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COMBAT CREW AND UNIT TRAINING IN THE AAF 1939 - 1945		RE NOT LOAN
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COMBAT CREW AND UNIT TRAINING IN THE AIR
1939-1945

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Air Historical Office
Headquarters, United States Air Force
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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 theAAF; No. 27: Individual Training of Navigators; No. 31: Flexible Gunnery Training in theAAF; No. 48: Pre-Flight Training in theAAF, 1939-1944; No. 49: Basic Military Training in theAAF, 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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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

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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

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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 radio-telephone 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.

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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

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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

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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

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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

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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:

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

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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 Fort 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

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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

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