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DEDICATION OF THE AIRDROME EXPANSION AT MAXWELL FIELD, ALABAMA

- 29 DECEMBER 1943 -

COMMANDING THE ARMY AIR FORCES
General H. H. Arnold

COMMANDING THE AAF TRAINING COMMAND
Lt. Gen. Barton K. Yount

COMMANDING THE AAF EASTERN FLYING TRAINING COMMAND
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Colonel Elmer J. Bowling

SPEAKER
United States Senator Lister Hill

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THIS HISTORY OF MAXWELL FIELD, PREPARED BY THE AAF HISTORICAL
DIVISION, IS EMBEDDED IN STONE TO INFORM THOSE WHO CARRY ON
THE TRADITIONS OF THE ARMY AIR FORCES OF WHAT HAPPENED HERE
BEFORE 1944.

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CHAPTER V. THE ARMY AIR FORCES AIRCREW CLASSIFICATION CENTER
AND THE ARMY AIR FORCES PRE-FLIGHT SCHOOL(PILOT)

The Reason for a Pre-Flight School

When Germany launched World War II in the fall of 1939, the Allied Nations were wholly unprepared. In desperation England developed a unique change in the method of training pilots.

The custom in both this country and England had been to take raw recruits to the airfields where both ground and flight training were given concurrently.

With an insatiable demand for airmen in the early stages of the War, the British could not be bothered with raw recruits at the flying schools which were very limited in number. In order to operate flight training on a mass production basis, it was necessary that all flying equipment and the adjacent housing be reserved exclusively to those students who were ready to take to the air. With war for us inevitable, the need for mass production methods were necessary; so it was only logical for us to consider, if not copy, the British system of having some sort of pre-flight training.

On 27 August 1941, therefore, the pre-flight program under the title of the Air Corps Replacement Center was activated on Maxwell Field. Its purpose was to prepare and fit its students for flight training as offered by the Army Air Corps.

At first anyone between the ages of twenty-one and twenty-seven who was a college graduate and who could pass a rigid physical examination, was eligible for membership. Soon afterwards the age limit was lowered to eighteen, and educational ability as measured by examinations was the requirement.

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The Air Crew Classification Center

It was believed that procedures might be developed to increase the efficiency of selection so that a larger percentage would be able to complete the flying course satisfactorily. It was hoped, also, that a fuller knowledge of special abilities and psychological characteristics would prevent rejection because of minor defects of those who might become outstanding pilots. Major L. F. Shaffer, Specialist Reserve, on leave of absence from Carnegie Institute of Technology where he was a professor, and also the head of their Bureau of Measurement and Guidance, was assigned to duty at the Air Corps Replacement Center, Maxwell Field, Alabama, and was to have immediate supervision of the project and also to serve as a member of the Medical Board which passed upon the acceptability of aviation cadets. The Air Corps Replacement Center program made provision for the cadets to submit themselves to six hours of psychological examination.

The earliest available Program of Instruction of the Air Corps Replacement Training Center (Aircrew) states that the cadets devoted five hours to psychological examinations. Three hours were devoted to Group Tests administered in units of 240 Aviation Cadets (Pilots), the materials being especially prepared test booklets. The remaining two hours were classified as "Individual tests to be administered to individual cadets (4 students each period), materials to consist of psychological laboratory testing equipment." The exact nature of this equipment does not seem to be a matter of record; however, it is known that some of the sets of Motor Skill Tests came from the Department of Psychology, Northwestern University, and some came from Alabama Polytechnic Institute, Auburn, Alabama. Lieutenant Colonel H. A. Mears, former director of academic instruction, Pilot Replacement Training Wing, Air Corps Replacement Center, stated that Major Shaffer used all sorts of tests for psychological testing. These consisted of jig-saw puzzles, mechanical gadgets, etc., some of which were developed at Maxwell Field. Among other things they used a panel of lights which were manipulated by a set of airplane controls. This device came from Wright Field.

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This project was definitely activated as Psychological Research Unit Number One, Air Corps Replacement Training Center, Maxwell Field, Alabama, 4 February 1942, and for administrative and supply purposes was attached to Headquarters and Headquarters Squadron (Sp), 13th Air Base Group (Sp), pending the constitution and activation of Headquarters Squadron, Air Corps Replacement Training Center. The objective and general plan of the classification of aviation cadets follows:

1. Objectives:

- a. To classify newly enlisted Aviation Cadets, Air Crew, for training as bombardiers, navigators, or pilots on the basis of psychological aptitude tests, measures of skill, knowledge, interest, physical qualifications, and other pertinent considerations.
- b. To collect data and carry out research relating to the construction, improvement, and development of psychological aptitude tests for this purpose.

2. General Plan:

- a. The psychological aptitude tests will be conducted by Psychological Research Unit Number One, which was recently activated at this station.
- b. These tests will be administered to all Aviation Cadets, Air Crew, who report to the Air Corps for training as indicated in the plan attached.
- c. A Classification Board consisting of an officer of the Psychological Classification and Research Section, a Flight Surgeon, and an Air Corps Officer will be appointed. This board will consider the results of the aptitude tests, the physical examinations for flying cadets' preferences, and other relevant facts; and will assign the cadet to one of the following classifications:
 - (1) Training for Pilot
 - (2) Training for Bombardier

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- (3) Training for Navigator
 - (4) For Consideration for Aviation Cadet Ground Duty Training
- d. After the completion of the classification of aviation cadets, the answer sheets and other tests forms will be forwarded to the Office of the Chief of Air Corps for Checking and for the compilation of records to be correlated with the subsequent success of aviation cadets in training and performance.
 - e. The Director of the Psychological Classification and Research Unit should conduct the classification tests at a rate sufficient to insure that the requirements for each primary class are met in sufficient time for shipment to the various primary schools.
 - f. The Commanding Officer, Air Corps Replacement Training Center, Air Crew, should furnish cadets for testing purposes at such times and in such numbers as requested by the Director of the Psychological Classification and Research Section.

While the cadets were going through the psychological process, other reception and processing activities were under way. Eight hours were devoted to initial issue of clothing and equipment, two hours to vaccination and inoculation, three hours in a low-pressure chamber where the pressure simulated an altitude of 30,000 feet in order to determine the individuals' ability to withstand high altitude flying. Those who could not were eliminated.

In July 1942 the Classification Center was moved from Maxwell Field to Nashville, Tennessee.

Pre-Flight Training

Two types of pre-flight training were given.

The Air Corps Replacement Center had two wings or schools. One was for pilots, the other for bombardier and

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navigators. The purpose of each wing or school had similarities. To quote the objective: "The preparation of Aviation Cadets, both physically and mentally, for intensive flight training in the Air Corps."

This involved first reception processing and classification as already described; second, academic preparation sufficient to fit aviation cadets for the successful completion of the ground school courses given in the flying schools; third, a knowledge of military customs and regulations, as well as the duties and responsibilities of junior officers. The duration of training was to be four weeks for pilots, but soon afterwards the period was extended to nine.

The nine weeks' program will be discussed in detail. This program covers academic subjects, military or tactical subjects, and the physical training program.

Academics

The Academic Department of the Pilot's Wing was organized by Professor R. Bliss Edgar who had been a captain in World War I. General W. R. Weaver selected him because he was an able educational administrator rather than for his former military experience.

On 28 May 1941, Professor Edgar was authorized to elect a faculty of fourteen. About a month later it was increased to thirty.

The commanding officer had confidence in Professor Edgar and asked him to run the school as he saw fit. He engaged civilian instructors, for he felt they would get better results. They were recruited from faculties of high schools and colleges.

In discussing the various subjects taught in the Air Corps Replacement Training Center (Aircrew), it might be well to state that a sub-department was created to teach each major subject, although some of the very short courses were lumped together into one sub-department. All instructors

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assigned to a given department taught only the subject (or subjects) given by that sub-department. Instructors were directly responsible to the senior instructor who was at the head of the sub-department.

This type of organization lead to specialization of activity and facilitated the development of the material in the course. Likewise, it assured uniformity of instruction throughout the Cadet Corps. As the school expanded, additional instructors were acquired and were assigned, usually by the director, occasionally by higher authority, to the various sub-departments. Usually the assignment was made on the basis of previous background. It was relatively easy to find a man who had taught basic courses, such as mathematics and physics. At times, however, when a new man with the exact knowledge was not available, it was necessary to assign one who lacked the desired qualifications. In this case it was necessary to train the man in the subject before he could be used in the classroom. This was especially true of the highly specialized subjects, such as Maps and Charts, Naval Forces, Ground Forces, Air Forces, Customs and Courtesies, and Aircraft Recognition. The customary method of training a new instructor was to let him visit classes in the subject he was to teach, give him copies of prepared lectures, and let him give sample lectures to some of the more competent instructors who would give him constructive criticism. A new man was, ordinarily, ready to begin teaching in a week. To begin with, his teaching load would be a bit light and he would usually be assigned to afternoon classes so that he would be free in the morning to hear other instructors give their lectures once more.

In general, the qualifications of the instructors and their work were high. This faculty with the only academic background was faced with the problem of providing lectures, texts, and test material for courses to be used by cadets who were preparing to take a very specialized type of training. The faculty wrote up the lectures and had them mimeographed and issued to cadets, one lesson in advance of each lecture.

As succeeding classes came, the faculty continued to read and learn more about those particular phases of the

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subject which seemed more interesting and useful to the cadets as future pilots. Whenever in the light of increased knowledge it was deemed advisable to alter a lesson and lecture to make it fit more completely into the pattern, this was done.

These lectures as prepared for the courses as initiated by the directive in March 1942, were considered sufficiently accurate to be printed and put into book form by November of the same year.

That in general indicates how courses were developed. More details for each particular course follow.

Mathematics

Mathematics was one of the original and permanent courses taught to the pilot trainees. The first directive made it a twenty-hour course and included work in arithmetic and algebra, as well as four lessons on logarithms. Minor changes were made in the winter of 1941-42, with the emphasis being placed on algebra and logarithms. At least two succeeding classes used an inferior and outdated text book ("New School Algebra"—Wentworth, 1898). Also during the winter of 1941-42 the mathematics faculty of the pilot trainees went over to the Aircraft Observer Candidates' (Striking Force) School and gave a twenty-two hour course to the navigation and bombardier trainees. This course included conversion of arc and time units, logarithms, plane trigonometry, spherical trigonometry, and an introduction to celestial navigation. Early in 1942 a Mathematics Department was set up in the Aircraft Observer Candidates' (Striking Force) School.

It might be interesting to note that early in 1942 during January, February, and March, a twenty-hour navigation course based on material from TM 1-205 was taught in the Pilot School. The 3-6B computer was used. Various members of the sub-department prepared the lectures.

In all of the above mentioned courses, the Mathematics Department constructed the tests and developed all teaching

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aids such as charts, time diagrams, models and mimeographed lessons sheets.

If any courses were inadequate, or if additional essential courses were desired, the Training Literature Section, Air Corps Tactical School, was designated to revise or prepare new courses. Therefore, during the first part of February 1942, Lieutenant M. R. Demers of the Air Corps Tactical School was asked to write a technical manual to be used in pilot training. Mr. Neal Andregg of the sub-department of mathematics Air Crew School assisted him. TM 1-900 "Mathematics for Pilot Trainees" soon made its appearance and was used as a text.

Air Forces

The course in Air Forces was originally outlined by Mr. Woodruff, then the head of the sub-department, and Mr. John Fagg. During the latter part of March and the early part of April 1942 when the course was being built up, Mr. Woodruff would work up the lecture for the day, while Mr. Fagg would develop the following day's lecture. Lecture notes were then exchanged. Field Manuals FM 1-5, 1-10, 1-15, and 1-20 were followed closely in making these preparations. Wherever possible, examples from contemporary war news were used to illustrate the tactical functions of aviation.

The sub-department grew rapidly during the early summer months, being composed of at least eleven men by August.

The first hour of the course consisted of a discussion of the background and history of the Army Air Forces, together with an outline of its present external organization. The second hour embodied a breakdown of the internal organization of the Army Air Forces from the air force down to the flight. Special emphasis was placed upon squadron organizations as regards its various sections and personnel.

In the third hour the various uses of military aviation as a whole were discussed, while the fourth hour dealt with the functions of bombardment aviation in general. The

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The fifth and sixth lectures considered the various types of bombardment aircraft and their specific uses, together with their accessory equipment and the types of formations generally employed. A detailed exposition of the various types of bombs used, together with their operation and functions, was considered by the instructors and cadets to be one of the most interesting and informative phases of the course.

The seventh and eight hours dealt with fighter aviation, its functions, tactics, and weapons. The ninth hour covered reconnaissance, observation, and liaison aviation, while the tenth hour consisted of a summary, answering of questions, and the final examination.

During the summer a reorganization of certain mechanical aspects of the course took place. For a time it was felt by some members of the department that outlines with too much detail were being given to the cadets. This in their opinion, encouraged lack of attention in class. The use of notes was permitted in answering the daily quizzes, and these made it possible for an indifferent student to "get by" with very little effort in or out of class. To remedy this situation very brief, topical outlines were prepared. These necessitated a considerable amount of note taking on the part of the cadets. This was felt to be desirable since it would demand the cadets' attention and the motor activity involved was considered to be of aid in the retention of the lecture material. After being used only about a month, however, the outlines were ordered withdrawn by the "front office." It was the opinion of the Director and the Executive that student outlines should be as full as possible. The cadet should be able, in their view, to devote his full attention to the lecturer. It was suggested, however, that the outlines not contain the answers to more than sixty to seventy per cent of the questions in the daily quizzes. To get a high grade, attention in class would still be necessary. The requested outlines were immediately put into effect.

The course was abolished in June 1943 in order to allow the spending of more hours on Aircraft Identification.

Naval Identification

Naval Identification gave a ten-hour course in Naval Forces and Operations. This course was first given in the Aircrew School in March 1942, and included three hours of

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recognition. This was given so that our future pilots would have a knowledge of the warships of the various nations at war and would therefore be able to distinguish between friendly and hostile ships.

An hour was spent regarding the organization of the Navy; another concerning the different types of ships and their specific function; a lecture was devoted to the submarine and another on the aircraft carrier; cruising, approach, contact and battle dispositions covered another hour; and in addition there were lectures on the fleet air arm, the sortie, passive defense of ships, and the naval battle. The customary examinations were of course given. In 1943 the course was reorganized — even the name changed from Naval Forces and Operations to Naval Identification. As the name indicated, it became a course in recognition. The Americans had bombed the British Aircraft Carrier "Illustrious." Our own airmen had dropped bombs on our own heavy cruiser "Chicago." Thus it can be seen that recognition needed to be stressed.

In the earlier days of teaching recognition (1942), pictures 18" x 24" were held up before the class. In 1943 a projection machine was used to flash an image on a screen. This was exposed for three or four seconds and the cadets became proficient to the extent that they would be able, on the average, to make less than thirty per cent errors. Many made perfect scores.

The instructors who first taught the course began as civilians. They were men who had experience in teaching in various high schools, colleges, and universities. One had spent a few years on merchantmen, however, most of them had never seen a ship. Later, three men who had been in the Navy in past years joined the staff. Actually these men contributed less to the course than some of the others who were more conscientious and studious. These included Mr. Edwin Shuman, Mr. Howard Bowne, and J. H. Tarbell. The two latter went to Naval yards and went on various types of ships. However, the original course material was acquired from, first, attending lectures given by Commander Ray Tarbuck, United States Navy (later made an Admiral). These lectures were given by him to the cadets in the Aircraft Observers (Striking Force) Candidates' School where bombardier and navigator trainees were taught. Two manuals on Naval Operation, prepared by the Army Air Forces Tactical School were also used as a

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basis for the course. Military Intelligence Manual on the American, British, German, and Japanese Navies were given to the cadets and were discussed from a standpoint of recognition.

Maps and Charts

Another academic subject that was introduced in the Air Crew School of the Air Corps Replacement Training Center when it lengthened its program to nine weeks was "Maps, Charts and Aerial Photos." This was to be a twelve-hour course and was designated as a subject for the Lower Class. This course was rather elementary and was based entirely on Basic Field Manual FM 21-25. This course was conceived as a basic course necessary for aircrew trainees and potential officers but not specifically designed for the needs of the aerial navigator. Technical Manual TM 1-205, "Air Navigation" was later regarded as a reference book but was not considered a basic text.

"The development of the sub-department of Maps and Charts really took place under Lieutenant W. Woodruff (later Captain Woodruff) who became Senior Instructor 13 May 1942. The revision of the tests, the modification of the scope of the course, and the standardization of classroom procedure became a cooperative effort. Lieutenant Woodruff, being more administrator than scholar, knew how and did put the course 'on the ball!' It is a credit to Lieutenant Woodruff that well over half of his men were really instrumental in improving the course. It must be said for the record that none of the instructors had anything approaching adequate training before being made instructors in this technical subject. Only over a period of months was it possible for the better instructors to approach a mastery of the subject. On this score the separate instructors deserve the highest praise since they acted with no adequate instructions or help from higher authority. Had one trained navigator and one trained engineer been assigned to the department, at least temporarily, the effectiveness of the training could have substantially increased."

Code

Instruction in Aural International Morse Code was

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first given to bombardier and navigator trainees in the Air Corps Replacement Center and not to pilot trainees.

When first introduced to the navigator and bombardier trainees, it was handled by enlisted men. Equipment was scarce, and only a few loud speakers and phones were available.

The Sub-department of Code in Pre-Flight School (Pilot) was organized in May 1942. This sub-department instructed all trainees in Pre-Flight Schools.

As the pilot trainees were required to learn visual as well as aural code, a new type of visual installation was developed by Lieutenant J. M. Williams. This consisted of a 110-volt alternating current line being placed on top of the code table, on the eye level of the student. Neon bulbs were used as the light source.

Soon afterwards, June 1942, a lesson plan was printed to facilitate teaching. All lesson plans were stapled together in book form. A schedule was set up showing the material to be taught every day by each instructor. These changes improved the general efficiency of the sub-department and greatly increased the number of cadets passing the required eight-word-per-minute code.

Physics

The subject of Physics was likewise one that was introduced when the course was lengthened to nine weeks. The course was twenty hours in length.

The program covered the principles of mechanics and hydrostatics which served as a background for the theory of flight. As a background for meteorology it included principles of heat and gas laws.

No materials were provided for putting the directive into operation, nor were any personnel available who had a sufficient background in piloting to assist in the organization.

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of the course. Texts and tests were neither specified nor furnished.

The faculty wrote up the lectures, ^{and} had them mimeographed and issued to cadets, one lesson in advance of each lecture. The faculty continued to read and learn more about those particular phases of physics which were more important to future pilots. When it was felt that the lessons were satisfactory they were published in book form. In 1943 a higher training command provided slightly better course material, and the work continued in a highly satisfactory manner.

Aircraft Identification

The first course in Aircraft Identification taught at Maxwell Field was started in early December 1941. Its purpose was to acquaint R.A.F. cadets with the principal types of American aircraft.

With Pearl Harbor came the decision to teach aircraft identification to our own cadets. The seven-hour course was based on the W.E.F.T. system—an analysis of the Wings, Engine, Fuselage and Tail of a plane. This early course was developed by Mr. J. B. Benson, Mr. Thomas Hart, Mr. H. V. Moss, and Mr. Ted Hipkens. Actually, however, the cadet got a look at one picture (due to lack of official photographs) and after six hours of lectures, he was given an examination. At first this was a written examination; later the examination consisted of identifying photographs. Photographs were tacked on the walls of the classroom. The cadets filed slowly by each picture, took a short look, and moved on to the next plane.

The inadequacy of the course was recognized, and in the autumn of 1942 several instructors worked with Doctor Ullin W. Leavell of the George Peabody College. This group used the flash meter with the opaque projector,—an advantage over the ordinary slide projector in that newspaper and magazine pictures could be used. Objective

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identification tests were also developed by this group. The fall of 1942 saw the departure of the man who to that time probably played the most important single role in the development of the course and the man universally recognized as the best instructor in Pre-Flight, Mr. Ted Hipkens.

In October of 1942, Lieutenant J. Alan Cross and Lieutenant Edward Word were sent to Ohio State University to study the so-called Renshaw System of Identification being taught at the Naval School of Identification. These men and the men who followed them returned to Maxwell, helped to set up the system on the field, and furnished the initial instructors for and set up an instructor's course in the Renshaw System at the Air Forces School of Applied Tactics at Orlando, Florida, which began in January 1943.

The Renshaw or flash system of identification, as it was called at Maxwell, utilized a special shutter on the lense of the projector, which was capable of flashing a plane on a screen at speeds up to 1/100 of a second. Through the use of a large number of slides the cadet was taught how a plane looked from all angles. By the method of increased shutter speed, the cadet was taught to see the plane as a whole and to identify it correctly at fast speeds. Efforts to develop the cadet's ability to see more in less time included the use of counting slides, requiring the student to accurately count numerous planes on a slide in a very short time, together with the flashing of numbers up to eight digits on the screen at speeds up to 1/10 of a second.

The course, as it was organized early in 1943, was eighteen hours in length; then it was increased to twenty-four hours and finally to thirty hours by the fall of 1943. Twenty hours were devoted to American aircraft and ten hours to British aircraft. Examinations were held on the 10th, 20th, and 30th hours. In the first examination the planes were shown at 1/5 of a second, while 1/10 of a second was the speed for the second and third examinations.

Class interest under the "flash" system was good. The cadet saw many different views of a plane; he usually did not have the opportunity to memorize a certain picture; the speed of the shutter kept him on his toes; he felt that the course was a vital one.

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Physical Training

A most important phase of work in the Air Corps Replacement Center was physical training. Mr. Ernest Smith, assisted by Mr. L. J. Fullbright, was engaged early in 1941 by the Southeast Air Corps Training Center to establish a physical training program within the Southeast Air Corps Training Center designed to bring the trainee to that state of physical and mental alertness essential to the successful accomplishment of his duties as a member of the Air Force Combat Crew by:

1. A series of conditioning and hardening exercises.
2. Exercises to maintain that condition throughout the training period.
3. The proper instruction to enable the trainee to keep himself in condition after graduation.
4. Exercises emphasizing coordination of eyes, ears, hands, and feet.
5. Proper dietetic instruction to fit the trainee to accomplish the missions required of the combat crew for which he is being trained.

The schedules for physical training at each post was planned to be so coordinated that the trainee would receive a progressive graduated series of physical exercises at successive schools. However, it should be stated here that this program was developed on Maxwell Field by means of experimenting with the cadets of the Replacement Center. Furthermore, a program of training physical training instructors for the entire Southeast Air Corps Training Center was inaugurated at Maxwell during this period.

In developing the physical training program, studies were made with the cooperation of flight surgeons to determine where strains fell on aircrew men. As the abdomen took punishment in dives, exercises were developed to strengthen the muscles of that portion of the body. Neck exercises were also stressed. Tumbling exercises were used

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to throw a man off equilibrium to teach him to recover, with the hope that this would be useful in recovering from spins. In general they found that a pilot needed well coordinated relaxed muscles, endurance, and for those who drive the big planes, brute strength.

It might be well to add here that the Physical Training Department gave a course in "First Aid."

The Tactical or Military Program

The tactical program for pre-flight trainees can be summed up by quoting the directive: "Aviation Cadets will gain a fundamental knowledge of military customs and regulations, as well as the duties and responsibilities of the junior officers."

This type of training included first, manual and firing of the .45 caliber pistol. An hour was devoted to its description, disassembly, assembly, care, cleaning, its ammunition, and safety precautions required. The cadet spent a couple of hours on the range to develop marksmanship.

Interior Guard Duty was another subject taught by the Tactical Department. Four hours were devoted to learning the problems involved, such as general provisions for Main Guard and duties of personnel, formations and orders for Main Guard, special guards, prisoners and prisoner guards. Miscellaneous matters such as Details and Rosters were included also.

Fourteen hours were spent on "Infantry Drill." They took up the purposes, definitions, school of the soldier, school of the platoon, school of the company, inspections, battalion drill, review and regiment drill. To acquire a knowledge of ceremonies and inspections, twenty-four hours were spent in daily parades of all cadets except on Saturday, on which day there was a formal inspection. There was also a formal guard mount daily except on Saturday.

Lieutenant James Luper was brought to Maxwell Field to organize this tactical program and execute it. It was

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decided to use the upper and lower class system which has been so successfully used at the United States Military Academy at West Point since 1803 and which has been found to be the best method for making officers in that it is stricter and throws responsibility on the cadets.

The cadet honor code system was an integral part of this system.

In the summer of 1943 one phase of the class system was eliminated. Up to that time it had been the duty and responsibility of the upper classmen to teach and correct lower classmen. Because some felt that the upper classmen were too strict, the system was discontinued.

In order to install the class system, Lieutenant Luper therefore searched the records for all available officers in the Southeast Air Corps Training Center command. From this list those officers who had had cadet training at any military academy (such as West Point, V. M. I., the Citadel, etc.) were brought in as tactical officers. Some seventeen began the work, but by the end of 1943 there were 137.

Lieutenant James Luper was commandant of cadets only for a short time. Major Mark Bane, now in charge, has served in this capacity for a much longer period.

On 28 April 1943, an important change was made in the Pre-Flight program of instruction. Thirty-five instructors were transferred from the Academic Department to the Tactical Department. They were to serve both as teachers of courses and as administrative and tactical assistants to the commanding officers of the cadet squadrons. Each tactical instructor was assigned to a specific squadron.

When the instructors were transferred, four courses were removed from the academic curriculum, allotted to the tactical instructors, and redesignated "Military Subjects." Captain Clayton A. McAdams was appointed Director of Military Subjects. The four courses were Safeguarding Military Information, Ground Forces, War Department Publications, and Customs and Courtesies. From time to time many changes have been made in the arrangement and the subject matter of these courses, but none of the changes have been of major significance. At the present time (December 1943) the courses are as follows:

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Safeguarding Military Information is a two-hour course, the first hour being devoted to a series of short films on protection of classified documents and on counter-combat intelligence. The second hour includes both a lecture and the final examination; the lecture is concerned with classification of information, transmission of documents, and cryptography.

Ground Forces is a five-hour course devoted to discussions of the missions, tactics, and weapons of the various arms and services; the organization of combat units, with particular emphasis on the triangular division; and the new tactics and techniques of modern warfare as exemplified in the battles of Belgium, Holland, France, North Africa, and Russia. The fourth hour is a showing of the movie "Divide and Conquer," third in the series of Why We Fight.

War Department Publications lasts for three periods and is intended to familiarize the cadets with the various types of War Department manuals and circulars which will be of value to them — Field Manuals, Technical Manuals, Army Regulations, Articles of War, Training Circulars, Technical Orders, Army Air Forces Memoranda, and Training Films.

Customs and Courtesies is a four-hour course devoted to discussions of such items as saluting, uncovering, precedence in travel, messhall etiquette, open post procedure, formal visits, ranks and titles, uniforms, and insignia. The second period is a film which was made of and for aviation cadets and which emphasizes pictorially the customs and courtesies discussed in the lectures.

The Tactical Department was also responsible for giving instruction in Chemical Warfare. This was an eleven-hour course and was taught by specialists who were not of the Air Corps, but were officers lent by the Chemical Warfare Service. The first dealt with the probabilities of gas warfare by Germany and Japan, its use in World War I; classification of chemical agents—physical state, physiological effect, tactical employment, and persistency. The second and third hours gave in detail the physical and chemical properties of gases, followed by lectures and demonstrations on field identification, incendiaries and

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screening smokes, incendiary display and smoke demonstrations, individual and collective protection, decontamination materials and methods, tactics, and then, in the eleventh hour, a review and examination.

For purposes of administration and training the Tactical Department divided the corps of cadets into groups. Each group was sub-divided into squadrons. The normal strength of each squadron was set up to contain one hundred seventy-five men. Later this figure often exceeded two hundred. For academic instruction, squadrons were to be divided into sections of about thirty men each.

As the school grew, additional groups were activated. When the groups grew to twelve, the school was divided into two "Wings" with six squadrons to the Wing. At this same time, September 1942, the Academic Department was divided into two wings also, and each had its own academic area with school buildings in both areas. Growth came quite rapidly and at the peak enrollment was close to twelve thousand students. There are three types of students. First the aviation cadet who predominates. Second there are aviation students who are enlisted men who have transferred to the school. They, if they chose, could become aviation cadets. The base pay of a cadet is seventy-five dollars. However, many of the enlisted men with relatively high rank and rating get more pay than that. Furthermore aviation students get flying pay as soon as their actual flying instruction begins. Otherwise their status is the same as that of a cadet. A third type of student is the commissioned officer who is usually referred to as "student officer." At present there are 8,091 aviation cadets on the field, 693 aviation students, 488 student officers, and a reserve detachment of about 800 made of miscellaneous men who have completed the course who are waiting to be moved out. The course of instruction is the same for all groups.

It might be added that we have had a fourth type of student—British cadets. Their course was about the same as given to the other men.

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Pre-Flight Navigator and Bombardier Training
Designations and Key Personnel

During the first eleven months that the pre-flight training program was in operation, there was in addition to the pilots' training program, a program for bombardier and navigator trainees. Practically the same military and tactical training was given to them as was given to the pilot trainees. This program was set up to cover a period of ten weeks.

Their academic program follows:

1. Squadron duties of Junior Officers.....	11 hours
2. Maps and Charts.....	8 hours
3. Ground Forces	
a. Organization and Employment.....	6 hours
b. Anti-aircraft Defense.....	6 hours
4. Air Force	
a. Pursuit Aviation.....	5 hours
b. Bombardment Aviation.....	14 hours
c. Reconnaissance Aviation.....	20 hours
d. Intelligence Procedure in Aviation Units.....	4 hours
e. Identification of Aircraft.....	6 hours
5. Naval Forces.....	14 hours
6. Signal Communications	
a. Radio	
(1) International Morse Code.....	55 hours
(2) The Liaison Radio Set.....	10 hours
b. Visual Communication	
(1) Signal lamps.....	12 hours
(2) Ship Board Signal flags.....	3 hours
(3) Air-Ground Liaison Code.....	3 hours
(4) Pyrotechnics.....	2 hours
c. Procedure and Technique.....	10 hours
d. Codes and Ciphers.....	5 hours
e. Air Corps Signal Communications.....	6 hours

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7. Photography..... 8 hours
8. Mathematics..... 9 hours
9. Flags of all Nations..... 2 hours

The instruction was begun by officer personnel, but as the quality of the work done by them was not satisfactory, they engaged civilian instructors who were selected from the teaching profession. Soon afterwards these civilian instructors made applications of commissions in the Army and same started coming through late in April 1942. This practice was used in the pilot trainees school.

Due to the fact that the students of the bombardier and navigator school were comprised of men who had been pilot trainees, and who had been eliminated for flying deficiencies of some sort, morale was not too good. These boys still preferred to be pilots and were unhappy about the situation.

In August 1942, this school with all records and personnel moved to Selman Field at Monroe, Louisiana.

When the pre-flight training began, we had the activation of the school 27 August 1941 under the title of Air Corps Replacement Center, with a Pilot Replacement Wing and an Aircrew Replacement Wing.

On 24 September 1941, the name was changed to Air Corps Replacement Training Center (Aircrew), and the two wings were called Pilot Replacement Training Wing and Aircrew Replacement Training Wing. Later 2 December 1941, these two wings were again redesignated, "Air Crew School" and "Aircraft Observer Candidates (Striking Force) School." Major Troup Miller, Junior, was appointed commanding officer, and he had his staff of personnel, intelligence, plans and training, and supply officers. In addition there were heads of the two wings or schools (Pilot, and Bombardier-Navigator) who were referred to as "Director of Academic Instruction." Captain H. A. Mears first held that post in the pilots wing and Captain S. P. Reese in the navigators wing.

Just prior to the removal of the navigators school to Monroe, Louisiana, the schools were separated, renamed

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Army Air Forces Pre-Flight School (Pilot) and Army Air Forces Pre-Flight School (Bombardier-Navigator) with Lieutenant Colonel Louis A. Guenther and Lieutenant Colonel T. V. Webb as commanding officers.

As indicated, the Bombardier-Navigator School was moved to Monroe, Louisiana. The Pre-Flight School (Pilot) is still on the field. Lieutenant Colonel C. R. Cross is in charge. His staff contains about twenty officers.

Major Mark Bane is commandant of cadets and student officers. There are 137 officers in his department which includes the physical training program.

The physical training program is directed by Lieutenant C. A. Bucher. There is one less officer in the Ground School (Academic Department) of which Captain J. B. Benson is director. In addition to this there are numerous mess officers, scores of enlisted men, and civilian employees.