air forces; following this date it communicated directly with the CAF, which was designed as an integrating headquarters for the four air forces and I Troop Carrier Command.[39] The CAF in turn transmitted the directives of Headquarters, AAF to its subordinate headquarters. Throughout the period of the war Headquarters, First Air Force, was located at Mitchel Field, N. Y., and Headquarters, Third Air Force, was located at Tampa, Fla. For nearly all the war period, Headquarters, Second Air Force was located at Colorado Springs, Colo., while Headquarters, Fourth Air Force was located at San Francisco, Calif. In general, though the territories of the air forces overlapped, that of the First Air Force comprised the area along the Atlantic coast, and inland north of the Ohio River; that of the Third Air Force, the

southeastern United States; that of the Second Air Force, the Great Plains area; and that of the Fourth Air Force, the Pacific coast states.

During the summer and fall of 1941 bomber and interceptor (fighter) commands were established in each of the continental air forces to act as intermediate headquarters in all matters pertaining to bomber and fighter units respectively. In time, a few of the bomber and fighter commands were either abolished or transferred out, but in the First and Third Air Forces they endured almost without a break for the duration of the war. In both these air forces they exercised command responsibilities. The IV Fighter and IV Bomber Commands also exercised command responsibilities in the Fourth Air Force until they were abolished on 1 April 1944.[40] In the Second Air Force, the II Bomber Command seems to have functioned through most of 1942 and early 1943 as a training agency for command and staff personnel and to have been without command responsibility. Command responsibility of the II Bomber Command was reestablished, however, following the reorganization of the Second Air Force in May 1943.[41] The II Interceptor Command received several redesignations, the last of which was that of V Fighter Command in August 1942. Since the Second Air Force had already been for some months without fighter units, the V Fighter Command was sent overseas in the following month.[42]

For most of the period of the war there was yet another subordinate administrative echelon between the air force and the training group. This echelon was the "wing." Subordinate in nearly all instances to a fighter command or a bomber command, the fighter or bomber wing was organized either on the basis of geography or of a

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particular type of fighter or bomber training. Wings to the number of three or four will normally subordinate to each bomber or fighter command. They were closest to the training groups in the command channel and assisted the higher levels of command in performing frequent visits of inspection to the training groups and stations.

At all levels from Headquarters, CAF to the group headquarters and the headquarters of the constituent squadrons there were staff offices concerned with training corresponding to the staff offices at Headquarters, AAF. They transmitted the directives and frequently elaborated them in detail to fit the needs more closely of their subordinate organizations. They also visited the training groups and squadrons to make certain that the training directives were being obeyed. Through this administrative organization the general directives of Headquarters, Army Air Forces were thus brought to bear directly upon the individual personnel in the units undergoing training.

CHAPTER II

CHARACTER OF BOMBARDMENT AND FIGHTER TRAINING

The character of bombardment and fighter training in the period of World War II was established primarily by the statements of Headquarters, Army Air Forces relative to the proficiencies to be attained by groups, squadrons, and individual replacements. After September 1942 the more important directives relating to the conduct and content of training were issued in the form of "training standards" for each type of training.[1] These were usually reissued at subordinate command and group levels in more specific detail in order to meet local needs. The directives were supplemented from time to time by statements of new requirements or modifications of old requirements in training through the use of normal communication channels. New and revised editions of old training standards were also occasionally issued.

In the administration of training the continental air forces were allowed a considerable autonomy by Headquarters, AAF. This seemed sound policy because each air force tended to specialize in particular types of training and could perhaps frequently make more sound decision from experience on specific matters than could the more remote Headquarters, AAF. The sphere of independent activity became progressively more narrow the lower the administrative echelon, with the wings acting primarily as inspection deputies for the air force headquarters.

Bombardment Training

Training standards were issued in each of four types of bombardment training: light and dive, medium, heavy, and very heavy. Standards

for the first type were issued by the Directorate of Air Support and for medium and heavy bombardment by the Directorate of Bombardment late in 1942 and early in 1943.[2] They had a direct continuity in content with the former annual training directives of the GHQ Air Force but were greatly modified and elaborated in conformity with new technical developments and the results of combat experience. The first very heavy bombardment training standard, which governed a new type, the B-29, was not issued until 11 November 1943.[3]

In general, although varying in detail and in the purposes for which the several different bombardment aircraft were designed, the training standards for each type of bombardment bore a strong family resemblance. Each training standard contained a general statement of the purposes of training in that particular type of bombardment, and more specific statements of the goals in unit, combat crew, and individual crew-member training. The medium bombardment training standard issued on 8 February 1943 can perhaps be taken as an example.[4]

The ideal of "unit training," according to this and other bombardment standards, were to create "a closely knit, well organized team of highly trained specialists of both the air and ground echelons." For the achievement of this general goal detailed instructions were issued governing administrative and technical training and also tactical training. Administrative and technical requirements covered such matters as proficiency in the conduct of normal housekeeping functions; mobility and readiness of both air and ground echelons; proficiency in first-echelon maintenance under field conditions and in second-echelon maintenance when necessary equipment was on hand; the ability to service rapidly aircraft in dispersed positions; the development of a sound

defense against chemical attack; and proficiency in the collection, classification, interpretation, and dissemination of combat intelligence.

In tactical operations, units were expected to be able to take off and assemble in unit formation in a rapid and orderly manner and to approach an airdrome in formation, disperse, and land in the same manner; to operate in formation under complete radio silence; to descend and ascend through an overcast and assemble in formation with the least possible delay; and to resist hostile fighters or antiaircraft by flying all types of tactical formations and changing from one type to another.

Combat crews were required to have ground instruction in their specialized duties coordinated with flying training, and to have at all times an understanding and consciousness of their responsibilities as individuals to one another. Each combat crew member was required to have experience in high-altitude operation; knowledge of the tactics of air attack and evasion and of the principles of bombing; the ability to operate any gun position on the airplane; proficiency in radiotelephone procedure; the ability to identify friendly and hostile aircraft, armored vehicles and naval vessels; and the ability to engage in effective air reconnaissance.

In addition to the requirements established for unit and combat-crew training, the training standards also prescribed the necessary skills to be attained by each individual crew member. They prescribed in detail the training of pilots, co-pilots, bombardiers, navigators, radio operator-gunners, aerial engineer-gunners, and career gunners.

The long list of requirements for individual combat-crew members suggested that they were designed not alone to achieve a high proficiency in each aircrew specialty but also to correct any deficiencies in qualifications supposed to have been attained in the schools of the Training Command. Without the achievement of a high proficiency in his specific specialty by each aircrew member, it is obvious that there could be neither an effective combat crew nor an effective unit.

The training standards for each of the several types of bombardment training were subject to occasional modification and elaboration. These amendments resulted from technical developments, such as radar, which brought about marked changes and improvements in heavy and very heavy bombardment training. They also resulted from combat experience and from successful experiments in training conducted by the Proving Ground Command and by various units in the continental air forces. Experiments in the assembly and disassembly of mines and in the technique of aerial mine warfare by OTU personnel of the Second and Third Air Forces early in 1943, for example, resulted in a requirement that four hours of aerial mine warfare instruction should be given each heavy bombardment combat crew.[5] Numerous other examples could also be cited.

In the implementation of the training standards devised by Headquarters, Army Air Forces, the continental air forces exercised considerable autonomy. The Second Air Force, which originally was the sole heavy bombardment training air force and which conducted a major portion of that training throughout the war period, established an administrative system of three wings.[6] Each wing supervised one of the three phases into which that air force divided OTU-RTU training. The

first wing supervised first-phase training, which was devoted primarily to individual training in instrument flying, navigation, night flying, bombing, and aerial gunnery. During the second phase, supervised by the second wing, emphasis was placed on the development of teamwork. It included extensive training in bombing and gunnery operations, instrument flying, and formation flying. In the third phase the third wing supervised extensive training in high-altitude formation flying, long-range navigation, target identification, and simulated combat missions. At the conclusion of the third phase the crews were expected to have developed teamwork both within and between crews to such an extent as to permit highly effective unit operation.

When heavy bombardment OTU-RTU training was added to the programs of the other three continental air forces late in 1943 in order to make possible additional combined training between fighter and bomber units,[7] the other air forces adopted the three-phase system of training in use in the Second Air Force. Since the size of heavy bombardment training programs in these air forces was small, however, they did not borrow the administrative wing structure. Instead, these air forces administered heavy bombardment training directly through their I, III, and IV Bomber Commands respectively.

Of all the air forces, the Third Air Force conducted the widest range of types of bombardment training. The addition of a small amount of heavy bombardment training in the fall of 1943 added that type to medium and light and dive bombardment, which were virtually Third Air Force monopolies. Medium bombardment training was administered by the III Bomber Command. Light and dive bombardment training were also originally administered by the III Bomber Command, but on 9 August 1942

their conduct was transferred to the III Ground Air Support Command.[8]

Heavy bombardment, which ultimately was spread among all the continental air forces, was by far the largest of the bombardment programs. During the period between December 1942 and August 1945 a total of 26,925 heavy bombardment crews were trained. Of these, 12,217 were B-17 crews and 14,708 were B-24 crews. During the same period a total of 5,887 medium bombardment and 1,602 light bombardment crews were also trained. The B-29 program, which did not get under way until the fall of 1943, trained a total of 2,347 crews.[9]

Both in the selection of personnel and in the character of the instruction given that personnel, the B-29, or very heavy bombardment program, was somewhat different from the other bombardment programs. This program was administered in the Second Air Force. The program represented a new and costly departure, with respect to which great care was required in the early stages in order to enhance the chances of its success. Particular care was exercised in selecting personnel for the first B-29 units. Instead of relying upon the usual policy of training recent graduates of the schools of the Training Command to staff new units, Headquarters, AAF took active steps to secure for the first units a nucleus of pilots and navigators who had had extensive experience in the long-range operation of heavy aircraft. Since the Air Transport Command was the organization most likely to have such experienced personnel, that command was requested to furnish the first two groups with pilots and navigators possessing the following main qualifications:[10]

Pilots

1. A minimum of two years' continuous active duty, or pilots with suitable military experience.

2. Four-engine pilots with at least 400 hours on four-engine equipment.

3. Those who had flown a maximum amount of weather and had performed long-range missions to the maximum range of the aircraft.

Navigators

1. A minimum of two years' active duty to date, or former civilian navigators with suitable military experience.

2. A minimum of five round trips to overseas destinations involving overwater flights while acting in the capacity of principal navigators.

After approximately a year of operation under the above requirements, Headquarters, AAF became convinced that first pilot (airplane commander) personnel selected for assignment to very heavy bombardment units needed to have still more four-engine training than then specified. It therefore sent to the Training Command a set of requirements designed to secure, if possible, B-17 and B-24 pilots with a minimum of 1,000 hours of four-engine flying time.[11]

A comparison of very heavy bombardment training standards prescribed in November 1943 and July 1944, respectively, indicates a trend from the first general requirements to those of more specific character. Although the 1944 standard included statements of general objectives in unit, crew, and individual training, respectively, it was specific in its minimum requirements for crews, which were as follows:[12]

(1) The aircraft commander will complete a minimum of 20 hours formation above 25,000 feet mean sea level.

(2) The aircraft commander will accomplish the instrument check prescribed by AAF Regulation 50-3.

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(3) The co-pilot will make a minimum of five landings from his own position.

(4) The co-pilot will accomplish at least four hours instrument flying under the hood to include at least two instrument let-downs on radio range.

(5) The combat crew will complete a navigational mission for a minimum of approximately 3,000 miles. Cruise control will be emphasized.

(6) The combat crew will complete a navigational mission by the use of radar alone, over a triangular course, for a minimum distance of 900 miles.

(7) The bombardier will drop a minimum of 20 individual bomb releases from above 25,000 feet mean sea level.

(8) The aircraft commander, navigator, and bombardier will combine their efforts in performing a minimum of 12 camera bombing attacks on industrial targets, four of which will be above 25,000 feet mean sea level.

(9) The combat crew members, except the aircraft commander, co-pilot, engineer, and radio operator, will accomplish a minimum of four gun camera missions (exposing approximately 50 feet of film on each and aimed at an attacking aircraft). The errors in aiming will be discussed between the instructor and gunner prior to the next gunnery mission.

(10) The combat crew members, with the exception of the aircraft commander, co-pilot, engineer, and radio operator, will fire 200 rounds above 25,000 feet mean sea level, divided between their primary and secondary gun positions.

The above training standard was soon modified in a number of ways, many of which illustrate the increasing emphasis on radar. The navigational mission by use of radar alone, for example, was extended to cover 1,000 miles instead of 900. Of the original requirement of 12 camera bombing attacks on industrial targets 4 were later specified to be accomplished by radar. It was also provided that radar be in operation a minimum of 50 per cent of the time on all flights.[13]

The composition of very heavy bombardment crews was a matter of

concern, and it was only by a process of experimentation that this problem was satisfactorily solved. The following "new B-29 crew composition," was decided upon 29 September 1944:

Officers	Enlisted Men
1 airplane commander	1 radio operator mechanic
1 pilot	1 CFC (central fire control) gunner
1 flight engineer (pilot)	1 airplane mechanic gunner
1 bombardier	1 electrical mechanic gunner
1 navigator	1 career gunner
1 radar observer, bombardment, BTO (bombing through overcast) operator	

Heretofore there had been only two rated pilots in a B-29 crew, since flight engineers were not yet trained as pilots or pilots as engineers. This dual type of training, it was felt, would enable three pilots to understand engineering problems of the airplane and would improve morale by permitting the flight engineer, after serving six months in that capacity or until a vacancy occurred, to advance to co-pilot and eventually to airplane commander. The decision to train commander - co-pilot - flight-engineer teams resulted in the creation of a transition program which was administered in the Training Command. It provided for a five-week course which would include a minimum of 40 hours of flying instruction combined with an intensive ground training course on the B-29 airplane. In the interest of greater specialization and efficiency, provision was made in the September program for discontinuing radar training for bombardier and navigator and assigning duties of that character to the BTO operator.[14]

Accidents occurred with such frequency on the still unperfected B-29 that as late as December 1944 Headquarters, AAF directed further instruction in bail-out and ditching procedures in case of engine failure. In order to avoid accidents, maximum load limits were also

prescribed for the B-29. For transition training flights, this maximum was 105,000 pounds; for all other training except maximum load take-offs, it was 120,000 pounds, and for maximum load take-offs, 130,000 pounds.[15]

In the late months of 1944 a significant administrative question of far reaching practical import arose concerning the B-29. As discussed at a B-29 conference held at Forth Worth on 10 October 1944, the question was this: should there be for the B-29 a continuation of the existing transition course plus a four-month OTU or three-month CCTS, or the basic (transition) course, together with a six-week advanced course under the Training Command at the expense of six weeks of the OTU and CCTS courses, respectively? Also, should there be more emphasis on individual and less on unit training or the reverse? The Training Command and the Second Air Force presented opposing arguments. The former agency contended that it had equipment advantages and could, by greater continuity of training, facilitate the unit training of the tactical agency. The Second Air Force insisted that six weeks would be too short a time period for CCTS training and that operational missions would have to be neglected to too great an extent. Headquarters, AAF decided in favor of an additional six-week program under the Training Command, however, for it considered individual gunnery training even more desirable than the highly valued operational missions.[16]

The B-29 program did not move according to schedule. As stated in July 1943, the requirements for replacement combat crews in January, February, and March 1944 were 56, 17, and 17, respectively. By March 1944, however, it had been impossible to give training on B-29 aircraft

to any crews other than those of the XX Bomber Command. As late as January 1945 a careful survey showed that between January and June of that year only 556 of the 644 crews required could be produced, if they were given the 108 hours of training set forth in the existing training standard. The necessity of changing a highly complex plane to facilitate maintenance, the lack of equipment, and highly specialized and complex training, all delayed the program. Reductions in the number of crews required, delays in the shipment of groups, and the sending of instructors to Training Command transition schools were the main steps taken to meet the unsatisfactory situation. In the endeavor to supply more crews Headquarters, AAF, decided on January 1945, to place very heavy bombardment instruction also in the Third Air Force.[17]

Fighter Training

As in the case of bombardment training standards, the early fighter training standards were derived in much of their content from the last of the annual training directives of the GHQ Air Force. Like the bombardment training standards, too, they revealed new departures in training based primarily on technical improvements in aircraft and associated equipment and on the results of combat experience.

The first training standard for day fighters was issued 1 December 1942 by the Directorate of Air Defense.[18] The first standard for night fighters was not issued until 23 June 1943,[19] by which time the first satisfactory night fighter, the P-61, was just beginning to come into production. Of the two programs, the day fighter was by far the more important. In the period from December 1942 through August 1945

only 485 night fighter crews were trained. This number stands in marked contrast to the more than 35,000 day fighter crews trained during the same period.[20]

Day fighter training standards were comprised of two major parts: unit and individual training. Since only in night fighters did the combat crew consist of more than one person, in day fighter training "combat crew" and "pilot" were synonomous. As in all types of air training, the twin goals of training were individual proficiency and teamwork.

Of the many detailed requirements for units, the following are among the more significant: (1) rapid take-off from dispersed positions and quick assembly into combat disposition; (2) precision landings in rapid succession; (3) flying all types of formations and maintaining formation at all times; (4) rapid take-off, ascent through a solid overcast, and assembly on top; (5) descent through overcast, landing, and dispersing rapidly; (6) efficient execution of all known offensive and defensive tactics against hostile air and surface forces. In addition, units were to develop proficiency in the rapid servicing of aircraft in dispersed positions; in moving air and ground echelons to a new base and in beginning combat operations with a minimum of delay; in maintaining aircraft under conditions approximating those at advanced airdromes in theaters of operations; and in accomplishing administrative and housekeeping functions under field conditions. The injection of realism into all training, both air and ground, was enjoined, so as to minimize the shock of transition from training to combat operations.

The training prescribed for the individual pilot was varied. Although the standard intended 50 flying hours per month for each of the three months of the operational training period, it was not until the end of the war that the demands from the combat theaters permitted such prolonged training. During 1942 fighter pilots frequently left for overseas with as little as 40 hours of flying experience in the assigned combat aircraft. During the succeeding year this figure was rarely more than 80 hours. Specific requirements were established for individual pilot training in transition and familiarization (which was later accomplished in the Training Command); formation flying; camera gunnery; ground gunnery; aerial gunnery; aerial bombing; acrobatics; individual combat; instrument flying; navigation; and night flying. Particular stress was placed upon high-altitude operations in much of this training, and in fostering aggressiveness and vigilance in the mind of the pilot. Among the major ground subjects of instruction were tactics and techniques of air fighting; airplane and engine maintenance; signal communications; armament; link trainer; navigation; meteorology; altitude flying; combat intelligence; and airdrome defense.

Night fighter training, while having much in common with day fighter training, differed from the latter in a number of ways. Because of the specialized use for which night fighters were intended, the normal unit organization was not as large, being a squadron and not a group. In training, particular emphasis was placed on instrument flying, on blind landings and take-offs, on night formation flying and night gunnery. Because the night fighter crew normally consisted of three--pilot, radio observer, and gunner--stress was also placed on

combat crew training. Since this training was highly complex, a minimum of 60 hours of flying training per month was specified by the training standard for each of the three months of operational training, in contrast to the 50 hours per month specified for day fighter trainees during the same length of time. Night fighter training was first administered at the School of Applied Tactics at Orlando, Fla. In January 1944, after the program had become better established and had grown in size, it was transferred to the Fourth Air Force.[21] There it remained for the balance of the war.

Although the fighter training programs remained much the same in content throughout the war, like the bombardment programs they showed the impress of new developments. The development of radar, for example, caused great changes in night fighter training. Again, as a result of reports from overseas with respect to deficiencies in gunnery and in high-altitude and formation flying as taught in fighter OTU's and RTU's early in the war, marked improvements were made in these and other aspects of training. As in bombardment training, but to a lesser extent, transition training to fighter aircraft was gradually transferred to the Training Command. No P-47 or P-51 transition training, however, was ever given in the Training Command.

The training standards issued to govern fighter training were edited, elaborated in detail, and reissued by each of the continental air forces exercising jurisdiction over fighter training. At the end of 1942 these were three: the First, Third, and Fourth Air Forces. At the end of that time the First Air Force was concerned primarily with OTU training, the Third Air Force with RTU training, and the Fourth Air Force with both OTU and RTU training. Following the gradual transfer of transition training

to the Training Command, the training programs consisted, in general, of two phases. In the first phase, which was two months in length, the emphasis was on individual pilot proficiency and elementary unit flying; in the second phase of one month, it was on advanced tactical flying.[22] In the First and Fourth Air Forces, which had defense missions until September 1943, OTU groups frequently combined the unit training phase with defense functions.

Each of the fighter training air forces had a subordinate fighter command which bore the same numerical designation as itself. Each fighter command acted as an intermediate administrative agency for fighter training. In addition, the Fourth Air Force utilized a wing system in supervising this training. These wings, originally established as "defense" wings, became increasingly concerned with training as the possibility of attack upon the Pacific coast became more remote.[23] A somewhat different wing structure was established to supervise fighter training following the dissolution of IV Fighter Command at the end of March 1944.[24] In the First and Third Air Forces the fighter commands endured throughout the period of the war. The Second Air Force established a fighter wing to supervise the small amount of fighter training delegated to that air force in the fall of 1943 so as to permit a greater amount of joint fighter and bomber training.[25]

Combined Training

Combined training covered a broad and varied field. Undoubtedly the most important form was joint fighter-bombardment training. The term covers, however, such other types as training between air and ground units, between air and searchlight units, and between air and

antiaircraft units. Combined training in all of these fields had been conducted prior to the war; the experiences of war reemphasized its desirability.

Teamwork between ground and air forces had been noticeably deficient in the early phases of the North African campaign. Because of this, by the spring of 1943 the War Department General Staff had been instrumental in working out a program in accordance with which OTU training was separated from the I and II Air Support Commands, and those commands were charged with continuous training with ground force units. In accordance with this program, as many light, medium, and dive bombardment, observation, and fighter units as possible were made available to these commands upon completion of their unit training so that they might engage in combined training with ground or naval forces. Medium bombardment units participated in this training, however, only when their commitment to overseas theaters was delayed by nonavailability of new aircraft to accompany them. The urgency of overseas requirements also determined the number of other types of units which received air-ground training.[26]

The use of antiaircraft searchlights in defense and the problems they created for offensive operations gave rise to various forms of combined training. As a result of experiences of B-29 crews in Japanese theaters of action, for example, exercises in flying and in selecting targets while crews were undergoing searchlight glare were included late in 1944 in the very heavy bombardment program. This training was first given at Salina Army Air Field, Kans.[27]

Combined fighter-antiaircraft searchlight unit training became

an integral part of searchlight unit training following successful experiments conducted at the School of Applied Tactics during the late months of 1942. Detailed instructions for fighter-antiaircraft searchlight unit cooperation were prepared in a combined training standard issued in mid-June 1943. According to this standard, ground searchlight units were to have received four months of basic mobilization instruction from the Army Ground Forces before they were placed under the jurisdiction of the Army Air Forces for combined training exercises. Three phases of training, each of a month's duration, were prescribed. Both fighter and bombardment aircraft were to be used in the missions. The main difference between the first and later phases was the use of airplane formations at progressively higher altitudes and with greater maneuverability. At the conclusion of this training the searchlight unit was expected to be able to "function efficiently in a fighter-searchlight defense capable of dealing with all forms of multiple plane attack of nine or more airplanes."[28]

The concept of the full utility of antiaircraft searchlight battalions was based upon their operation in a defense area in conjunction with antiaircraft, fighter aviation, and with aircraft warning facilities. The development of an aircraft warning system culminated in October 1942 in the establishment of the Aircraft Warning Unit Training Center at Drew Field, Florida. At this center trainees were processed, classified, trained as plotters or as radio or radar operators, and then given operational training. This center was administered by the Third Air Force. By the end of 1943 steps had also been taken to institute combined training between aircraft warning units and other defense units in the First and Fourth Air Forces.[29]

Another closely related aspect of combined training consisted of aircrew familiarization with the actual appearance of antiaircraft heavy-gun high-explosive shell bursts. Early in 1944 arrangements for such training were made between the training air forces and various of the antiaircraft artillery training centers. This was not regarded as an additional requirement but as an exercise to be conducted as a part of the training flights already required.

One of the simplest methods proposed for familiarization was to request antiaircraft artillery to fire at a towed target under standard target practice conditions, with aircraft in formation following the target at a safe distance. It was pointed out, however, that the towed sleeve target was not visible at the heights required by heavy bombardment high-altitude training and that the use of radar to track the target was dangerous, since it would also pick up the tow plane and the bomber formation. The I Bomber Command, which had flown nine successful flak missions early in 1944, suggested a procedure which involved the use of radio and radar without the towed target. In practice, several additional methods were also used.[30]

Joint fighter-bombardment training was of far greater importance than any of the forms of combined training thus far described. This type of training, which involved the use of fighters as bomber escorts and as interceptors against attacking bomber formations, had begun in the period prior to Pearl Harbor.[31] After the outbreak of war, however, joint fighter-bombardment training tended to lapse because of the specialization in types of training between air forces and because of the constant and pressing need from overseas theaters for additional combat units. When time existed to give only the most basic training

to both bombardment and fighter units, as was true during 1942, the involved preparations necessary for joint training were not possible. The proficiency of fighter pilots and bomber crews in many instances was so low, moreover, as to render joint training of less value than additional training of pilots and crews in their own specialty.

Beginning in January 1943 some joint fighter-bombardment training was occasionally carried on by the Second and Fourth Air Forces in conjunction with defense exercises. At that time the Fourth Air Force, although primarily concerned with fighter training, had also assigned to it two bombardment groups to assist in the performance of its defense functions. Heavy bombardment units of the Second Air Force were also available on call to assist the Fourth Air Force in repelling any attack upon the Pacific coast.

In seeking to perfect defense plans, the Second and Fourth Air Forces jointly conducted a series of carefully planned fighter-bombardment exercises based on assumed attacks from enemy carriers on various Pacific coast cities. The first of these exercises took place in January 1943. Others occurred at intervals throughout the year. The exercises were given greater reality by cooperation of the Navy in supplying small vessels to simulate enemy naval formations. In these exercises Fourth Air Force fighter units acted as escorts to bomber formations as they departed on search missions for enemy naval vessels. The fighter units also sought to intercept these same bomber formations when, on their return, they approached the Pacific coast city in a simulated attempt at bombardment. The lengthy critique following each exercise was of great value in suggesting how both fighter and bomber tactics could be improved.[32]

Because of reports from overseas concerning deficiencies revealed in cooperative missions between fighter and heavy bombardment units and in the ability of heavy bombardment units to repel enemy fighters, the attempt was made during the fall of 1943 both to systematize and to increase the emphasis on joint fighter-bombardment training. At the command of General Arnold a conference was held late in August at Headquarters, Army Air Forces by the commanding generals of the continental air forces.[33] At this conference plans were formulated to carry on sufficient fighter and heavy bombardment training in each air force which had formerly been engaged in either heavy bombardment or fighter OTU training to permit more effective joint fighter-bombardment training. By the end of 1943, in conformity with this plan, heavy bombardment OTU's had been established in the First and Fourth Air Forces and fighter OTU's had been established in the Second Air Force. The Third Air Force was already engaged in heavy bombardment and fighter RTU training.

As in the other instances of prescribed training, a training standard was issued on 13 October 1943 to govern this combined training. The purpose, as stated in the standard, was "to provide overseas theater commanders with units thoroughly trained under all types of simulated combat conditions and capable of effective combined operations as elements of an operating air force." The standard established requirements for bombardment and fighter units and for "available antiaircraft, fighter control, and aircraft warning units."[34]

The requirements established by Headquarters, Army Air Forces were in turn made more specific by the subordinate continental air forces. The Fourth Air Force memorandum on joint fighter-bombardment training issued on 1 March 1944, itself a revision of an earlier memorandum

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issued on 31 October 1943, provided an elaborate set of requirements. Each fighter pilot, for example, was to receive "a minimum of one supervised interception and three attacks on bomber formations at 20,000 feet or above," but at least two interceptions and six attacks were desired when practicable. At least one two-hour escort mission above 20,000 feet was also desired, as well as practice in furnishing cover for take-off's and landings of bomber formations. Each bomber crew, in formation at above 20,000 feet, was to receive a minimum of six fighter attacks and as much experience with fighter escorts as possible. The use of both oxygen and camera guns was prescribed in these exercises. Following the flights the camera gun films were to be analyzed to determine gunnery accuracy. The IV Bomber and IV Fighter Commands were directed to submit weekly reports to Headquarters, Fourth Air Force, stating the extent of joint fighter-bombardment training and suggesting means by which this training might be rendered increasingly effective.[35]

One result of the heavy emphasis on fighter-bombardment training was to create the need for a greater number of hours of instruction for both bomber and fighter pilots. As late as March 1943, 40 hours of flying time in the assigned combat aircraft was the absolute minimum for a replacement fighter pilot destined for an active theater but by the latter part of that year, 80 hours was the accepted minimum. During early 1944, the separation of RTU's into basic and advanced groups paved the way for the former to continue the 80-hour program, and for the latter to give an additional 40 hours of purely tactical, including joint fighter-bombardment, training with emphasis upon use of the camera gun.[36]

CHAPTER III

DIFFICULTIES COMMON TO FIGHTER AND BOMBARDMENT TRAINING

Fighter and bombardment combat training procedures were beset with a number of common problems. These arose from the basic difficulty of expanding tremendously a relatively small air force in a minimum of time. They were solved not always in the most desirable fashion but frequently on the basis of improvisation in the face of immediate and pressing urgency. On the degree of success achieved in their solution depended the total success of the operational training program.

Administration

The relationship between Headquarters, Army Air Forces and the training air forces in the operational training system was based upon the premise that the former would tell the latter what to do but not how to do it. This principle was not always carried out to the satisfaction of the air forces. During the summer of 1942, for example, the Second Air Force expressed resentment at interference from Washington with respect to the means by which it sought to meet the group requirements placed upon it. It felt that Headquarters, AAF should limit its requests to the number and type of units required, leaving to the Second Air Force the responsibility of determining the specific units to be selected.[1] The Third Air Force likewise complained that the directives from Washington were so strict as to forbid it the flexibility necessary to the most effective operation of a varied training

program. A training air force, it maintained, should be given requirements as to standards and the fullest information available, but then should be allowed that freedom of action necessary to efficiency.[2]

One result of the reorganization of Headquarters, AAF on 29 March 1943 was to establish more clearly the line of demarcation between it and the four continental air forces. This reorganization abolished the system of directorates, which had operational responsibilities with respect to the various types of training. While Headquarters, AAF continued to issue and revise integrated training programs and to determine whether its directives were complied with, the means of compliance was left almost exclusively to the air forces. After the reorganization, Headquarters, AAF tried consistently to follow the general principle of separation of functions.[3] In the summer of 1944 it refused to prescribe a minimum total flying time for heavy bombardment crews, stating that it considered such an effort to be "another directive from this Headquarters telling the Air Forces how to do their jobs and further robs them of initiative and flexibility in scheduling."[4] As a result of this new policy, a major source of friction seems to have been removed, and this delegation of authority seems also to have redounded to the increased effectiveness of the total training program.

Personnel

The operational training system was confronted by major personnel problems, particularly during the early period of its existence. One of these problems resulted from inadequate integration between the individual training level of the Training Command and the operational training level of the continental air forces so that graduates from

the Training Command had not acquired sufficient proficiency in their specific specialties to be ready for operational training. Another was that of maintaining an instructional staff sufficient in size and quality to permit the most effective conduct of OTU-RTU training in the face of the great demand for experienced personnel overseas. In addition there was the further difficulty of seeking to coordinate the training of service units with their related combat groups.

Although the OTU-RTU system was designed solely as an advanced school to give operational training, in reality it gave much individual training designed to increase individual proficiency to a level necessary to the requirements of crew and unit training. This was especially true during the year 1942 when the training program in the Training Command had not been sufficiently developed to meet adequately the needs of the continental air forces. The Third Air Force, for example, reported in June 1942 that its training programs had been "based on the assumption that all personnel received--pilots, bombardiers, gunners, radio operators, engineers, mechanics and all other technicians--would have completed their individual training at a special service school prior to the start of their operational training. The above conditions have never existed."[5] In consequence the Third Air Force had to give individual instruction to most of the incoming personnel.

This situation was not peculiar to the Third Air Force but was typical of all continental air forces. The Second Air Force reported early in 1943, "They [the gunners] do not know how to harmonize turrets, load ammunition cans and install in turrets; they do not know the use of K-3 and K-4 sights; they do not know how to install guns on the turrets or time solenoids for firing; they do not know how to detail

strip the .50 caliber machine guns, and they do not know how to take care of any malfunctions which may occur in the action of the .50 caliber gun."[6] The other air forces also reported major deficiencies in the individual training of graduates from Training Command schools, particularly during 1942 and 1943. The conduct of remedial training, designed to increase individual proficiency so as to make possible more effective advanced operational training, could of course be accomplished only at the expense of time intended for operational training.

During the year 1943 a number of steps were taken designed to improve individual training in the Training Command both in quality and in extent. One of these provided for greater integration between the Training Command and its constituent subcommands and the training air forces. In some instances visits to OTU's and RTU's were authorized for instructors from advanced flying schools in the Training Command, and liaison officers were appointed between the training subcommands and specific continental air forces. In addition, conferences were occasionally held between the Training Command and the continental air forces, or between subordinate commands of the Training Command and one or another of the continental air forces.[7] Through these means the Training Command could know far more clearly the needs and desires of the continental air forces.

Other steps taken to improve /the quality and extent of/ instruction included the establishment of central instructor schools for each of the major types of individual training given in the Training Command. These schools were designed to improve the level of individual instruction in the Training Command by indoctrinating new

instructors and by standardizing the methods of old instructors. Central instructor schools were ultimately established for pilots, navigators, bombardiers, and flexible gunners, for fixed gunnery, and for link trainer.[8]

The extent of individual training given in the Training Command was gradually increased to include transition training to combat aircraft in several types of pilot training. At the beginning of 1942 transition training was still a function of the air forces, but the great stress on operational training led to a consideration of the possibility of giving the advanced individual training in the Training Command. Early in 1942 some replacement pilots were being prepared for overseas by the Training Command, even though that command was not adequately equipped to give combat training. The arrangement finally established was that all replacement training would be conducted in the continental air forces because they were best equipped for it, and that transition training would be gradually transferred to the Training Command. The gradual transfer of transition training for all first pilots of bombardment-type aircraft made possible the elimination of a great part of the transition work previously done by the training air forces, and consequently greater attention could be given to crew and unit training. Ultimately some fighter transition training was also given in the Training Command, though never on the P-47 or P-51.[9]

The continental air forces were faced not alone with the problem of seeing to it that personnel received from the Training Command were ready for operational training but also that they themselves were able to maintain a trained instructional staff in OTU's and RTU's. The

problem of keeping a relatively high experience level in parent goups was particularly acute during 1942 and 1943. Although the OTU system was predicated upon the principle of interchangeability, to some extent, of seasoned and inexperienced personnel, it was desired that this interchange be kept within limits so as not to damage the effectiveness of the parent unit in its conduct of later training.[10] Had it been possible to accept the long-range view of emphasizing groups in 1943 and replacement crews in 1944, with its implications for effective use of facilities and for quality, the "robbing" of OTU's and RTU's at the expense of a desired proficiency level might not have occurred. However, it was not unnatural that generals in the combat theaters should regard with disfavor a policy that would inevitably curtail sharply the flow of units and crews.[11]

Pressure from abroad caused the modification of long-range, careful planning. Attempts to meet the demands for replacements resulted in the robbing of OTU's, a practice commonly called "sniping." In April 1942, a sudden demand upon the Second Air Force for four combat crews was met only by depleting the instructional force in the parent OTU's. This practice continued throughout the summer months, despite protests by the Second Air Force that such a policy was imperiling the whole operational training structure.[12]

The Third and Fourth Air Forces also reported similar cases which threatened the effectiveness of the training groups. In September 1942 the Third Air Force reported, for example, that "the continual drain on OTU groups to furnish replacement personnel" seriously affected the quality of training being given in that air force.[13] In the Fourth Air Force, training of the 354th Fighter Group, the first satellite

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in that air force, was almost called to a halt as a result of a heavy raid upon the parent OTU, the 328th Group, for replacement pilots.[14] Although this crisis was passed, the conduct of OTU training in the Fourth Air Force was again jeopardized in June 1943 because of the apparently greater immediate need for pilot replacements. At that time the announcement was made that no OTU training would be continued after the completion of training of the current OTU satellites. This announcement was rescinded, however, within two weeks.[15]

The drain upon experienced personnel even after 1942 may have been in part responsible for the establishment of the CCTS (combat crew training station) system in the summer of 1944, for these base units were established exclusively for training purposes and kept their personnel intact. Undoubtedly, however, the maintenance of a high experience level among instructors late in the war period was due more to the use of combat returnees as instructors than to the functioning of the CCTS system.

A third personnel problem affecting the conduct of OTU training was that of integrating the training of service units with the training of their respective fighter and bombardment groups. As late as September 1943, Maj. Gen. B. M. Giles, Chief of Air Staff, stated that combat units would cease to be activated unless service units were in being to support them. It was felt that the main remedies for this situation consisted in improving the individual training of specialists before they entered the unit phase; in providing better-qualified personnel to perform the training functions; and in working out a smooth system of cooperation between the Air Service Command and the training air forces in the training of both service and combat groups.[16]

Despite these efforts, it was necessary for the Eighth and Ninth Air Forces to conduct ordnance training in the combat theater well into 1944.[17]

Planes and Equipment

Probably as consistently harassing as any of the problems faced by the fighter and bombardment training programs was the securing of sufficient numbers of the desired types of aircraft. The United States was supplying aircraft not alone to its own air forces, Army and Navy, but also to several of our allies through the mechanism of lend-lease. The continental air forces had naturally a lower priority for new aircraft than had the combat air forces and, in most instances, our allies. Thus the Fourth Air Force fighter pilot program was seriously jeopardized early in 1943 as a result of the diversion to the Russians at Stalingrad of P-39's which had originally been destined to the Fourth Air Force.[18]

According to plans for both fighter and bomber programs, the training groups in the United States were to be outfitted with new aircraft just prior to their departure for overseas. The aircraft used in training were turned back to be used again in the operational training of new pilots and crews. Under this system training aircraft tended to be old and, in the absence of sufficient new aircraft, to be replaced by "war-weary" aircraft which had been shipped home from combat theaters.

Shortages of combat aircraft were by no means limited to one particular air force or particular type of operational training. In greater or less degree they were common to all air forces and to all types of training well into the year 1944. In very heavy bombardment and in at

least one type of fighter training (P-38), the shortages lasted almost until the end of the war. The Third Air Force reported in May 1942 that its heavy bombardment OTU's were short 55 per cent and that because of this shortage flying time had to be reduced 25 per cent.[19] In the case of B-29 training, airplane production and modificiation was considered in January 1944 as "the single greatest critical item in the entire project." In November 1943 the number of B-29's was still pronounced critically short, and as late as January 1945 only 228 of the 284 aircraft promised had been delivered to the training groups.[20] Such shortages could be offset in some degree by more efficient use of the aircraft which were available, as in the instance of the Third Air Force above cited. In the main, however, they could not fail to affect training adversely either by delaying the completion of training of groups and crews or by limiting the extent of that training.

Perhaps as good an example as any of the effect of aircraft shortage on fighter training is to be found in the history of P-38 training in the Fourth Air Force. The first organizations to be equipped with P-38's (the 1st and 14th Groups) were sent overseas from that air force during the late spring and early summer of 1942. New groups of green pilots were organized to succeed them and to train on the old aircraft they left behind. At this time the shortage was also acute in twin-engine training aircraft suitable for transition flying by new pilots. These pilots had had no twin-engine flying and needed that experience before they were permitted to solo in the P-38, the first of the "hot" aircraft. Although the Fourth Air Force had briefly a few AT-9's on loan from the Flying Training Command during the summer of 1942, these were later withdrawn by [illegible]

of its own urgent need for all trainer-type aircraft.[21] The withdrawal of these AT-9's undoubtedly resulted in an increased accident rate among pilots learning to fly the P-38 and contributed to the low morale so common in P-38 training groups during 1942 and early 1943. This problem of fear of the P-38 was not successfully met until the "piggy-back" two-seater P-38 was developed late in 1942 and until the Lockheed test pilot, Jimmy Mattern, used one of these airplanes to visit the various OTU and RTU training groups. He gave check rides to new pilots in his piggy-back and made demonstration flights designed to prove the maneuverability and safe flying qualities of the P-38.[22]

The Fourth Air Force fighter training program was later seriously affected by shortage in the number of P-38's. As more P-38 groups went overseas, an increasingly large number of new P-38's were required to supply these groups with new aircraft prior to their departure and to maintain the groups in combat. As the P-38 training program in the Fourth Air Force was increased in size in order to provide still more P-38 groups for overseas, the number of P-38 airplanes in the training groups became progressively less adequate. The only way, in fact, in which the training schedule could be met was to train prospective P-38 pilots in part on the single-engine P-39. At the end of 1943 this mixed training involved giving the first 60 hours of operational training to many of the pilots on the P-39; thereafter training was given on the P-38. This improvisation was not fully discarded until March 1945, at which time P-38's became available in a number sufficient to the needs of training.[23] Mixed training, though a necessary expedient, was of course highly undesirable, for the flying characteristics of the two different type aircraft were by no means the same.

The problem of shortage in aircraft was the more serious because of deficiencies in maintenance. Since the number of combat aircraft available for operational training was rarely adequate to the needs of training, a heavy burden was placed on maintenance personnel and facilities. Having aircraft out of service for maintenance inevitably upset training schedules. The maintenance problem was particularly critical because so many aircraft used in training were older aircraft and required consequently greater attention than would new aircraft direct from the factory.

This situation was indeed difficult and was one that was met at best only in part. As in the case of experienced pilots, the number of experienced maintenance personnel in the United States was small. On most of these the combat air forces had first call. Those who were serving with fighter and bombardment units were occasionally withdrawn from their units and sent overseas, leaving less skilled men to take care of the needs of the groups in training.[24]

Depot maintenance, involving third- and fourth-echelon repairs, was likewise frequently slow and unsatisfactory. As in so many phases of air force activity, rapid expansion resulted in a situation in which there were too few skilled personnel and service facilities to accomplish expeditiously the vast quantity of work to be done. First priority at the depots was usually given to the readying of new aircraft for overseas, although in some instances, as in the repair of P-38's in the Fourth Air Force late in 1943, the repair of training aircraft was given equal priority.

Efforts were made by a number of means to improve maintenance and thereby to keep more aircraft available for flying training. These

included programs designed to improve the quality of maintenance training and to train more men--such as specialist training courses at aircraft factories and the establishment of MTU's (mobile training units)--and to see that supplies of parts were more rapidly available where needed. In the Fourth Air Force late in 1943 consideration was given to a plan for establishing a system for delivery of parts by air when necessary.[25]

None of these efforts was of greater consequence that the development of MTU's which were first devised in the Western Technical Training Command during the summer of 1942. Each of these units usually consisted of a trailer, a liaison officer, and six to eight enlisted men. The personnel of each unit included highly trained engine specialists, hydraulic specialists, armament specialists, and radio specialists for the particular type of aircraft upon which the unit was to give instruction. Each MTU carried complete equipment for the type of aircraft with which it was concerned, including such items as "sectionalized engines, carburetors, radios, and complete mock-ups of fuel, oil, electrical and hydraulic systems."

Since each MTU stayed with a training group for approximately 10 days, it could visit 7 stations in a training air force at least once during the normal 3-month OTU training cycle. So successful was this system that by the end of 1943 these MTU's were operating in all the training air forces and in nearly all combat theaters. They proved markedly effective in improving maintenance training and thereby also the total efficiency of the Army Air Forces.[26]

Operational training was also subject to difficulties as a result of a severe shortage, prevalent particularly during the latter months

of 1943 and early 1944, in the quantity of high-octane gasoline available for training purposes. The extraordinary demands for gasoline in the combat theaters could be met only at the expense of the needs of the training programs. This crisis was not passed until new plants were constructed and new means were developed to increase the production of high-octane gasoline.

The effect of the shortage was a curtailment of total flying hours, especially in high-altitude flying, in maximum load take-offs, and in cross-country flights. Early in November 1943, when the shortage of 100-octane gasoline was most critical, a report was submitted to the Undersecretary of War indicating the extent of its effect upon operational training during the preceding month. According to this report, the cost of substitution of lower octane grades during the month of October was considered equivalent to a loss of 5,558 flying hours. It was also responsible for diminishing the training output by 160 pilot trainees and by 29 bomber crews.[27]

As late as February 1945 the fighter training directive issued by Headquarters, Army Air Forces, carried alternative altitudes for high-altitude flying with gasolines of different octane ratings. The high-altitude flying ceiling for P-38 training with 100-octane gasoline was 25,000 feet; with 91-octane, it was only 16,000 feet. Similar restrictions on altitude were specified for other types of fighter aircraft.[28] Although these alternatives were rarely invoked after that date, it is obvious that such altitude substitutions would markedly diminish the effectiveness of training.

A further problem common to the conduct of both bomber and fighter training was inadequacy in training airfields. These fields were in-

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adequate in number and frequently in facilities; many of them were also badly located. Particularly in the early period the growth of the operational training program almost surpassed the ability of the fields to absorb the training units. In numerous instances it was necessary to break down the training group and settle squadrons at separate airfields, many of which had been formerly small municipal airports.

Many of the Army fields, moreover, had been constructed for another purpose, that of continental defense. Those fields constructed in the Pacific northwest and in the north Atlantic states were located in areas undesirable for training because of frequent bad weather; but, owing to the shortage in number, the fields had to be used both for training and for defense purposes. In the Fourth Air Force early in the war, for example, training was conducted at major defense airfields along the coast from Mexico to Canada; late in the war, however, it was concentrated primarily in southern California and in the inland fields away from the coast. Thus flying hours for training purposes were gradually increased, and conditions more conducive to safety in flying were achieved.[29]

CHAPTER IV

CRITICISM AND EVOLUTION OF THE FIGHTER AND BOMBARDMENT PROGRAMS

The operational and replacement training programs were subject to constant criticism by "the using agencies," the overseas air forces; by the staff offices both at Headquarters, Army Air Forces and at the subordinate headquarters; and by the training units themselves. The criticism from overseas was perhaps most important, since the training process was designed to produce skilled personnel for the theater air forces and those air forces could estimate both the degree of success and the nature of deficiencies. The theater air forces also occasionally made recommendations as to how the content and processes of training might be improved; however, Headquarters, AAF and the subordinate headquarters, which knew the possibilities and limitations of the domestic training plant, were better judges of the efficacy of the measures suggested and better able to develop new remedies. The training units themselves could criticize the practicability of the directives placed upon them and also suggest improvements from their viewpoint. As a result of the criticisms and recommendations from these various sources and levels, both fighter and bomber programs became increasingly effective in fulfiling their training missions the war progressed.

Sources and Nature of Criticisms

Partly because of the deficiencies in OTU-RTU training, every overseas air force gave preliminary training before committing newly arrived fighter and bomber personnel to combat. This training also involved indoctrination in the peculiarities of combat in the particular

theater. During the fall of 1942 six weeks were spent in some of the combat theaters in preparing fighter groups for action, of which perhaps two weeks were necessary for theater indoctrination. The overseas air forces were, in general, anxious to reduce this burdensome amount of training to a minimum so that they might concentrate more exclusively on the performance of their mission as combat air forces. Consequently, they directed a steady stream of criticism of training to Headquarters, AAF in order to achieve that goal.[1]

The two most constant complaints with respect to fighter crews were that they were deficient in gunnery and in high-altitude flying. A letter from the commanding general of the VIII Fighter Command written in mid-September 1942 stated: "Very few of the pilots had conducted air-to-air gunnery (live or camera) against high speed towed-targets or against other high speed aircraft. Practically all of their previous gunnery training had been carried out at low altitudes and not at the high and medium altitudes where much of the present-day combat takes place." Other deficiencies were reported in low-altitude navigation, in the assembling and maneuvering of large units at low altitudes, and in instrument flying individually and in formation.[2] A more startling instance of training deficiency was reported from the Southwest Pacific. Lt. Gen. George C. Kenney found that only four in one group of 29 fighter pilot replacements had flown combat aircraft. These four had flown the obsolescent P-35 and P-36; the other 25 had not advanced beyond the AT-6.[3]

Similarly, the thoroughness of training of bomber crews was also the subject of complaint. One combat crew reception center in England

early in 1943 reported that the personnel it processed tended to be seriously deficient in high-altitude formation flying, in air-to-air gunnery, in tow-target gunnery, and in coordination between pilots and bombardiers.[4] The Tenth Air Force stated that 90 per cent of the heavy bomber pilots arrived in the China-Burma-India theater with very little formation practice at high altitudes and that no gunner had fired on air-to-air targets from the B-24. Other alleged deficiencies involved proficiency in instrument flying, understanding of the aircraft, and the failure of the pilot to exercise necessary command authority over other members of the crew. Teamwork among bombardment crews was also considered to be lacking in too many instances; pilots, bombardiers, and navigators all too frequently did not show that smooth coordination so essential "in locating, approaching, and releasing on the target."[5]

The commanding generals of overseas commands and air forces submitted their criticisms of the content and process of training; they also occasionally forwarded questionnaires filled out in the theater by newly arrived pilots and crew members, who revealed their personal opinions as to the quality of their training. The answers of these new arrivals may be in a degree suspect as to exact objectivity, since personnel about to go into combat for a first time may very well be disposed to consider their training as somewhat less than adequate. Nevertheless, the number so testifying during late 1942 and early 1943 is impressive and goes far to buttress the more general statements from the theater. That pilots reported no air-to-air gunnery or perhaps no high-altitude flying, that they reported flying time as having been spent merely in flying "pretty" formations or in merely piling up hours with which to

fill in the necessary blanks on the training form, was brought forcefully to the attention of the various continental headquarters, for each individual filling out a questionnaire gave the name and location of his training unit.[6]

These criticisms, of which only a few have been cited here, in time became less sweeping in nature. Although criticisms continued, they dealt with smaller points of training; for as the pressure of the first hectic year passed, Headquarters, AAF and the subordinate air forces were able to evolve more successful programs for both fighter and bomber training. Perhaps additional evidence is to be found in the shorter length of training given the newly arrived pilots and crews in the theaters, particularly in Europe, after 1943.[7]

The various headquarters, and particularly Headquarters, AAF, had the advantage not alone of knowing the needs in training from visits to the combat theaters and from communications received from overseas but they also knew the /limitations/ of the domestic training plant. Inspectional visits to the continental airfields by higher headquarters were an important means for keeping informed upon the status of training in the groups and squadrons destined for overseas. These inspectional visits resulted in new suggestions with respect to the content and conduct of training.

Reports required of groups by higher headquarters afforded a steady flow of information on which wing, command, air force, and Headquarters, AAF decisions could be based. Some of the more important of these were periodic reports on aircraft status, flying time, gunnery training, and personnel strength. In addition, as particular problems and conditions arose which could not be dealt with satisfactorily by

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usual methods, or which might exist within the day-to-day pattern without noticeably being reflected in the usual reports, special studies were initiated and reports made.[8]

Another major means for improvement of the training program was the use of conferences. Some of these were held under the auspices of Headquarters, Army Air Forces. Others, beginning in February 1943, were held intermittently between the Flying Training Command, its subordinate commands, and the continental fighter and bomber commands and air forces. As a result of these conferences, it was possible to pool the information and ideas of large numbers of administrators of training and to disseminate new ideas, derived frequently from the combat theaters.

Evolution of the Programs

As a result of the criticism of deficiencies in the training programs and the steps taken to remedy those deficiencies, the fighter and bombardment training programs became increasingly competent in supplying the overseas air forces with better-trained personnel as the war progressed. The following means were among those used to achieve this goal: improved instruction, the introduction of greater specialization into training, a longer period of training, and broadening and adapting the content of the programs so as to meet more adequately the needs of the combat theaters.

Improved instruction was an essential of major magnitude, for the rapid expansion of the Army Air Forces after Pearl Harbor spread very thin an experience level which was even before that date undesirably low. This expansion was so accelerated that it was difficult to find experienced personnel for even key jobs in the newly organized groups.

In such a situation it was urgently necessary that experienced personnel be not dissipated but be used in those activities where their influence could be most far-reaching.

One means by which the effort was made to capitalize upon experienced personnel was through the AAF School of Applied Tactics at Orlando. In November 1942, this school was superimposed upon the earlier Fighter Command School, enlarging upon the former functions to include bombardment aviation. A prime purpose of the Fighter Command School was to train key personnel of new fighter groups in tactics and in administrative operations so that they might be a more capable cadre in OTU training, and after November 1942 the School of Applied Tactics provided such training for bombardment OTU cadres as well as for fighter cadres.[9] Cadres thus trained by highly experienced personnel in up-to-date air tactics and in administrative techniques were able to advance the proficiency level of a new group far more rapidly than would otherwise have been possible.

Another means for improving instruction was the use of returnees from combat theaters as instructors. The first returnees appeared in Fourth Air Force fighter training units in the late months of 1942. Thereafter they came in gradually increasing numbers. Through their presence it was possible to inject greater reality into the training program, for the instructor returnees were able to supplement and modify "textbook" instruction with their own combat experience.

The use of combat returnees as instructors was not unattended with difficulties, however. Many of the returnees were lacking in background and maturity. After the excitement of combat, they found it difficult

to acquire the painstaking and sympathetic attitude so necessary to good instruction. Many of them, too, had been narrowed by their experiences in only one theater and were unable to adjust to a program designed to supply personnel to all theaters. Others had failed to keep abreast of recent improvements in their own special field of training.[10]

These difficulties were not adequately met until a standard procedure for redistribution of returnee personnel was established in the late summer of 1944. An AAF regulation requiring that 20 per cent of all replacement combat crews for overseas be experienced led Headquarters, Army Air Forces to announce a formal policy which provided that all returnees physically qualified for further flying duty were to be transferred to the Training Command for refresher instruction. Following this instruction 50 per cent were to be assigned to the four continental air forces and I Troop Carrier Command, and the other 50 per cent were to be sent to instructor schools and to specialized courses. Those displaced in the instructor schools by the returnees were to be used to supply a portion of the requirement for "experienced" combat-crew replacements. The remainder of the experienced replacements were to come from returnees in the four continental air forces and in I Troop Carrier Command.[11] By this system combat returnees would be winnowed so that only those best adapted to instruction would be assigned such duties; the rest would be sent back to combat. By March 1945 more than 90 per cent of the instruction in fighter OTUs was being given by combat-experienced personnel.[12]

"Marrying" of bombardment groups undergoing training in the United States to groups equipped with the same type aircraft in the combat

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theaters was an important device which was used beginning early in 1943. This system, it was believed, would result in improved training, for the combat group could suggest to its training counterpart deficiencies in training made manifest by its combat experiences. It could also suggest areas for emphasis. Such matters as the locations of units, strength in personnel and equipment, combat losses, and future plans were never discussed because of reasons of security and morale. "Specific lessons learned as to proper tactical employment of the group, maintenance, suitability and/or limitations of equipment, necessary security precautions, camouflage and dispersal," were considered, on the other hand, to be the proper matters for discussion.[13] Although there is no evidence that this system was adopted for fighter groups, it does seem to have had considerable value in leading increased reality to bombardment training.

A more far-reaching and important endeavor to lessen the gap between the quality of training in the United States and the needs of the theaters was made during 1943 and 1944 when specialized training for service in individual theaters was gradually instituted. A successful experiment in the summer and fall of 1943 with a South Pacific bombardment flight echelon which had returned to the United States led to the establishment of a more widespread program. This echelon, following its period of leave, became the nucleus of a new unit being trained for service in the South Pacific. So successful was this experiment that it was soon established on a bi-monthly basis. Thereafter at regular intervals a combat-experienced cadre was returned to the combat zone as the nucleus of a newly trained group, and another war-weary cadre

was sent to the United States to reenact the same role in another newly organized group.[14]

By late 1944 training for specific theaters was made a standard policy for all air forces, with the proviso that replacement crews were to be trained basically for all theaters. Areas were designated for which respective domestic air forces were responsible, and eliminations and additions were made in the training programs of the various air forces to conform with the new policy. Certain CCTS's in the Third Air Force, for example, were directed to train their crews for use against Japan, while the Fourth Air Force, having been assigned heavy bombardment training for the Far East,[15] was authorized to eliminate instructions in United Kingdom control and in German aircraft recognition. For some months training was hampered by the operation of security measures which prevented prospective combatants from knowing the theater for which they were being trained, but those measures were gradually relaxed. This training lessened the need overseas to spend time in conducting theater indoctrination courses for newly arrived groups and replacements.[16]

Criticism and experience resulted not alone in improvements in the methods and means of training but in even more important changes in duration and content. As the tremendous pressure to get units overseas in a minimum of time lessened, additional time became available to permit more thorough training. The 40-hour fighter pilot was the rule in 1942, but by the end of 1943 the average flying time per fighter

pilot was somewhere between 60 and 80 hours. By the end of 1944 the endeavor was made to require all fighter replacement pilots to have 120 hours of operational flying training,[17] although there was some doubt if this figure could be attained in all of the continental air forces. The increase in pilot time and the tendency of fighter unit and crew requirements to level off resulted late in the fall of 1944 in a reduction in the fighter operational training load of the air forces from 1,110 to 990 crews.[18] Hours of flying training were increased in nearly all phases, but particularly in gunnery (including camera), formation flying, navigation, instrument flying, and in combined training between fighter and bomber units.

Although it is not possible, even were it desirable, to rehearse in detail the changes in these various phases because of lack of exact evidence, perhaps some suggestion of what was considered basic to fighter training may be gathered from a study of a fighter training directive issued by Headquarters, Army Air Forces early in 1945. This program prescribed the extent and nature of training for fighter pilots in cumulative training periods of 60, 80, 100, 120, and 150 hours. During the period of the war the 150-hour figure tended to be at best one of hope rather than of achievement. Small amounts of non-directed flying training was also permitted in each of these periods. The training program follows:[19]

	60 Hour Pilot		80 Hour Pilot		100 Hour Pilot		120 Hour Pilot		150 Hour Pilot	
	Hrs.	Mis.*	Hrs.	Mis.	Hrs.	Mis.	Hrs.	Mis.	Hrs.	Mis.
Transition	6	3	6	3	6	3	6	3	6	3
Formation										
a. High altitude	6	3	6	3	6	3	6	3	7	3
b. Medium altitude	2	1	2	1	2	1	2	1	2	1
c. Low altitude	2	1	6	3	6	3	8	4	10	5
Navigation										
a. High altitude	2	1	4	2	4	2	4	2	6	2
b. Medium altitude	2	1	2	1	2	1	2	1	2	1
c. Low altitude	2	1	2	1	2	1	4	2	6	3
Acrobatics										
a. Medium altitude	1	1	1	1	1	1	1	1	1	1
b. High altitude	2	2	5	3	5	3	6	4	6	4
Ground strafing and low altitude combat flying	2	2	2	2	6	6	7	7	10	10
Rocket Gunnery	0		0		24 rockets		24 rockets		32 rockets	
Aerial Gunnery										
a. Medium altitude	4	4	6	6	8	8	10	10	10	10
b. High altitude	4	2	6	3	21	10	21	10	25	12
Night Flying										
a. Transition	2	1	2	1	2	1	2	1	2	1
b. Formation	2	1	2	1	2	2	4	3	4	3
Bombing										
a. Dive	8 bombs		12 bombs		14 bombs		16 bombs		24 bombs	
b. Low level, skip	4 bombs		8 bombs		10 bombs		12 bombs		14 bombs	
Instruments	4	4	7	7	7	7	10	10	10	10
Combat										
a. Individual	3	3	3	3	3	3	3	3	3	3
b. Unit	2	2	2	2	2	2	4	4	4	4
Combined training	0	0	0	0	3	2	7	4	7	4
Chemical spray	1		1		2		2		4	
Theater tactics									10	5
TOTAL	48	33	64	43	88	59	107	73	131	89

High altitude for the purpose of this directive will be within 5,000 feet of operational ceiling by type of airplane and gasoline as follows:

Type Plane	100 Octane	91 Octane
P-47	25,000	16,000
P-40	20,000	15,000
P-51	25,000	---
P-38	25,000	16,000
P-61	22,000	---

* Missions.

The effect of the progress of the war on the content and conduct of training was usually accompanied by a time lag. Thus when after 1943 the American air forces were encountering progressively less opposition in the air, this change was gradually reflected in the heavier emphasis on certain phases of fighter training. These phases included low-altitude formation flying, ground strafing, rocket gunnery, and skip bombing. All these phases of training were designed to make American fighter aircraft more effective against enemy ground targets and ground forces.

During 1944 much attention was also given to the production of crews for long-range fighters to accompany heavy bombers in their increasingly frequent raids deep over Europe. The training of these escort fighter pilots was primarily defensive in character in conformity with their mission. Consequently, the ground strafing, dive bombing, and similar tactics taught offensive fighters were not included in the long-range fighter program.[20]

Flying time in bombardment operational training also increased markedly during the period of the war, although for a time during the early months of 1944 the demand for heavy bombardment units and crews was so great as to require a temporary reduction in the training period from 12 to 10 weeks. The period was restored to 12 weeks, however, in September 1944.[21]

Bombardment training standards, like those for fighter training, suggest by their changes the important developments and emphases in that field of training. Early standards for the various types of bombardment training were more general in nature; they consisted primarily

of general statements of proficiency to be attained. Later standards were more specific in respect to minimum requirements. The contrast is likewise illustrated by the increasingly stringent requirements with respect to training in the functions of the bombardier, in navigation, in gunnery, and in the duties of the airplane commander.

As in the case of fighter standards, the absence of a complete file of the various types of bombardment training makes difficult a presentation of exact evidence of changes. Among the more striking developments, however, were the increasing use of radar in heavy and very heavy bombardment operations; the increase in the total number of releases of bombs during the training period; the use of the camera in simulated bombing attacks; the greater stress on formation flying; the performance of more and longer navigation training flights; increased emphasis on both air-to-air and air-to-ground gunnery, including use of the gun camera; and the conduct of combined training missions, with fighter aircraft acting at various times either as escorts or as fighters attacking the bomber formation. As a result of these developments, the bombardment combat crews supplied to overseas air forces late in the war were far more competent than those sent over in the early period.[22]

The training progress of both fighter and bombardment crews was watched closely by the various administrative headquarters to which the training units were assigned and by the Office of the Air Inspector. The POE (Preparation for Overseas Movement) division of that office prepared publications intended to assist units in scheduling their training. It also sent out inspection teams, so that higher headquarters might be kept informed of the state of readiness of the training units

[illegible]

and could take prompt corrective action when necessary. In addition, late in 1943 a pre-POE inspection system was instituted. Under this system more opportunity for corrective action was provided, for units were given a rigorous inspection from 30 to 60 days prior to their scheduled departure for combat zones.[23]

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CHAPTER V

RECONNAISSANCE TRAINING

Origin and Structure

Reconnaissance aviation before the outbreak of the war was divided among reconnaissance squadrons, observation groups, and a single photo group. The 1st Photographic Group, later redesignated the 1st Mapping Group, was activated on 10 June 1941 with personnel supplied from the earlier 1st Photographic Squadron.[1] It was created in order to expand the organization in the Army Air Forces for photo mapping and also to conduct experiments in long-range photo reconnaissance after the pattern derived from British war experience.[2] At the time of Pearl Harbor its headquarters was subordinate to the Air Force Combat Command. One of its four squadrons was subordinate to each of the four continental air forces.

The reconnaissance squadrons were each attached to a bombardment group, heavy, medium, or light. No bombardment group was without its associated reconnaissance squadron. Observation groups, equipped with light aircraft, were used for short-range reconnaissance missions in conjunction with ground force units. Reconnaissance squadrons equipped with heavy or medium bombardment aircraft were subordinate units of the bomber commands, while other reconnaissance squadrons equipped with light bombardment aircraft and observation groups were subordinate units of the air support commands. Both bomber and air support commands were established during the summer and fall of 1941 in each of the four continental air forces.

Each reconnaissance squadron was equipped with the same type aircraft as that of the bombardment group to which it was attached. It was intended to serve as the "eyes" of the associated bombardment group and also to serve, secondarily, as another bombardment squadron. Consequently, these squadrons were supposed to receive training both in reconnaissance and in bombardment. Reconnaissance for heavy and medium bombardment squadrons as then planned, however, was considerably different from reconnaissance theory developed later during the war; for it consisted primarily of sea-search missions conceived in the idea of continental defense.[3]

Despite the intent that reconnaissance be considered the primary mission of the prewar reconnaissance squadrons, the training emphasis in 1941 seems to have been in greater measure upon bombardment. Thus the 38th Reconnaissance Squadron, which during most of 1941 was associated with the famous 19th Bombardment Group at Albuquerque Army Air Base, N. Mex., received considerable training in bombardment but only secondary training in such reconnaissance specialties as pinpoint photography, strip photography, and mosaic mapping.[4] The extent of training given most other reconnaissance squadrons during 1941 was far less; for they were affected to a much greater degree than the 38th by the serious shortages in personnel, aircraft, and equipment characteristic of so many units in the Army Air Forces at that time.

In the apparent desire to strengthen the combat effectiveness of the bombardment groups, the associated reconnaissance squadrons gradually lost their independent identity during the fall of 1941 and early 1942 and became integral parts, fourth squadrons, of their respective bombardment groups.[5] Such reconnaissance as was undertaken thus became

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a group rather than a squadron responsibility. On 9 April 1942 the withdrawal of bombardment groups from reconnaissance aviation became even more definite. On that date the bombardment groups were relieved of all responsibility for photo reconnaissance and that responsibility was assigned to the newly emergent photo reconnaissance units.[6]

As result of this conversion of reconnaissance squadrons to regular bombardment units, reconnaissance training shortly after Pearl Harbor became almost the sole responsibility of the observation groups and, to a small extent, of the 1st Mapping Group. Training given by the 1st Mapping Group was severely limited, however, for its squadrons were busily engaged in various mapping enterprises for the defense of the western hemisphere.[7] Not until May 1942 was an organization established, the 1st Photographic Group, which was able to devote full time to training.[8]

Training was conducted in the observation units with the greatest difficulty. The old O-type aircraft with which the groups were equipped in nearly all instances were inadequate in number to outfit a group and were, moreover, obsolete. In December 1941, for example, the three observation groups and the three separate observation squadrons assigned to the III Air Support Command were equipped with a total of 136 aircraft, nearly all of which were obsolete.[9] Perhaps because of the unsatisfactory character of O-type aircraft and also because of the transitional status in the development of observation aviation, no new types of observation aircraft seems to have been designed. Instead, the intent was to supplant the O-type models with fighter and bombardment aircraft. But the substitution of modern fighter and bombardment

aircraft for these antiquated models was slow indeed; fighter and bombardment units had in general a higher priority than observation units in the assignment of new aircraft. In the spring of 1942 the 67th and 68th Observation Groups of the III Air Support Command began to be equipped with a few P-43's and A-20's, and in the autumn of the same year the first P-51's and B-25's were assigned.[10]

In time, four major types of reconnaissance training evolved out of the more or less backward and chaotic situation existing in reconnaissance training during 1941 and 1942. These four types were photo reconnaissance, tactical reconnaissance, liaison pilot training, and weather reconnaissance. Of these, photo reconnaissance produced the greatest number of crews. This training, conducted chiefly at Peterson Field, Colo., and Will Rogers Field, Okla., was designed to produce crews capable of long-range missions and the proper use of complex photographic equipment. Special photographic units were also established for specific purposes. These included combat mapping squadrons, which were trained to obtain strategic photography for mapping and charting, and also special night photo units.[11]

Tactical and liaison reconnaissance training emerged out of the breakdown of the old observation group structure during 1943. Tactical reconnaissance units conducted short-range missions over battle areas designed to secure information by visual or photographic means and to return that information for use in the briefest possible time. They were equipped with fighter aircraft and were trained primarily at Key Field, Meridian, Miss.[12] Liaison units were equipped with small, low-speed aircraft, for use in directing and coordinating ground force activities. At first liaison pilots were trained in the individual

liaison units, but early in 1944 a liaison pilot school was established for this training at Tyler, Texas.[13] As a program, liaison training was relatively simple. New problems attached to its operation.

Weather reconnaissance training came into being during the summer of 1944 and was the last and smallest of these several programs. This training involved the development of a high proficiency in the conduct of long-range missions designed to discover essential weather information. Crews were trained on B-29's, B-24's and B-25's at Key Field and subsequently at Will Rogers Field, Okla.[14]

Except for a small amount of B-29 photo reconnaissance training, which was begun in the Second Air Force in August 1944, practically all reconnaissance training became centered ultimately in the Third Air Force. The number and complexity of the reorganizations of reconnaissance training within the Third Air Force make a detailed examination of these changes highly unprofitable. They do indicate, however, the fluid state of reconnaissance training, in contrast to the more firmly developed and stable fighter and bomber programs.[15]

Operational training in reconnaissance, like operational training in bombardment and fighter aviation, was conducted under the OTU-RTU system. During 1942 the system was, if at all, only vaguely operative; for the few observation units readied for overseas were, in the main, self-training. The first observation RTU seems to have been established at Will Rogers Field in early November 1942.[16] Because of the low morale in which observation was then held and because of shortages in personnel and equipment, this RTU was notably unsuccessful.

During 1943 OTU-RTU training became increasingly effective in

each of the major types of reconnaissance training. By 1944 the shift in emphasis from OTU to RTU, parallel to this similar shift in other types of training, became marked, as the demand for replacements for units already overseas increased. To supply this need, photo reconnaissance training was expanded and divided in June 1944 between Coffeyville Army Air Field, Kans., and Will Rogers Field. Coffeyville became an RTU training center, while both OTU and RTU training were conducted at Will Rogers Field.[17] In the other types of reconnaissance, training generally continued at the same locations, but little OTU training was carried on. The name of the RTU units was changed to CCTS at the time of the general redesignation of all RTU's at the end of August 1944.

As in the case of bombardment and fighter training, standards establishing proficiencies for reconnaissance units and crews were issued by Headquarters, Army Air Forces.[18] These were reissued and elaborated at subordinate levels of command to fit the needs of the units and crews receiving training. From time to time new training standards were issued embodying changes resulting from new technical developments or from experience either in the domestic training establishments or overseas. At the conclusion of the war 14 different training standards were being issued to govern as many specialized types of reconnaissance training.[19]

The aircraft used in reconnaissance training were, with the exception of those in liaison training, bombardment and fighter models. (In liaison training the L-5 was principally used.) When modified to carry photographic equipment, bombardment and fighter models were designated as F-type airplanes. Of these, the F-5, F-6, F-7, and, toward the end of the war, the F-15, were probably most important. The list of F-type

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airplanes and the corresponding fighters and bombers follows:[20]

F-type	Corresponding Aircraft
F-3	A-20
F-4	A-38
F-5	P-38
F-6	P-51
F-7	P-44
F-8	Mosquito
F-9	B-17
F-10	B-25
F-13	B-29
F-14	P-80
F-15	P-61

Problems and Developments

Perhaps to a greater degree than in any other field of operational training, the various types of reconnaissance were harassed by problems which during the early period of the war threatened to destroy effectiveness. These problems were of two types: crippling shortages in personnel and aircraft, and inadequacies in the content and duration of training. As the war progressed, however, shortages in personnel and aircraft were gradually surmounted, and the experiences derived both in training and in combat theaters were utilized in creating an increasingly effective series of reconnaissance programs.

Personnel shortages were undoubtedly greatest and most crippling among the observation groups in the early months of the war. Most of these groups, a large number of which were of National Guard origin, were substantially understrength at the time of Pearl Harbor. In most instances this situation improved slightly, if at all, during the following year. This fact may well reflect the prevailing lack of confidence in the usefulness of observation aviation as then organized. Both bombardment and fighter units had a higher priority for new pilot

graduates of the Flying Training Command than had observation units, and in some cases withdrawals of personnel were even made from observation units to supply additional personnel for other organizations. The starving of observation units may in retrospect seem somewhat shortsighted, since they represented at the time so large a part of reconnaissance; nevertheless the needs of combat fighter and bombardment groups took precedence over the needs of most observation units.

Certain statistics make the personnel status of observation units more clear. "An inspection of the 68th Group on 25 April [1942] revealed that it had received no new pilots since the summer of 1941 and that therefore no training instruction was being conducted. The group had approximately 50 observers and 65 pilots present and 15 per cent of its enlisted men."[21] In October 1942 a directive was issued by Headquarters, Army Air Forces reducing four of the five observation groups of the II Air Support Command to 50 per cent of authorized strength, so that the personnel thus obtained could be used in tow-target squadrons and in heavy bombardment OTU's and RTU's.[22] In the I and III Air Support Commands, three of the six groups were reduced to 50 per cent and one to 25 per cent of authorized strength, so that the personnel thus gained could be used for the same purposes as in the II Air Support Command.[23] Similar reductions in strength may possibly have also occurred in certain units of the IV Air Support Command.

Although the personnel shortages tended to be less marked following the disposition of the outmoded observation group structure, lesser shortages in personnel in one or another of the various types of reconnaissance did occasionally occur. In the autumn of 1943 the

situation in photo reconnaissance became particularly difficult. On 1 November 1943, for example, the 111 Reconnaissance Command requested that it be relieved of its commitment to fill its shortage of 37 crews during November because of insufficient input. This request resulted in the assignment of an increased number of personnel for training.[24] It should be pointed out, however, that these shortages became progressively less frequent and smaller in the later stages of the war.

Shortages in personnel were matched or even exceeded early in the war by the very great deficiencies in number or type of aircraft, or both. Mention has already been made of the antiquated O models which were almost the sole equipment of all observation units in December 1941. As late as 24 August 1942 only three of the six observation groups in the Third Air Force had any tactical aircraft. Together these groups possessed a total of 12 A-20's, 11 P-40's, and 14 P-43's.[25] In mid-November the 71st Observation Group, a priority group in the Second Air Force, had 0 light bombers and 15 fighters as its total tactical complement.[26] Other observation groups fared even less well. In both personnel strength and aircraft, fighter and bombardment groups were favored over observation units.

Following the reorganization and revitalization of reconnaissance aviation during the summer of 1943, aircraft were made available in more substantial numbers. By that time aircraft production had increased and greater confidence was felt in the potential combat effectiveness of the new tactical reconnaissance units in contrast to the former observation units. In fact, U adquarters, AAF placed reconnaissance on a priority for aircraft second only to heavy bombardment.[27] ost tactical reconnaissance pilots from the date of the initiation of

the program were trained on P-51's, the tactical aircraft they were destined to fly overseas. The shortage in P-51's which persisted until about March 1944 was overcome by the use of P-39's and P-40's,[28] but thereafter it was possible to reduce radically the use of these less desirable aircraft.

Photo reconnaissance, which enjoyed greater prestige than observation training during 1942, had less difficulty with respect to type of aircraft than with respect to number in its rapidly expanding program. P-38's and B-17's were available to that program in 1942 and, after its transfer to the Third Air Force, P-38's and C-24's. But until the later period of the war, the number was rarely adequate for the most expeditious training. Early in 1944, in order to help take care of the training load, it was found necessary to have transferred from the Training Command station at Williams Field, Ariz., P-322's (the model of the P-38 rejected by the British).[29] Many of these airplanes were old and "beat-up," dating from 1941.

Because of the unsettled and ill-planned state of reconnaissance in the Army Air Forces at the beginning of the war, training in reconnaissance probably was more influenced in content and structure by overseas experience than was any other field of operational training. This was particularly true of tactical reconnaissance and photo reconnaissance, which owed much of their initial impetus to British experience, and of night and weather reconnaissance, which grew out of American experience in overseas theaters.

The inadequacies of the observation units sent overseas in 1942 had been so apparent during the North African campaign that observation training was radically reorganized during the summer of 1943 on the

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basis of British example. Maj. John R. Dyas, a squadron commander of the 68th Observation Group, returned to Headquarters, Army Air Forces during the summer of 1943, accompanied by Lt. Col. Edward Siden of the South African Air Force, to discuss the advisability of modeling reconnaissance aviation after the British pattern which had proved so successful in North Africa. In contrast to the observation group structure, comprising medium or light bombers, liaison aircraft, and fighters, British tactical reconnaissance was formed solely of speedy fighters. As a result of these conferences, the old observation structure and program were junked and tactical reconnaissance instituted. Dyas became the first commanding officer of the tactical reconnaissance OTU-RTU at Key Field, Miss., where he was assisted for a time by Colonel Siden.[30]

Although photo reconnaissance was by no means new in the Army Air Forces, its structure and content were also markedly affected by American observation of British methods. Lt. Col. David M. Hutchison, the first commanding officer at Peterson Field, Colo., had spent several months in England during the fall of 1941 observing British photo reconnaissance, and in May 1942 he made use of that experience in shaping the content of training in the first photo reconnaissance OTU.[31]

Like tactical reconnaissance, the establishment of weather reconnaissance during the summer of 1942 and of night photo reconnaissance somewhat earlier owed much to the North African experience. Responsible officers felt that the operations of combat forces had been hampered in that theater by the failure to obtain and report accurately weather phenomena. The newly established weather units and crews at Key Field

were required to have certain proficiencies common to all reconnaissance units, but particular attention was given to a knowledge of weather. A weather officer or a pilot who had received weather training was a member of each crew.[32]

Night photo reconnaissance training also seemed desirable because of the fact that the Germans in North Africa conducted many of their military movements at night. The training given to the A-20 crews at Will Rogers and later at Key Field was very similar to day photo reconnaissance, but special emphasis was placed on the use of photo flash bombs and on night navigation.[33]

The extent of training in each of the various types of reconnaissance was dependent upon the degree of urgency for personnel overseas and the amount of equipment available for use in training. Early in the war the extent of training was far less than desirable, for demands from the theaters for personnel as well as deficiencies in such vital matters as numbers and types of aircraft available and in the quality of maintenance put narrow limits to training. In early 1944, when the worst crises were past, tactical reconnaissance crews were receiving two months of training, while photo reconnaissance crews were also receiving two months of training in their specialty. By September 1944 it became possible to increase the extent of training in each category to three months.[34]

Training was not only increased in extent but it was also markedly improved in quality and perfected in emphasis. In both these latter respects the improvement was made possible chiefly as a result of the close liaison existing between overseas reconnaissance units and their

domestic training establishments. Each type of reconnaissance training was so small in total personnel that it was relatively easy to maintain a close, almost family, relationship between personnel at home and those overseas. This tie was the stronger because, increasingly as the war progressed, the instructional staffs were comprised of overseas returnees. Major Dyas, for example, began tactical reconnaissance training at Key Field with the assistance of several members of his former observation group as instructors.[35] By the spring of 1944 at least 60 per cent of the instructors in photo reconnaissance training at Will Rogers Field had had overseas experience.[36] This trend continued until the end of the war.

As a result of the combination of such factors as overseas experience, returnee instructors, aircraft more adequate in number and type, and a greater period of time for the conduct of training, reconnaissance personnel departed for overseas increasingly well trained. In achieving this improvement, criticisms from overseas were particularly important. Overseas criticisms during 1942 and 1943, for example, included statements that photo reconnaissance crews had had too little training in photography, particularly in mapping; that they were weak in instrument flying and gunnery; and that they were insufficiently grounded in the knowledge of the mechanism and maintenance of reconnaissance aircraft.[37]

These criticisms resulted in increased attention to all the weaknesses listed above. The photo reconnaissance training program issued at Will Rogers Field in June 1944 provided for 24 hours of aerial photography in comparison with 18 hours in 1943. It also provided for the first time that each crew be required to complete a mapping mission

at 20,000 feet or above, covering a minimum area of 10 by 20 miles. Pilots, moreover, were to receive 36 hours in engineering, so that they might become increasingly familiar with the structure and maintenance of their aircraft.[38] In the fall of 1944 the existing training program was further amended so as to secure increased instrument training and a still additional increase in total flying time for those reconnaissance pilots flying P-38 type aircraft. Thereafter each replacement pilot was to receive, if at all possible, 100 hours of flying time on the P-38.[39]

Some of the same criticisms leveled against photo reconnaissance during 1942 and 1943 were also made against tactical reconnaissance, and, in addition, there were reports that the latter type of reconnaissance was seriously deficient in directing the adjustment of artillery fire.[40] As in the case of photo reconnaissance, the later training programs for tactical reconnaissance reveal changes suggesting an awareness of the validity of these criticisms. The tactical reconnaissance program issued early in 1944 devoted to gunnery a total of 16 hours of ground and flying training, but one issued later in that year extended the gunnery training requirement to 48 hours. The requirement for instrument training was correspondingly increased from 19 to 68 hours.[41] In order that greater coordination might be achieved in locating artillery targets, increased emphasis was also placed on developing a satisfactory proficiency in directing artillery and naval gunfire. This deficiency was met in still another way by provision for additional ground training in this subject.[42]

Tactical reconnaissance training was also improved during 1944 through the injection of greater reality into training. This was

possible because by the summer of 1944 the training program was becoming better able to meet its overseas commitments and, in fact, to produce a surplus of pilots beyond commitments. As a result of this surplus, certain graduates of the RTU at Key Field could be made available to either the I or II Tactical Air Division for additional training. These divisions had been created from former air support commands late in 1943 to engage in combined training maneuvers with ground force units. The assignment of tactical reconnaissance pilots to these units for a period of three or four weeks put an edge to their training not possible when no surplus, either in number of pilots or time, existed at Key Field. During the summer of 1944 approximately 20 per cent of the tactical reconnaissance graduates were able to receive this additional training. This percentage grew steadily during the final months of the war.[43]

Although reconnaissance aviation was slower in development during the early part of the war than either bombardment or fighter aviation, it had surmounted most of its problems at least by 1944 and was fulfilling effectively its functions to both air and ground force units. This struggle had been the more difficult because of the lesser esteem in which reconnaissance was held early in the war and its consequent definitely secondary position both to fighter and bombardment aviation in the consideration of Headquarters, Army Air Forces. The gradual recognition of the very great importance of this neglected field led to its receiving increased attention, however, and by the end of 1943 the basis for a truly effective series of reconnaissance programs had been laid.

The quantitative statement of the total numbers of reconnaissance

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crews trained, while far smaller than in either fighter or bombardment aviation, is nevertheless substantial. In the period from the beginning of the year 1942 until V-J Day the number of reconnaissance crews trained on the F-2, F-3, F-6, F-7, and F-13 totaled 3,097. Of these, 1,107 were photo reconnaissance crews trained on the F-5 and 806 tactical reconnaissance crews trained on the F-6. In addition, a total of 552 liaison pilots were trained on L-type aircraft during the same period.[44]

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CHAPTER VI

TROOP CARRIER TRAINING

Organization and Structure

The I Troop Carrier Command was activated on 30 April 1942 at Stout Field, Indianapolis, where it maintained its headquarters throughout the period of the war.[1] Originally designated the Air Transport Command, it received its more permanent designation on 20 June 1942, at which time the former Ferrying Command was renamed the Air Transport Command. Its mission was defined as "the training of troop carrier units, which provide for the the air movement of air landing troops and equipment, including glider-borne troops and parachute troops and equipment; and for the training of air evacuation units."[2]

Troop carrier training was of relatively recent origin. Experiments in the transport of airborne troops had been conducted by transport units at various times during the decade of the 1930's. In May 1940 at Fort Benning, Ga., these units conducted their first operations with parachute troops.[3] The experiments thus begun were vastly expanded and a training program instituted as a result of the startling success of German airborne and paratroop operations. In seeking to find a means for the rapid expansion of this training, the system of OTU-RTU training, already being used in bombardment and fighter training was adopted for troop carrier training. The designation for RTU troop carrier training was changed to OCTS in August 1944 at the same time that the same change was made in the designation of fighter, bombardment, and reconnaissance RTU training.

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Troop carrier unit and replacement training until 1944 was conducted over a five-month period for pilots and over a three-month period for the remainder of the crew. During the first two months pilots received transition and other training in order to facilitate the total training process following the assignment of the other crew members. In 1944, however, training for both pilots and crews was reduced to three months so as to conform to the time period allotted to pilots in bombardment operational training. As in the case of the latter types of training, unit training was preceded by a three-month organizational period following activation, during which time the initiating cadre was built up to authorized strength. Prior to the activation of the group the cadre itself had received a month of training at the School of Applied Tactics at Orlando.[4]

The chain of command also roughly paralleled that for bombardment and fighter OTU-RTU training. Directives governing troop carrier training emanated from Headquarters, Army Air Forces to Headquarters, I Troop Carrier Command. This headquarters in turn issued its own directives in conformity with those received from Headquarters, AAF and was assisted in the administrative supervision of the training groups and squadrons by a series of intermediate wing headquarters. In April 1945, just before the war ended in Europe, the I Troop Carrier Command joined the four continental air forces as a fifth subordinate headquarters to the Continental Air Forces, as that integrating headquarters became fully operational.[5]

Although troop carrier, like reconnaissance training, was a minor program in comparison with the large numbers trained in the various

phases of fighter and bombardment aviation, the statistics of troop carrier crews trained between December 1942 and August 1945 are impressive. During this time a total of 4,608 crews were prepared for overseas service. Of these, 3,816 crews were trained on the C-47 and 792 crews on the C-46.[6]

Troop Carrier Training Programs

The training standards issued by Headquarters, Army Air Forces laid down statements of proficiencies to be attained by units, combat crews, and individual combat crew members. The first such standard was issued on 1 December 1942.[7] In the course of the war it was subjected to several revisions which were designed to amend troop carrier training in the light of experience and of new technical developments. These general statements of proficiencies were translated into specified operational training directives by Headquarters, I Troop Carrier Command.

The general unit training requirements stated in the initial training standard included the following: that units be proficient "in operational technique for employment with paratroops and airborne troops . . . ; in operational technique in the towing and piloting of gliders . . . ; in dispatching, loading, taxiing, take-offs, assemblies, tactical type formations, navigation to objective at low altitudes, releasing of glider, landing, parking, and dispersal of airplanes and gliders." In addition, proficiencies in air discipline, in the ability to ascend and descend through overcast and to reassemble with a minimum of delay, in airdrome defense, and in the effective administration of the unit were also prescribed. The main difference between these requirements for

unit training and those embodied in later standards were that the revised unit requirements emphasized indirectly the need of injecting greater reality into training. Particularly was this evident in the stress placed in the later standards upon night formation practice and training under blackout conditions.[8]

Combat crew training requirements centered upon the essential of developing a high degree of teamwork within each combat crew. In turn, this was predicated not alone upon such knowledge common to all crew members as airplane and glider care and maintenance under field conditions and proficiency in aircraft and naval identification, but also upon developing a high proficiency on the part of each member in his specialty. The standards included substantial statements of proficiencies to be achieved by the individual crew members. These were the airplane pilot, co-pilot, radio operator, airplane mechanic, glider pilot and co-pilot, and glider mechanic. Subsequent revisions of the original standard also included requirements for a navigator, who was in some instances a member of a troop carrier crew.

The programs issued by Headquarters, I Troop Carrier Command are suggestive in a more specific way of the changing emphases in troop carrier training. The two following programs and the chart were issued during 1943, 1944, and 1945 respectively.[9] Particularly notable is the increased emphasis on night flying for both power and glider pilots during 1944. The chart for 1945 shows a much reduced training period at a time when all training was combat crew replacement training. The chart also indicates the change from C-47 (DC-3) aircraft to the C-46, which change had begun to take place during the fall of the preceding year because of the greater carrying capacity of the latter airplane.

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	Desired Attainment	Minimum Requirement
Power Pilots:		
Time as 1st pilot of DC-3 type (hours)	250	200
Time as co-pilot of DC-3 type (hours)	50	25
Time as glider pilot (hours)	5	1
Time night flying (hours)	50	30
Time formation flying (hours)	25	15
Time night formation flying (hours)	10	5
Time glider towing (hours)	15	5
Time glider towing in formation (hours)	5	5
Time glider towing in formation, night (hours)	5	2
Time instrument flying-hooded or in overcast (hours)	50	40
Time radio D.F. practice (hours)	20	5
Time minimum altitude navigation (hours)	20	10
Time paratroop missions (hours)	20	10
Number of takeoffs and landings overloaded	5	2
Number of takeoffs and landings - small fields	5	5
Number of rendezvous missions	5	2
Number of radar homing approaches	10	10
Number of ascents and/or descents thru overcast	10	10
Number of ascents and/or descents thru overcast-formation	5	2
Number of 1,000 mile over-water navigation flights	1	0
Average code speed (C-. words per minute)	15	10
Average code speed (blinker) words per minute	10	8
Glider Pilots:		
Time as glider pilot in gliders (hours)	50	30
Time as glider pilot in liaison planes (hours)	50	30
Time night flying (glider or liaison planes) (hours)	10	5
Time formation flying (glider or liaison planes) (hours)	10	5
Time night formation flying (glider or liaison planes) (hours)	5	2
Time instrument flying (glider or liaison planes) (hours)	0	0
Time minimum altitude navigation (glider or liaison planes) (hours)	10	5
Number of takeoffs and landings, fully loaded, in gliders	20	10
Number of small field landings - glider or liaison planes	5	5
Average blinker operating speed - words per minute	8	6

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Power Pilots:	Desired Attainment	Minimum Requirement
Time as troop carrier pilot of DC-3 type (hours)	250	200
Time as glider pilot (hours) plus 5 landings	5	2
Time night flying (hours)	100	30
Time formation flying (hours)	25	15
Time glider towing (hours)	15	5
Time night formation flying (hours)	15	10
Time glider towing in formation (hours)	5	3
Time glider towing in formation, night (hours)	5	2
Time instrument flying - hooded or in overcast (hours)	50	40
Time radio D/F practice (hours, 1 actual intr. approach)	10	5
Time minimum altitude navigation (hours)	20	15
Time paratroop missions (hours)	15	5
Number of takeoffs and landings overloaded	2	2
Number of takeoffs and landings - small fields	10	5
Number of radar homing approaches (subj. to equip. available)	10	5
Number of ascents and/or descents through overcast-formation	5	2
Number of 1,000-mile over-water navigational flights (optional)	1	0
Code speed (C-1) words per minute	15	10
Code speed (blinker) words per minute	10	5
Glider Pilots:		
Time as glider pilot in gliders (hours)	50	30
Time as night flying (glider) (hours)	25	15
Time flying in column (hours)	10	5
Time night flying in column (hours)	5	2
Route navigation and release orientation (hours)	5	2
No. of landings fully loaded in gliders	20	10
No. of small field landings - gliders	10	5
Average blinker operating speed - words per minute (all time will be in CG-4A)	8	5

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Evolution of Troop Carrier Training

The course of troop carrier training closely paralleled developments in other types of operational training. Troop carrier training tended to be beset by many of the problems characteristic of the other programs, although of course it also suffered from problems peculiar to itself. In addition, like fighter and bombardment training, it was subject to constant criticism from overseas theaters. These problems and criticisms received careful study by Headquarters, Army Air Forces, Headquarters, I Troop Carrier Command, and the subordinate headquarters in their joint and individual efforts to improve troop carrier training.

Personnel difficulties, which were most pressing during the early part of the war, included reception of personnel for operational training whose prior training had not been complete. This was particularly true with respect to soldiers assigned to the I Troop Carrier Command without having completed basic training. In the endeavor to meet this problem, a procedure was established in 1943 whereby such personnel were sent to the troop carrier base at Baer Field, Ind., before being assigned to tactical units.[10]

Securing an adequate supply of instructors was a difficult task, in part because troop carrier activities represented so new a departure in aviation tactics. Considerable use of airline pilots was made in the early stages of training. The flow of personnel from the Tactical Center at Orlando and, by 1944, the return of personnel from the combat theaters also helped in supplying instructors. As in the bombardment and fighter programs, instructional efficiency suffered during 1942 and 1943 from the common practice of robbing the instructional staffs of OTU's

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and CTU's to supply combat replacement crews for immediate shipment overseas.[11]

Equipment shortages centered particularly around the all-important item of aircraft. Many C-47's (DC-3's) were obtained from civilian airlines as well as from the factories, but never enough during the early period. In November 1943, for example, the Acting Deputy Chief of Air Staff opposed a proposal to activate an additional wing of four troop carrier groups because of the shortage in aircraft and in trained personnel. He pointed out that the allotment of 30 planes to a group during its first three months of operational training and of 52 aircraft during the eight weeks of combined and maneuver training could not be made if the new groups were activated.[12] At times lack of radio equipment and weapons as well as aircraft also resulted in failures to meet replacement commitments.[13]

The shortages in aircraft and associated equipment were gradually overcome as the result of increased production and increased allocations. During the autumn of 1944, as has already been mentioned, the C-46 also began to be used by the I Troop Carrier Command. The use of the C-46 seemed a particularly desirable development, since that airplane could carry approximately 50 paratroopers whereas the C-47 carried only 18 or 20. Beginning in November 1944, transitioning on the C-46 became increasingly common. By the end of the war this aircraft had completely supplanted the C-47 in training.[14]

Several significant developments centered around glider operations in connection with the troop carrier program. One of these concerned the basis of selection and the quality of glider pilots. In the early

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period glider pilot trainees were selected in conformity with extremely low standards and were frequently individuals who had been eliminated from bombardment and fighter pilot training. Headquarters, I Troop Carrier Command strongly objected to this policy because, it was alleged, under such a system inferior glider pilots were provided for work that was essentially hazardous and involved a large number of lives. Headquarters, Army Air Forces took steps late in 1943 to raise the standards of selection for glider pilot training, and the new standards resulted ultimately in a higher quality of personnel.[15]

Double-towing operations were another major source of controversy in glider training. Reports from combat theaters indicated that limited speed range interfered with assembly into formation and maneuvering of aircraft when two loaded CG-4A gliders were towed by one C-47 airplane. Because of the undoubted value of the doubletow in meeting situations in which large quantities of bulky material had to be transferred by air, Headquarters, Army Air Forces was not willing to abandon this type of training. It did agree, however, to place additional emphasis on single-tow formation training.[16]

Throughout the period of the war persistent attention was given to the problem of improving the quality of glider training. In landing gliders, it was essential that the spot selected in the designated area be the one which would best provide after-landing cover for troops and equipment and which would also avoid traffic problems caused by the approach of other gliders at low altitudes. In order to give greater reality to this training, exercises were instituted during the intermediate stages of training which involved landing over artificial

hurdles comprised of trees or ropes strung between poles at the approach end of the airfield and the use of barricades of trees or poles at the dispersal end.[17]

By early 1945 the glider training directive of Headquarters, I Troop Carrier Command provided for a transition course in the CG-4A in which six landings, two of them single-tow and one double-tow, were required. In the advanced course 40 landings in gross-loaded gliders were required, at least 15 of which had to be night landings. In addition, two pick-up training exercises were provided, as well as 39 hours of ground school and 47 of tactical training in after-landing procedure.[18]

Combined training of troop carrier units with airborne troops presented a number of problems. For one thing, it was often difficult to coordinate schedules of troop carrier and ground units for airborne maneuvers. At times, moreover, so much of the last month of the normal training program for troop carrier units was consumed in joint operation with the airborne command that those units were not adequately trained in the phases contemplated for that period.[19] Ultimately, however, a combined training program was evolved which met with the approval of the I Troop Carrier Command. The exercises under this program were divided into three phases, which may be summarized as follows:[20]

Phase I - Small Unit Training

1. Minimum period--4 weeks--with one troop carrier group.
2. Objectives:
   Troop carrier--operations by squadrons.
   Airborne--loading, landing, assembly, and entry into combat by company or battery.
   Parachute and glider units to employ tugs and gliders on the same flight.

Phase II - Large Unit Training

1. Minimum period--3 weeks--with two troop carrier groups.
2. Objectives:
   Troop carrier--operation by groups.
   Airborne--loading, landing, assembly, and entry into combat by battalion combat teams.

Phase III - Divisional Training

1. Minimum period--1 week--with one troop carrier wing and four groups.
2. Objectives:
   Troop carrier--operation as a wing.
   Airborne--loading, landing, assembly, and entry into combat as a division, moving in two lifts over a route up to 300 miles long.

During all these phases troop carrier units emphasized single- and double-tow of gliders with appropriate loads in the airplanes and gliders; night operations with departure from separate airfields; location of areas by day and night with only those navigational aids normally expected in a combat zone and dropping of parachutists and landing of gliders therein. In carrying out the third phase the directive provided that at least one-half of the flight operations including assembly, formations, and drops should be accomplished at night; and that there should be during the period, practice in resupply, evacuation by air, and air landings.

New responsibilities undertaken by the I Troop Carrier Command in 1944 included the training of combat cargo units to transport personnel and supplies for air commando units; combined training to a limited extent with antiaircraft units; and the training of pathfinder crews. The number of combat cargo units trained was few; and, although a recommendation was approved to continue combined training with antiaircraft units, such training was perhaps limited to the initial exercise held

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at Camp Davis, N. C., early in 1944.[21] Pathfinder crew training, however, became a sustained operation, and a school was established for that purpose at Stout Field, Ind., about 1 September 1944.[22]

A pathfinder crew consisted of a pilot, co-pilot, navigator, radio operator, and airplane mechanic. The navigator and radio operator of each crew were given special radar instruction. The purpose of this instruction was to permit the pathfinder plane, which had radio facilities too bulky for use on an ordinary troop carrier airplane, to locate a suitable landing spot for its accompanying formation. After parachutists landed at this spot, they placed, maintained, and operated "navigational aids to guide the main striking force to the drop zone or landing zone." Through this new means operations were much improved in effectiveness.[23]

Numerous criticisms of the troop carrier training programs came from all combat theaters and were particularly marked during the early period when training was least adequate. The 374th Troop Carrier Group, for example, wrote a long report early in 1943 suggesting some of the deficiencies in training with which it had become familiar as a result of its experiences in the Southwest Pacific. It singled out particularly the desirability of giving more emphasis to strange field landings under load conditions, since landing strips were usually narrow and relatively short and the approaches were frequently obstructed by trees or ridges. It also suggested the advisability of having more practice in pilotage and dead reckoning with the compass only, in low-altitude flying, and in proper timing in combat areas. Further ground training for pilots was also considered desirable, so that they might have more adequate understanding of their aircraft.[24]

In the fall of 1943 the commanding general of the later named 82d Airborne Division reported that "grave deficiencies" had been noted in troop carrier airborne training. These included failures in co ct drops because of lack of understanding of the proper technique for locating drop zones on the part of troop carrier personnel. Because glider pilots lacked training, night glider operations had not even been tried, and those carried out during the daytime had not been satisfactory.[25] The Ninth Air Force likewise expressed its concern early in 1944 because of the fact that the first two troop carrier groups assigned to it had had practically no night flying training with glider tows and no night formation flying whatsoever.[26]

Headquarters, Army Air Forces and Headquarters, I Troop Carrier Command took co nizance of these criticisms from overseas in the revision of training requirements and in the conduct of training; beginning early in 1944 they gradually instituted specialized tow er training. The last seven troop carrier groups sent to the United Kingdom prior to March 1944, for example, had been given specialized training based upon data and training aids supplied by the theater.[27] During August and September 1944 the specialization principle was definitely adopted for all theaters, although with the special proviso that two of the four bases should continue to give the more general course.[28]

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CHAPTER VII

THE STAGING ATLAS

Administration of Staging

Units of all types, once trained, went through a staging process immediately prior to overseas shipment. During this process they received the equipment they were to use overseas and were themselves subject to inspection to determine whether the units were at full strength and if standards had been met in such matters as training, the maintenance of administrative records, and the physical status of personnel. This process took a variable period of time. Its duration depended upon such factors as the urgency with which units were required overseas; the efficiency and content of staging; and the speed with which shortages were filled and other defects remedied, aircraft and other equipment supplied, and shipping space made available. Since the process normally required four or more weeks, the conduct of training seemed highly desirable during this period in order to insure the maintenance of individual skills and of physical conditioning.

Those units dispatched overseas early in 1942 went through improvised staging procedures based largely on the urgencies of the moment. Time usually was available for only the most cursory check. There were, moreover, far too few trained inspecting officers to make detailed inspection possible. Warning and movement orders designating a specific unit for shipment were received frequently hard upon one another by an air force; the air force sought desperately to ready the

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unit and get it to the port of embarkation by the date specified.

Early in 1942 little time was allowed for filling shortages of personnel, and the extent of training was largely ignored. Pilots in such groups as the 31st Pursuit Group, which went to the Southwest Pacific in January 1942, had had many fewer flying hours in combat aircraft than would have been allowed at any future date. This was the day of the pilot with 40 hours of training, or less. As for equipment, units left with what they had or with what they could find quickly.[1]

In the endeavor to systematize staging, which had become somewhat less hectic by the time of the departure of Eighth Air Force units in the early summer of 1942, Headquarters, Army Air Forces established the Foreign Service Concentration Command on 19 June 1942.[2] This command, subsequently redesignated the I Concentration Command, was intended to become operational almost at once. Its responsibilities, as first outlined, included completing the organization and equipment of air force tactical and combat groups, dispatching the ground echelons in accordance with movement orders, operating replacement casual detachments, and maintaining coordinating personnel at ports of embarkation and at fly-away points. It was also to assume control and to operate air bases necessary to the accomplishment of its missions.[3]

Despite the ambitious intent for the command revealed in this outline of duties, the I Concentration Command met with extremely limited success. For one thing, the command suffered the antagonism of certain of the air forces, particularly the Second Air Force, for its real and alleged shortcomings in the performance of its duties. The Second Air Force charged, for example, that no suddenly created agency could have

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the experienced personnel necessary to determine the status of training in all the different groups comitted to its jurisdiction. It suggested further that because of this shortage in experienced personnel the command was far less effective than the former training air force in continuing to develop troup proficiency. Consequently, it maintained, both group proficiency and group morale suffered.[4]

The I Concentration Command also experienced great difficulty in acquiring the air bases it considered necessary to fulfil its mission, for these air bases could be acquired only at the expense of commands and air forces to which they had formerly been assigned. In addition it frequently found itself unable to get sufficient new aircraft quickly to outfit the units bound overseas. These difficulties were not primarily the fault of the command, but the lack of success in solving them meant that the organization operated neither smoothly nor effectively. As a result of its lack of success in administering so complex a mission, in early August its responsibilities were reduced to the preparation of air echelons for overseas and, in fact, only those air echelons which were to fly overseas in their own aircraft. This eliminated nearly all fighter units from its jurisdiction.[5]

The inability of the I Concentration Command to function effectively plus the ultimate conclusion that the addition of the new command complicated rather than simplified the processing-out activity, particularly by increasing the air travel of most units prior to their departure overseas, led to its disbandment toward the end of November 1942.[6] The attempt at centralizing staging activity was reversed thereafter. With the dissolution of the I Concentration Command, each continental air force and the I Troop Carrier Command became responsible for staging

the air echelons of units trained under its jurisdiction.

Each continental air force and the I Troop Carrier Command established administrative organizations to conduct the staging of the air echelons. These varied between air forces and within air forces from time to time. By November 1942 the Second Air Force had established the 21st Concentration Wing to control the processing of heavy bombardment units,[7] and the Third Air Force activated a somewhat similar organization shortly thereafter at Hunter Field, Ga.[8] The First Air Force established the First Heavy Bombardment Processing Headquarters at Scott Field, Ill., which late in 1943 was superseded by the Provisional Staging Squadron located at Mitchel Field, N. Y.[9] The Fourth Air Force, which had formerly conducted staging in informal fashion at various bases, by early 1943 had established processing-out squadrons for heavy bombardment pilots at Hamilton Field and for fighter pilots at Salinas Army Air Field, Calif.[10] In April 1943, the staging area for the I Troop Carrier Command was organized at Baer Field, Fort Wayne, Ind.[11]

The decentralization suggested by the above developments was more apparent than real, however, for the regulations of the Army Air Forces governing all staging became increasingly detailed and exacting. The increasing stringency of these regulations undoubtedly reflected dissatisfaction in the theaters with earlier groups which had been sent out. Many of these had arrived in the theaters deficient in training, in personnel, and in equipment, and consequently were not ready for effective service. The later regulations governing staging were intended to prevent other units being sent out with similar defects and to make sure that such defects were remedied prior to departure overseas.

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Staging Area Problems

Problems arising in staging areas with respect to personnel who had received operational training were of a variety of types. These included, as has already been suggested, deficiencies in administrative reports accompanying the units, deficiencies in training, and a frequent inability to coordinate aircraft and personnel in the staging areas so as to permit departures from those areas with maximum speed. Of these problems, the latter was most persistent. All of the problems were subject to the attention of the various higher headquarters in the effort to make the staging process progressively more routine and more efficient.

As late as 1943 problems arose frequently in the staging areas with respect to both intelligence and flying training. There were indications that units being prepared for overseas shipment were not adequately trained, especially in regard to safeguarding military information and combat intelligence, and that those imparting instruction not infrequently had little conception of their duties. The First Air Force complained that the Army Air Forces Air Intelligence School was supplying an inadequate number of graduates. It requested that an increased allotment be made so that the OTU's might receive better intelligence training and the demands from overseas for individual replacements might be met. In its reply Headquarters, AAF pointed out that it was doing everything possible to keep the classes at the intelligence school at maximum size. It also suggested, however, that the training air forces might help solve their problem of shortage by selecting officers in their jurisdiction and detailing them to the school on temporary duty.[12]

Some flying training was given in the staging areas, although hardly as much as was called for by the training directives. Instruction was given in navigation, in exercises preparatory to flight to the combat zone and for operations in a particular theater, and in the use of sights and small arms. A genuine training program, however, could not be instituted without checking the progress of staging and without lowering the morale of men who, except for brief intervals of inactivity, had ample duties to perform. That practice in some cases was contrary to directives is illustrated by the policy of the Third Air Force. By the end of April 1944 it was no longer giving any operational training during the staging period; nor did it anticipate giving any in the future. The Second Air Force at this time was planning to end operational training during the period of overseas processing.[13] Thus, despite the directives, the trend was toward a decrease instead of an increase in training activities.

A better coordinated system designed to discover and remedy defects prior to the staging process was developed during 1943. Chief among the improvements was the establishment of a AC Inspection Division in the Office of the Air Inspector at the time of the major reorganization of Headquarters, Army Air Forces at the end of March 1943. The function of this division was to make "final inspections of all Army Air Forces units and casuals under orders for overseas duty to determine adequacy of training, personnel, equipment, and supplies." The inspections, which were made shortly before the crews left the training bases for staging, covered "(1) number of personnel and adequacy of discipline, morale, and physical condition; (2) status of individual

and unit technical and tactical training; (3) amount and condition of individual and organizational equipment; and (4) efficiency of unit administration and maintenance of individual records."[14]

As a result of these inspections, the status of units departing for staging was markedly improved. The POE reports, for example, not infrequently contained demands for "stringent action" to avoid recurrence of undesirable conditions. Such demands during the summer of 1943 were associated with finds that higher echelons, in failing to give prescribed proficiency tests to alerted units, were not checking closely upon the progress of training; that in certain instances base commanders had failed to assist unit commanders in preparing for overseas movement; that in some cases unfit or unsuitable personnel had been shifted to units bound overseas, to the serious detriment of the morale and efficiency of the units concerned; and that all too frequently men were lacking in familiarity with the use of their weapons.[15]

Another report in the fall of 1943 also called for "stringent action" of a corrective nature because each echelon in the staging process was shifting some of its duties to the succeeding echelon. Final-phase training stations, according to this report, had not taken the steps necessary to produce proficiency before units were sent to staging bases, and the latter had passed too much of the processing task to the ports of embarkation.[16]

In addition to the POE inspection teams, which were under the jurisdiction of Headquarters, Army Air Forces, pre-POE teams were established late in 1943 by each of the four continental air forces and, presumably, by the I Troop Carrier Command. These teams inspected

units in their jurisdiction usually from 30 to 60 days before the readiness date for each unit. Since these inspections occurred considerably earlier than the regular [illegible] inspections, they were particularly valuable, for they permitted a greater period of time in which to correct deficiencies and irregularities discovered in the inspected units.[17]

Occasionally, special inspections were also made by Headquarters, Army Air Forces. During the spring of 1941, for example, representatives of the Assistant Chief of Air Staff, Operations, Commitments, and Requirements made a field trip to the staging areas and ports of aerial embarkation of the four training air forces. After observing matters of control, discipline, and processing of replacement combat crews and of aircraft, the representatives concluded that the Fourth Air Force was not carrying out its staging program as efficiently as the other three air forces. They reported that Fourth Air Force crew commanders were deficient in their exercise of command jurisdiction, that personnel records were frequently in an unsatisfactory condition, and that airplanes declared ready for departure from Hamilton Field, the bombardment staging air base of the Fourth Air Force, were not always ready when scheduled. As a result of this report, the Chief of Air Staff ordered the Fourth Air Force to take "drastic action" to correct these deficiencies.[18]

One of the most difficult problems to solve in the staging areas, and one apparently never quite solved, was that of properly coordinating the movement of crews and the security of aircraft. When crews and aircraft arrived separately in the staging areas, frequently time was lacking for a sufficiently early assignment of crews to aircraft.[19] Shortage of aircraft was at times a factor in causing this situation; but even

when there was no shortage, uncertainty as to the degree of proficiency of the crews complicated the problem. Many of these crews required more flying time before they were considered adequately trained for overseas service.

Headquarters, Army Air Forces sought to meet the problem of supplying adequately trained personnel to the staging areas in different ways. Early in the war AC/AS, Training set up an inflexible proficiency standard and a time in which to attain it. But the two did not harmonize, and the period of time in training had to become a variable because so many factors interfered with the attainment of proficiency. Then the procedure was reversed, and inflexible time limits were placed on the training cycle. However, variations in proficiency still existed. When decisions as to the acceptability of crews were necessary, AC/AS, Operations, Commitments, and Requirements made them on the basis of data supplied by the training air forces.[20]

The lack of coordination in the arrival of aircraft and crews continued to create problems almost to the end of the war. In September 1944, for example, the Third Air Force complained sharply of crowded housing conditions existing in its staging wing at Hunter Field and of consequent low morale among the crews because of the failure of equipment to arrive at scheduled times.[21] The Second Air Force voiced a similar complaint in October 1944 with respect to B-29 crews. Thirty-six B-29 crews which moved to the staging area on 1 October 1944 were still there on 16 October, with but two aircraft available of the quota assigned to fly this combat personnel to the theater. Valuable training time in the CTU had thus been lost, and the means of improving flying proficiency had been lacking. Although steps were taken to have

crews available on dates staggered throughout the month, so as to effect better coordination for movement of planes and crews, and although an attempt was made to work out a system of more reliable estimates of the number of aircraft available, Headquarters, AAF officials frankly adopted the policy, with concurrence of some of the theaters, of some delay in shipment. It was felt that the disadvantages of this delay would be more than offset if crews thereby gained the advantages in morale and training to be derived from flying tactical aircraft to final overseas destinations.[22]

CHAPTER VIII

SUMMARY AND CONCLUSIONS

The vast expansion of the Army Air Forces, particularly after the outbreak of war, placed a tremendous stress upon all training facilities. Only by intensive training could the new manpower be processed into effective organizations. This necessary training consisted of two phases: individual training and operational (crew and unit) training. The first involved the development of basic skills in individuals in each of the various air force specialties, while the second was designed to perfect the skills and to weld the individual specialists into air force units. Prior to the war the first phase was accomplished in flying and technical schools operated by the Air Corps; the second was accomplished chiefly by assigning newly trained graduates of flying and technical schools to old and experienced organizations.

The size and speed of growth following Pearl Harbor made more acute the problems which had emerged in both phases of training during the expansion since 1939. Particularly during the early stages of the war, the problems of getting sufficient aircraft, other equipment, and facilities, as well as an adequate instructional staff and flow of trainee personnel, were especially acute. These problems were in general more difficult in operational training than in the individual flying and technical phase because operational training was more complex. The conduct of operational training, for example, required combat aircraft, with respect to which overseas units and frequently the Lend-Lease Administration had a higher priority. The same problem of an

adequate supply arose also with respect to other operational equipment. In addition, since operational training was more complex, it was even more difficult to get competent instructors than was true in the individual phase of training.

Although it was possible to handle the vastly increased numbers enrolled in individual training by expanding in size and number the training schools which had existed before the war, a totally new system was required for operational training. As a result of the war, it was no longer possible to have the combat unit act as a self-training organization in training new graduates of the flying and technical schools. Older experienced units were required overseas in combat theaters, and thus operational training under the old pattern would be brought to an end. Consequently, a new system was needed which, while permitting the old units and most of the experienced personnel to go overseas to combat, would nevertheless permit the effective use of a smaller number of experienced personnel for training the many new units required for expansion.

The system ultimately evolved in the year after Pearl Harbor was derived in large measure from British wartime experience. It provided for the use of groups of a relatively high experience level to conduct operational training repetitively for new groups comprised primarily of recent flying school and technical school graduates. Prior to and during the course of training a sprinkling of experienced personnel was added to the new group from the older group to occupy the critical position of leadership. Before the older group began the training cycle again with another new group, its strength was replenished by the assignment

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of additional personnel; later in the war, this personnel included combat veterans returned from overseas. The system was known as OTU (operational training unit).

Parallel to the OTU system, which was designed to train new groups, an RTU (replacement training unit) system was also devised. Under the latter program groups comprised of older experienced pilots and crews trained recent flying and technical school graduates in order to provide a flow of individual replacements for organizations already involved in combat. Early in the war OTU was the more important of the two types of operational training; as more and more units moved overseas, RTU became progressively of greater consequence. By early 1944, OTU was almost abandoned. Thereafter emphasis was placed on RTU, which was redesignated CCTs (combat crew training station) in August 1944.

Standards governing the various types of training were issued from Headquarters, Army Air Forces and were revised from time to time. The standards were transmitted to groups and squadrons through the chain of command and were subject to more precise definition and elaboration at the intermediate command levels. During the war these intermediate levels were frequently three--air force, command, and wing. Toward the end of the war the intermediate levels were in some instances reduced to two, as in the Fourth Air Force. After March 1944, in that air force the headquarters made more specific the general requirements established by Headquarters, Army Air Forces, while its subordinate wings checked to make certain that the detailed requirements issued by headquarters, Fourth Air Force, were being /observed/. This may be contrasted with the condition existing in the same air force during much of 1942 and 1943 when the air force, the commands, and at times the wings were all

issuing training directives. Such an administrative organization proved unnecessarily complex and hindered execution of the program.

Training directives were revised in the light of experience derived both from the operation of the domestic training establishment and from developments overseas. The importance of reports from the combat theaters as to the adequacy of operational training and as to new developments in combat was readily recognized, although during the early period not as effective use was made of this information as was possible later on. This was true because the demand from overseas for additional units was so immediate as to reduce the operational phase of training to the barest essentials; moreover, those conducting training during the early period had rarely had combat experience and consequently taught "by the book." But as the war progressed, as the early months of crisis passed and additional time was available to do a more finished job of training with later groups, as combat returnees began to join the instructional staffs of OTU's and RTU's, and as new procedures were devised, such as "marrying" a specific bomber group in training with another in combat so as to make available to the training unit the experience of the associated combat unit overseas, the experiences of overseas organizations were used to make operational training increasingly realistic and substantial. Toward the end of the war, in fact, successful efforts were made to modify operational training curricula so as to prepare personnel for service in particular theaters. The importance of making overseas criticisms of training and the lessons of combat readily available to the training establishment and of using this experience in modifying training cannot be overestimated. In any future

analogous situation special care should be taken to make sure that the channels for the transmission of information from the combat theaters to the training establishments are both clear and rapid.

The story of operational training seems to suggest the advisability of maintaining the closest possible liaison not only between the overseas theaters and the operational training air forces but also between those air forces and the individual training level of the flying and technical schools (the Training Command). While it is true that coordination between the individual and operational phases was achieved in considerable degree through the staff agencies of Headquarters, Army Air Forces and through occasional training conferences held under its auspices, it is also probably true that the conduct of both operational and individual training would have been benefited through more direct contact between those levels.

Certain efforts at achieving more direct coordination between the operational and individual training levels were, in fact, made as the war progressed. A first conference between the Flying Training Command and the training air forces seems to have occurred early in 1943, and subsequent conferences were held at irregular intervals. In some instances, too, the training air forces and the Training Command and its successors, maintained liaison officers at various headquarters at the other level. Thus, for a time at least, the Western Flying Training Command maintained a liaison officer at Headquarters, Fourth Air Force. This was done because most of the P-of trainee pilots of the Fourth Air Force was supplied by Western Flying Training Command pilot schools.

The greater use of means such as these, including perhaps visits of pilot school instructor personnel to OTU's and RTU's, should be of substantial value in achieving more effective training. By such means the individual training level could be made more aware of the needs and problems of the operational level. This understanding could result in modifications in the conduct of the individual phase of training, just as reports from units overseas afforded guidance in improving the content and quality of operational training.

The various types of bombardment and fighter aviation far outstripped in size and emphasis the reconnaissance and troop carrier training during the war. Reconnaissance aviation underwent revolutionary change during the early period, while troop carrier training was new and was just getting under way. Some of the difficulties experienced by these programs may, however, be assessed against the larger preoccupation of training authorities with bombardment and fighter aviation. Although minor to these, both reconnaissance and troop carrier aviation are essential to a well-rounded air force; they should not be neglected despite the necessarily greater size of bombardment and fighter aviation.

Despite shortcomings, particularly during the early stages of the war, the operational training system devised to meet the emergency need for rapid expansion of the Army Air Forces proved its worth. It helped to create a maximum of adequately trained air force units and crews in a minimum of time. Although no longer necessary, since there is now no large need for operational training that cannot be carried on within established units, the tested OTU-RTU idea should nevertheless be held in reserve.

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GLOSSARY

AA	Antiaircraft
ACAS	Assistant Chief of Air Staff
ACS	Assistant Chief of Staff
AFCC	Air Force Combat Command
AFHRO	Air Historical Office
AGF	Army Ground Forces
BTO	Bombing through overcast
CAF	Continental Air Forces
CAS	Chief of Air Staff
CCTS	Combat Crew Training School or Station
CFC	Central fire control
CG	Commanding General
CO	Commanding Officer
C/S	Chief of Staff
CTU	Combat training unit
Dir	Director; Directorate
ETOUSA	European Theater of Operations, U.S. Army
I TCC	I Troop Carrier Command
GHQAF	General Headquarters Air Force
GO	General Order
IG	Materiel and Services
MTU	Mobile training unit
OCAC	Office, Chief of the Air Corps
OCOM	Operations, Commitments, and Requirements
OPD	Operations Division
OTU	Operational training unit
Orgn	Organization
POE	Preparation for overseas movement
Recon	Reconnaissance
R.O.	Radio operator mechanic
RTU	Replacement training unit
TAG	The Adjutant General
Tng	Training
TC	Training Command
USSTAF	U.S. Strategic Air Forces

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VHB	Very heavy bombardment
WDGS	War Department General Staff
WDSS	War Department Special Staff

NOTES

CHAPTER I

1. Chart, Development of AAF Program, prepared by Statistical Control Div., Hq. AAF, 5 Aug. 1944.

2. Training Policies and Operations in the Fourth Air Force through the Year 1941, pp. 31-33.

3. Ibid., pp. 73-77.

4. Ibid., pp. 7-10.

5. Ibid., p. 11.

6. History, III Bomber Comd., Phase I, p. 8, and 1st ind. (basic ltr. unknown) Hq. 3d Wg., GHQAF to CG GHQAF, n.d., in supporting docs.

7. Ltrs., Hq. GHQAF to CG 2d Wg., GHQAF 21 Mar. 1939, and to CG 3d Wg., 2 Nov. 1939, both supporting docs., ibid.

8. Ibid., p. 9.

9. History, 2d AF, 7 Dec.-1941-31 Dec. 1942, I, 88-89.

10. History, III Fighter Comd., 21 Apr.-6 Dec. 1941, pp. 35-36.

11. Ibid., p. 36; History, III Reconnaissance Comd., 7 Dec. 1941-30 Sept. 1943, p. 2.

12. Training Policies and Operations in the Fourth Air Force through the Year 1941, table opposite p. 20.

13. Chart, Development of AAF Program, by Statistical Control Div., 5 Aug. 1944.

14. Ibid.

15. Report of Maj. Gen. W. L. Kenly, Dir. of Mil. Aeronautics, for year ending 30 June 1918; Annual Report of Director of Air Service, 1919, p. 46.

16. Report, Maj. R.B. Williams, Mil. Observer to Great Britain, 29 Apr. 1941, 385 Misc. B, Methods--Manner of Conducting War.

17. Training Policies and Operations in the Fourth Air Force through the Year 1941, pp. 200-209.

18. Ltr., Hq. III Bomber Comd., to CG 3d AF, 18 Jan. 1942, with incl., in AAFHS files.

19. Ltr., Hq. AFCC to CG 2d AF, 2 Feb. 1942, with incl., in 322.3, Operational Training Units.

20. Ltr., Hq. AFCC to CG 1st AF, 2 May 1942, in 322.3, OTU.

21. Ltr., Hq. AFCC to CG 4th AF, 11 May 1942, in 322.3, OTU.

22. Fighter Training in the Fourth Air Force, 1942-1945, pp. 30-32.

23. Ibid., pp. 54, 56.

24. Ibid., p. 28.

25. Ibid., pp. 23-24.

26. Ibid., p. 39.

27. Ibid., p. 40.

28. Ibid., p. 41.

29. Ibid., p. 44.

30. Bombardment Training in the Fourth Air Force, 1942-1945, p. 103.

31. Memo for Brig. Gen. S.F. Harper, 31 May 1943, in 322-C, OTU Trg.

32. Fighter Training in the Fourth Air Force, 1942-1945, p. 6.

33. Ibid.

34. AAF Historical Study No. 10, Organization of the Army Air Arm, 1935-1943, pp. 60, 63. A third directorate, the Directorate of Ground Support, administered light and dive bombardment and observation training. Its activities were less important, however, because of the confused and backward status of light and dive bombardment and observation aviation during the period of the directorates.

35. Ibid., p. 70.

36. Organization Chart, Unit Training Div., AC/AS Trg., 1 Oct. 1943.

37. Organization Chart, Flying Training Div., AC/AS-3, 1 May 1945.

38. Hq. AAF, GO 9, 16 Apr. 1945.

39. For a discussion of the I Troop Carrier Command, see Chapter VI, this study. Its headquarters was located at Stout Field, Indianapolis, and its fields were chiefly east of the Mississippi and away from the coast.

Since it was a command and not an air force, its structure closely resembled the bomber and fighter commands subordinate to the air forces.

40. Organization and Functions of the Fourth Air Force, 1942-1945, p..400.

41. History, 2d AF, 7 Dec. 1941-31 Dec. 1942, II, 371, and for 1943, p. 10.

42. History, 2d AF, 7 Dec. 1941-31 Dec. 1942, II, 265-66.

NOTES

CHAPTER II

1. The order establishing training standards for each of the various types of air force units was issued in memorandum form. (AAF Memo 50-6, 11 Sept. 1942.)

2. AAF Training Standards 30-3-1, Light and Dive Bombardment Units and Crews, 1 Dec. 1942; 20-2-1, Heavy Bombardment Units and Crews, 8 Feb. 1943; 20-1-1, Medium Bombardment Units and Crews, 8 Feb. 1943.

3. AAF Tng. Standard 20-2-2, Very Heavy Bombardment Units and Crews, 11 Nov. 1943.

4. AAF Tng. Standard 20-1-1.

5. Ltrs., Hq. AAF to CG 2d AF, 17 Dec. 1942 and 16 Feb. 1943, with 2d ind. to latter, Hq. III Bomber Comd. to CG 3d AF, 24 Feb. 1943; ltr., Hq. 2d AF to CG AAF, 22 Feb. 1943, all in 322-A, Units--OTU Opnl. Tng.

6. Ltr., Hq. 2d AF to CG AAF, 23 May 1942, in Bulk files (classified).

7. Memo for CG's of the four continental AF's from Gen. H.H. Arnold, CG AAF, 21 Aug. 1943, in 353-K, Tng. Misc.

8. History 3d AF: Flying Training, 1941-1944, pp. 280-81.

9. Table 52, Crews Completing Training in Continental U.S., by Type: Dec. 1942 to Aug. 1945, in AAF Statistical Digest, World War II.

10. Ltrs., AC/AS, OC&R to CG 2d AF, 5 May and 27 Aug. 1943; ltr., C/AS to CG ATC, 12 Aug. 1943, in 452.1A, B-29 Bombers.

11. Ltr., Hq. AAF to CG 2d AF, 13 Sept. 1944, in AFSHO files.

12. AAF Tng. Standard 20-3, Very Heavy Bombardment Crews, 6 July 1944.

13. AAF Tng. Standard 20-3A, Very Heavy Bombardment Crews, 25 Aug. 1944.

14. Ltr., Air Inspector to Field Air Inspector, Colorado Springs, 18 May 1944, in 452.1G, B-29 Bombers; ltrs., Hq. AAF to CG 2d AF, 25 and 29 Sept. 1944, in AFSHO files.

15. Ltrs., Hq. AAF to CG 2d AF, 20 July and 8 Dec. 1944, in AFSHO files.

16. Ltr., Hq. AAF to CG's TRC and 2d AF, 30 Oct. 1944, with inds., in 452.1H, B-29 Bombers.

17. R&R, AC/AS Tng. to AC/AS OC&R, March 1944, in 322-E, Crews; ltr., Hq.

2d AF to CG AAF, 6 Nov. 1944, and 1st ind. (basic unknown), AC/AS Tng. to CG 2d AF, 6 Dec. 1944, in AAG 370 files.

18. AAF Tng. Standard 10-1-1, Day Fighter Units and Crews, 1 Dec. 1942.

19. AAF Tng. Standard 10-1-2, Night Fighter Units and Crews, 23 June 1943.

20. Table 32, as cited in n. 9.

21. Fighter Training in the Fourth Air Force, 1942-1945, p. 101.

22. For an example, see Hq. 4th AF, Memo 50-5, Fighter Training Directive, 18 Apr. 1944.

23. Fighter Training in the Fourth Air Force, 1942-1945, pp. 7-8.

24. Ibid., pp. 9-11.

25. History 2d AF, 1943, pp. 31-32.

26. Ltr., Brig. Gen. P.M. Robinett to Gen. G.C. Marshall, 8 Dec. 1942; memo for Chief of C D, WDGS from AC/AS A-3, n.d., both in 322-F, Orgns. and Tactical Units; ltr., Hq. AAF to CG 31 AF, 25 Feb. 1943 in 322-A Units--OTU Opnl. Tng.; memo for AC/AS Tng. from Unit Tng. Div., Daily Diary, 13 Sept. 1943, in AAG 370 files.

27. RAF's, Special Asst. for AA, Hq. AAF to CG 20th AF, 14 Aug. 1944; C/S 20th AF to Special Asst. for AA, 6 Sept. 1944; Special Asst. for AA, to AC/AS Tng., 4 Oct. 1944, all in 322-C, Crews.

28. AAF Tng. Standard 10-61, Antiaircraft Searchlight Units Cooperating with Fighters, 14 June 1943.

29. History, All Fighter Cond., Instal. II, Part II, 7 Dec. 1941-21 July 1944, p. 90; Unit Tng. Div., Daily Diary, 14 and 15 Aug. 1943; ltr., Hq. AAF to CG 4th AF, 10 Nov. 1943, in 322-C, Units--OTU Opnl. Tng.

30. Ltr., Hq. AAF to CG 1st AF and to CG AAF, 31 Mar. 1944, with 2d ind., Hq. I Bomber Comd. to CG I Fighter Comd., 18 Apr. 1944, and 4th ind., Hq. 1st AF to CG AAF, 1 May 1944; ltr., Hq. AAF to CG 2d AF, 3 July 1944, all in 322-F, Crews.

31. Training Policies and Operations in the Fourth Air Force Through the Year 1941, pp. 94-98.

32. For an example, see Critique on Fourth Air Force Training Exercise No. 7, 21-24 May 1943, in 322-F, Tng. Misc. See also Bombardment Training in the Fourth Air Force, 1942-1945, pp. 27-29.

33. Memo for CG's of the four continental AF's from CG AAF, 21 Aug. 1943, in 353-I Tng. Misc.

34. AAF Tng. Standard 200-1, Combined Air Force Training, 15 Oct. 1943.

35. Hq. 4th AF, Memo 50-36, Fighter-Bomber Training, 1 Mar. 1944, in Fighter Training in the Fourth Air Force, 1942-1945, Doc. 73.

36. Fighter Training in the Fourth Air Force, 1942-1945, p. 16; interview with Lt. Col. G.W. Prentice, Unit Tng. Div., by Dr. Henry H. Simms, AFSHO, 16 Mar. 1945.

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CHAPTER III

1. History 2d AF, 7 Dec. 1941-31 Dec. 1942, I, 157-58.

2. Memo for AC/AS Tng. from CG 3d AF, 8 Apr. 1943, in 322-B, Units--OTU Opnl. Tng.

3. Ltr., Adj. Gen to CG 1st AF and others, 10 Apr. 1943, in 322-B Units--OTU Opnl. Tng.

4. Ltr., AC/AS Tng. to DC/AS, 7 July 1944, in AFSHO files.

5. 1st ind. (Hq. AAF to CG 3d AF, 15 May 1942) Hq. 3d AF to CG AAF, 2 June 1942, in 322.3-B, OTU.

6. Ltr., Hq. AAF to CG 2d AF and others, 12 Jan. 1943 with inds., in 353-A, Gunnery Trng.

7. For an example, see Report on Training Conference held at AAF School of Applied Tactics, Orlando, Fla., 18 May 1943, in 337-I, Conferences. See also Report of Training Conference held at Hq. 2d AF, Colorado Springs, 20-22 Sept. 1943, in 337-I, Conferences.

8. See the relevant chapters on the various types of training in History of the AAF Flying Training Command and its Predecessors, 1 Jan. 1939 to 7 July 1943.

9. R&R's, Dir. of Bombardment to Dir. of Mil. Requirements, 31 May 1942; Dir. of Mil. Requirements to Dir. of Bombardment, 4 June 1942, both in 322.38 OTU; R&R, AC/AS Trng. to AC/AS C&R, 3 Dec. 1943, in 322-B Orgns. and Tactical Units; AAF Historical Study No. 18, Pilot Transition to Combat Aircraft, pp. 58-63. See also the relevant chapters on the various types of training in History of the AAF Flying Training Command and its Predecessors, 1 Jan. 1939 to 7 July 1943, and in History of AAF Training Command, 7 July 1943 to 31 Dec. 1944.

10. Report to Gen. H. H. Arnold submitted by Dir. of Mil. Requirements, 28 Dec. 1942, in 322-B, Orgns. and Tactical Units.

11. For example, see statement of Maj. Gen. Carl Spaatz quoted in R&R, Dir. of Mil. Requirements to Dir. of Individual Trng., 2 Apr. 1942, in 322.332, Activation of Units.

12. History, 2d AF, 7 Dec. 1941-31 Dec. 1943, pp. 132, 167 ff.

13. Ltr., Hq. 3d AF to CG AAF, 6 Sept. 1942, in 32 .38, Opnl. Trng. Units.

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11. Fighter Training in the Fourth Air Force, 1942-1945, p. 36.

15. Ibid., p. 37.

16. Ltrs., C/AS to CG AAC, 25 Sept. 1943, and Hq. 3d AF to CG AAF, 5 Nov. 1943 with ind., both in 322-D, Units--OTU Opnl. Tng.; ltr., C/AS to CG 1st AF, 25 Sept. 1943, in 322-L, Orgns. and Tactical Units.

17. Ltr., Ordnance Officer, Hq. USSTAF to Air Ordnance Officer, Hq. AAF, 26 Jan. 1944, in 322-F, Units--OTU Opnl. Tng.

18. Fighter Training in the Fourth Air Force, 1942-1945, p. 68.

19. Ltr., Hq. 3d AF to CG AAF, 2 Nov 1942, in 322.3 OTU.

20. Memo for DC/AS from C/AS OCAR, 4 Jan. 1944, in 452.18, B-29 Bombers; ltr., Hq. 2d AF to CG AAF, 6 Nov. 1944, in 452.1M, B-29 Bombers; memo for Brig. Gen. L.S. Smith, from AC/AS Tng., 13 Jan. 1945, in 452.1, B-29 Bombers.

21. Fighter Training in the Fourth Air Force, 1942-1945, pp. 69-72.

22. Ibid., pp. 74-75.

23. Ibid., pp. 47-48, 60. See also ibid., Doc. 60, ltr., Hq. IV Fighter Comd. to CG Fourth Air Force, 20 Dec. 1943, and Doc. 60A, Schedule for Training.

24. Ibid., p. 30.

25. Ibid., Doc. 56, ltr., Hq. Los Angeles Air Defense Wing to CG IV Fighter Comd., 1 Dec. 1943. See also Administrative Policies and Problems in the Fourth Air Force, 1942-1945, pp. 312-16.

26. Ibid., pp. 334-35. See also ltr. Hq. Western Tech. Tng. Comd. to CG AAF Tng. Comd., 21 Jan. 1944, in 322-F, Units--OTU Opnl. Tng.; R&R, AC/AS Tng to AC/AS OCAR, 12 Sept. 1944, in 322-T, OTU Opnl. Tng.

27. AAF Historical Study No. 61, Aviation Gasoline Production and Controls, pp. 72-75. For material on the effect of the shortage of high-octane gasoline on Fourth Air Force training, see Administrative Problems and Policies of the Fourth Air Force, 1942-1945, pp. 317-20.

28. Hq. AAF, AAF Ltr. 50-48, Fighter Pilot Training, 22 Feb. 1945.

29. Fighter Training in the Fourth Air Force, 1942-1945, pp. 6-9, 41.

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CHAPTER IV

1. See Chap. 20, Training in Overseas Air Forces, in history prepared by Air Historical Office for the WDSS Historical Div.

2. Ltr., Hq. VIII Fighter Comd., to CG 8th AF, 15 Sept. 1942 with ind., in 322-A, Units--OTU Opnl. Tng.

3. See Training in Overseas Air Forces, cited in n. 1 above.

4. Report from APO 634, 19 Feb. 1943, in 32?-1, Units Misc.

5. Ltr., CG 10th AF to CG AAF, 24 Dec. 1943 with inds., in 322-B, Units--OTU Opnl. Tng.

6. For an example, see Report cited in n. 4. See also ltr., Brig. Gen. ... , CG V Bomber Comd. to CG 5th AF, 7 July 1943, with incls., in 322-?, Units--OTU Opnl. Tng.

7. Training in Overseas Air Forces.

8. Fighter Training in the Fourth Air Force, 1942-1945, pp. 12-15.

9. Training and Testing at AAF School of Applied Tactics, 5 Nov. 1942-29 Oct. 1943, pp. 8, 19. See also History, AAF School of Applied Tactics, p. 1; History, Fighter Comd. School, Mar. 1942-5 Nov. 1942, p. 30.

10. Ltr., Hq. AAF to CG 3d AF, 23 June 1943, with inds., in Unit Tng. Div. files.

11. Ltr., Hq. AAF to CG FTC, ? Sept. 194? , in 32?-?, Crews.

12. Interview with Lt. Col. Oscar Rock, Unit Tng. Div., by Dr. Henry ?. Simms, 15 Mar. 1945.

13. R&R, Dir. of Bombardment to AC/AS A-3, 4 Mar. 1943; ltr., Hq. AAF to CG's, 2d, 3d, 8th, and 12th AF's, 6 Mar. 1943, both in 32?-?, Orgns. and Tactical Units. See also ltr., Hq. AAF to CG 2d AF, 10 Mar. 1943, in 32?-?, Units Misc.

14. Ltrs., AC/AS Tng. to CG 3d AF, 29 July 1943, in 32?-? Units--OTU Opnl. Tng.; AC/AS Tng. to CG 2d AF, 31 Aug. 1943, with ind. 32?-?, Units--OTU Opnl. Tng.; Immediate Action ltr., AC/AS Tng. to CG 2d AF, 16 Oct. 1943, in 32?-? Units--OTU Opnl. Tng.

15. For specialized training in the Fourth Air Force, see Bombardment Training in the Fourth Air Force, 1942-1945, pp. 129-75.

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16. Ltrs., Hq. AAF to CG 2d AF, 27 Apr. 1944, in 322-C, Units--OTU Opnl. Trng.; Hq. AAF to CG 1st AF, 17 July 1944, Hq. AAF to CG 3d AF, 17 Aug. 1944, and Memo for C/AS from AC/AS Trng., 8 Sept. 1944, in 322-N, Units--OTU Opnl. Trng.; ltr., Hq. AAF to CG 2d AF, 17 Aug. 1944, in 322-7, Crews.

17. AAF Ltr. O-48, Fighter Pilot Training, 2 Aug. 1944.

18. Ltr., Hq. AAF to CG's 1st, 2d, 3d, and 4th AF's, 27 Oct. 1944, with inds., in 322-C, Units--OTU Opnl. Trng.

19. AAF Ltr. O-48, Fighter Pilot Training, 22 Feb. 1945.

20. Interview with Lt. Col. George Prentice, Unit Trng. Div., by Dr. Henry P. Sims, 5 May 1945; ltrs., Hq. AAF to CG 1st AF, quoting Lt. Gen. B.M. Young, CG TWC, 5 July 1944, and AC/AS Trng. to AC/AS OC&R, 10 Oct. 1944, both in AFHRO files.

21. Ltrs., AC/AS Trng. to AC/AS OC&R, 28 June 1944; AC/AS Trng. to CG 1st AF, 27 Sept. 1944, both in AFHRO files. The Fourth Air Force monograph, Bombardment Training in the Fourth Air Force, 1942-1944, dates the period of 10-week training as extending from April to November 1944 (pp. 98-115).

22. These statements are based upon an examination of available AAF Trng. Standards (Bombardment).

23. Ltr., C/AS to DC/S, 15 Dec. 1943, in 322-A, Orgns. and Tactical Units.

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CHAPTER V

1. Memo, OCAC to AAF, 29 May 1941, in 321.9-A, Photographic Groups.

2. The use of fighter type aircraft in photo reconnaissance, a British idea, was first attempted by pilots during the Carolina maneuvers in the fall of 1941. The P-38, P-40, and P-43 were all tested. Of these types the P-38 proved most satisfactory. Its success in the maneuvers led to its gradual perfection for use in photo reconnaissance during the following months. Perhaps the most basic improvement achieved was to take the guns from the nose and to place the camera in that position, for a camera placed in a tail boom of the P-38, as during the maneuvers, tended to be affected by vibration and also by the deposit of oil on the lens. Both these difficulties were eliminated as a result of the change in the position of the camera. (Interview with Lt. Col. John D. Murray, Policy and Tactical Implement Br., AC/AS-3, who piloted a P-38 during the Carolina maneuvers, by Dr. Gerald T. White, AC340, 13 June 1946.)

3. For examples of reconnaissance training directives, see Training Policies and Operations in the Fourth Air Force Through the War 1941, Docs. 35, 36, 38; pp. 80-96.

4. Ibid., pp. 121-22.

5. For the loss of identity of certain reconnaissance squadrons, see ibid., pp. 75-76.

6. Memo for C/AS from Col. W.G. Breene, Dir., Technical Services, 4 July 1942, in 321.9-A, Photographic Groups.

7. Ltr., dq. AAF to CG 1st AF and others, 1 Apr. 1942, in 321.9, Bolling Field.

8. Organization History, 24 Photographic Gp. Reconnaissance, 7 May to 31 Dec. 1942, p. 2.

9. History, 3d AF: Flying Training, 1941-1944, p. 348.

10. Ibid., pp. 358, 368.

11. Ibid., pp. 386-406; History, VIII Tactical Air Div., Sept. 1941, pp. 24-28.

12. History, 3d AF: Flying Training, 1941-1944, pp. 377-84.

13. Ibid., pp. 376-77; interview with Lt. Col. G.F. Tatum, AC/AS OPD and formerly in charge of reconnaissance training, Hq, 3d AF, by Dr. Gerald T. White, AFSHO, 16 June 1945.

14. Ltr., AC/AS OC&R to Management Control, 12 Sept. 1944, Rcn. Branch files, AC/AS, Tng. See also History, Hq. III Tactical Air Div., Jan. 1945, pp. 7-9.

15. Organizational Development of the First Air Force, pp. 20-21; History, 2d AF, 7 Dec. 1941-31 Dec. 1942, p. 358; History of the I /sic/ Tactical Air Div., 1 Apr. 1944-1 Jan. 1945, p. 32; monthly histories of III Tactical Air Division for the period after May 1944; Organization History, 2d Photographic Gp. (Rcn.), 7 May 1942 to 31 Dec. 1942; History, 3d AF: Flying Training 1941-1944, pp. 385, 387-91.

16. Ibid., pp. 370-75.

17. History, III Tactical Air Div., June 1944, pp. 3-4. Also interview with Col. Frank L. Dunn, A-2 Div., Hq. AAF, and formerly CO, Coffeyville Army Air Field, by Dr. Gerald T. White, AFSHO, 17 June 1945.

18. See AAF Trng. Standards 30-1-1, Observation Units and Crews, 1 Dec. 1942; 60-1-1, Photographic Units and Crews, 11 Mar. 1943; and 70-1-1, Tactical Reconnaissance Units and Crews.

19. See the "30" series of AAF Tng. Standards.

20. Interview with Lt. Col. J.O. Bradshaw, Rcn. Br., AC/AS Tng., by Dr. Henry A. Simms, AFSHO, 21 May 1945.

21. History, 3d AF: Flying Training 1941-1944, pp. 351-52.

22. History, 2d AF, 7 Dec. 1941-31 Dec. 1942, pp. 357-59.

23. History, 3d AF: Flying Training, 1941-1944, pp. 356-57.

24. Ibid., pp. 402-4.

25. Ibid., p. 356.

26. History, 2d AF, 7 Dec. 1941-31 Dec. 1942, pp. 340-41.

27. Ltr., Hq. AAF to CG 3d AF, 21 July 1943, in Rcn. Br. files, AC/AS Tng.

28. History, 3d AF: Flying Training, 1941-1944, pp. 381-82.

29. Tatum interview.

30. Tatum interviews.

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31. The Army Officer, Nov. 1942, p. 5.

32. Tatum interview. See also History, III Tactical Air Div., Jan 1945, pp. 7-9.

33. Memo for Col. Walker from AC/AS Tng., 18 Nov. 1943, in Rcn. Br. files.

34. History, 3d ... Flying Training, 1941-1944, p. 380; Tatum interview; ltr., AC/AS Tng. to AC/AS OC ..., 6 Sept. 1944, in AFS... files.

35. Tatum interview.

36. Dunn interview.

37. ...s for C/... from Lt. Gen. L.J. ...r, 25 ...r. 1943, and from AC/AS Tng., 20 ...y 1.43, with incl., in Rcn. Br. files; ltr., Hq. AAF to ..., 20 ... Nov. 19.., in ... files; Report of Reconnaissance and CG 3d ..., 28 Nov. 19.., in ... files; ... School of Applied ... Photographic Board, ...to ... Board, ... School of Applied Tactics, pp. 8-9, 19 June 1943, in Rcn. Br. files.

38. Hq. 89th Rcn. Tng. Wing (Will Rogers Field), Reg. 50-4, 1 June 1944, in Rcn. Br. files.

39. 2d ind. (basic unknown) AC/AS Tng. to CG ..., India-Burma Sector, CBI Theater, 26 Nov. 194., in AFSHO files.

40. R&R, AC/AS OC..., to AC/AS Tng. 30 Nov. 1944, in 323-..., Units--OTU Opnl. Tng.

41. Hq. 75th Tactical Rcn. Gp. (Key Field, Miss.), Tng. Program, 20 Jan. 1944; Office of CO, Key Field, Miss., Memo 50-3, 13 Sept. 194., both in Rcn. Br. files.

42. ...F Tng. Standard 20-2A, 28 Feb. 1944.

43. Tatum interview. See also the histories of I and II Tactical Air Divisions.

44. Table 52, Crews Completing Training in Continental U.S., by Type: Dec. 1942 to Aug. 1945, in AAF Statistical Digest, World War II.

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CHAPTER VI

1. The series of I Troop Carrier Command studies was not discovered in the AAFHO archives until after the completion of this chapter. Volume III of this series contains detailed studies of pilot transition, glider, group, and individual replacement training. These studies should be consulted for further information on the conduct and problems of troop carrier training.

2. Outline History, I Troop Carrier Cmd., 24 Sept. 1945, p. 1; Brief History of the I Troop Carrier Command: Accomplishments and Commitments, 21 Dec. 1943, p. 1.

3. Interview with Lt. Col. [illegible]acMahon, Troop Carrier Gr., AC/AS, Engr., by Dr. Henry P. Sims, AAFHO, 28 Mar 1945.

4. Ibid., 11 May 1945; ltr., AC/AS Engr. to C/AS, 28 June 1944, in AAFHO files.

5. Fg. Cir., No 9, 10 Apr. 1945.

6. Table 52, Crews Completing Training in Continental U.S., by Type: Dec. 1942 to Aug. 1945, in AAF Statistical Digest, World War II.

7. AAF Engr. Standard 30-2-1, Troop Carrier Units and Crews, 1 Dec. 1942.

8. Ibid., 21 July 1945. See also the data abstracted from the training programs of Fg., I Troop Carrier Command, which are included in this chapter.

9. For 1943 program see ltr., AC/AS Engr. to the Air Inspector, 2 Jan. 1944 with incl. in Air Inspector files, Fg. AAF; for 1944 program, see note for Lt. Col. [illegible] Brown, from Deputy Chief, Troop Carrier Gr., AC/AS Engr., 20 Mar. 1944, in AAFHO files; for 1945 chart, see TCAS, Engr. Directive, C-46 Type Aircraft, I TCC, 9 Feb. 1945, in Troop Carrier Gr. files.

10. Ltr., Fg. Cir. to CG I TCC, 20 Sept. 1943 with 1nd., in 322-C, Units--CCo Unni. Engr.

11. [illegible]acMahon interview; History, 64 Troop Carrier Gp., 1 Dec. 1942-31 Dec. 1943, pp. 8, 9, 12; Unit Engr. Div. Daily Diary, 14 May 1943, in AAFHO files.

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1. On the status of Fourth Air Force fighter units bound overseas late in 1941 and in January 1942, see Processing and Ferrying Functions of the Fourth Air Force Through the Year 1941, pp. 119-20, and Training Policies and Operations in the Fourth Air Force Through the Year 1941, pp. 209-210. See also ltr., Hq. 81st Ftr. Gp. (AFO 629) to FAF, 25 Mar. 1942, in AG 320 files.

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3. Ibid., pp. 5-6.

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5. History, AAF First Concentration Command, Pt. II, pp. 1-2.

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8. Historical Reports of Hunter Field, Georgia, 7 Dec. 1941 to 30 Sept. 1945, pp. 172-208.

9. Movements to Combat from the First Air Force, pp. 93-96.

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20. ..R, AC/AS Tn . to the Air Inspector, 26 Nov. 1943, in 32 -., Units--OTU Opnl. Tng.

21. Ltr., Hq. 2. . to C. ..F, 25 .eb. 1944, with ind., in 32.-., Crews.

22. R&R, AC/.. Tn . in turn to Co . i ments Div., AC/AS OC. ., and C/AS, 20th .F, 17 Oct. 1944; . 's, Co itments Div., AC/AS OC ., to AC/AS, OC . and AC/.. Tn ., 31 Oct. and 3 Nov. 19.., respectively, all in 322-., Crews.

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