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TRAINING AIR SERVICE PURSUIT PILOTS IN  
WORLD WAR I

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by

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*Abstract*

The purpose of this study was to determine if the American Air Service developed a training program which successfully prepared pursuit pilots to accomplish their mission along the western front in World War I. This historical research thoroughly examined each of the three key phases (ground training, preliminary flight training, and advanced flight training) of the training concept adopted by the Air Service to determine if each phase successfully prepared the pilot with the skills necessary to advance to the next phase and eventually into combat. The study also briefly explored the overall combat performance of the American pursuit pilots as a direct measure of the success of the training concept. Findings indicated that despite difficulties with variable and outdated training equipment and some inconsistent instruction in the preliminary phase of training, the overall training program provided the pursuit pilots with the basic skills required to be successful in combat. As a result, pursuit pilots trained in the Air Service program were able to post an outstanding record by the end of the war.

## **Chapter 1**

### **Introduction**

To say the American Air Service was in poor condition upon America's entry into the first World War would be an understatement. The nation that had been first to achieve powered flight had done little to further the development of flying. The Air Service's military capability reflected the general state of aviation in the nation. When the United States entered the war on 6 April 1917, the sum total of the nation's military aviation capability included 51 obsolete and 4 obsolescent training aircraft, and 35 officers who could fly.<sup>1</sup>

The infrastructure to train large numbers of new pilots to fight in combat did not exist either. The Air Service only had three schools. No organized method of instruction existed. The Air Service had none of the combat-type aircraft being employed in the war, and the American aircraft industry did not have orders to build any. Finally, the United States had no pilots qualified to give the advanced training necessary for pilots to survive the rigors of combat.<sup>2</sup>

### **Purpose**

Two questions arise as the result of the condition of the Air Service when the United States entered the war. First, given that the United States had poor equipment and no

qualified instructors, how did the Air Service eventually accomplish the training of its pursuit pilots? Second, did the training program the Air Service eventually adopted successfully produce pursuit pilots capable of accomplishing their mission.? This study will attempt to answer these two questions from the perspective of pilots trained after the United States entered the war. Although some American pilots, such as Major Raoul Lufberry, were trained by other nations prior to America entering the war, they will not be considered in order to limit the study.

This study proposes to show that, although the Air Service encountered difficulties and some unexpected outcomes in developing a training program, it developed a training program which successfully prepared pursuit pilots to prosecute the war from the air. To accomplish this task, the study will focus on the training program itself. The first part of this research will look at the approach taken by the Air Service and at the initial stages of training. Next, the study will explain how the Air Service accomplished the preliminary and advanced training of its pursuit pilots to include the strengths and shortcomings of the programs. Afterwards, the study will briefly focus on the conduct of operations as an aid to determining if the training programs were successful in training the pilots to accomplish their respective missions.

### **Methods and Sources**

Before beginning, a word or two is in order about the methods and sources used in this study. As historical research, the study is not an attempt to write the history of the Air Service's involvement in the first World War but rather an attempt to derive insights into whether training was adequate to accomplish the mission. It relies heavily, therefore,

on the collection of official histories (e.g., Mauer, 1978), books and memoirs from active participants (e.g., Pershing, 1931), and secondary sources from authorities on the subject (e.g., Hudson, 1968). The official histories were accepted as fact unless some disagreement between the sources arose. In these cases, attempts were made to resolve the discrepancy by looking for corroborating evidence in some of the available memoirs.

#### Notes

<sup>1</sup> John J. Pershing, *My Experiences in the World War*, vol. 1 (New York: Frederick A Stokes Co., 1931), 27.

<sup>2</sup> Mauer Mauer, ed., *The United States Air Service in World War I*, vol. 1, *The Final Report and a Tactical History* (Washington D.C.: Office of Air Force History, 1978), 93.

## Chapter 2

### From the Ground Up

The Allies enthusiastically received the news of America's entry into the war. The thought of America's industrial might and the infusion of manpower into the war gave them much needed hope that the tide of the war would now swing in their favor. Aviation was one area in particular that the Allies believed the United States could make significant contributions. As a result, one of the earliest calls for help came via cable from French Premier Alexander Ribot urging President Wilson to help the war effort by supplying large quantities of aircraft and pilots.

In response to the request, a team led by then Major Benjamin D. Foulois drafted a program which called for building 22,625 airplanes and developing a training program to graduate 6,210 pilots.<sup>1</sup> Congress quickly approved the program with an appropriation of \$640 million thus committing the United States to the effort. The enthusiasm of the moment quickly passed, however, when the Air Service and American industry realized they now faced an immense task.

The approval of the program immediately created two major problems. The first problem, gearing up an almost non-existent industry to build massive quantities of aircraft, is beyond the scope of this study. As will be seen in following sections, however, the failure to completely resolve this issue did have a significant impact on the training of

United States airmen. The second problem concerned how to quickly train the quantities of the pilots needed to prosecute the war. Of the two hurdles, the Air Service believed the pilot training issue to be the limiting factor in meeting the requirements of the program.<sup>2</sup>

### **The Training Approach**

Obviously, to send thousands of trained pilots to the front by the summer of 1918 would require a highly efficient system of training that educated pilots with the essential skills needed for combat flying. Therefore, the first problem confronting the Air Service was developing an overall training approach. Since time was critical, the Air Service decided that using a system already developed and in use by one of the Allies might be the best course of action. With that in mind, the Army sent a group of officers to Canada to view their training methods. The trip resulted in the United States adopting the system of training used in England and Canada.<sup>3</sup> This system consisted of three phases: ground training, primary training, and advanced training.

As will be seen throughout this study, this training approach proved to be quite successful albeit not without some deficiencies. For the first time it organized the formerly disjointed training conducted by the Air Service into an orderly build-up approach. Its chief strength is that it allowed instructors to evaluate students at key points in the training process, and it also provided opportunities to either disqualify unpromising candidates or to move candidates into a more suitable mission track (i.e., from pursuit to observation). The primary testament to the success of this system is that, with a few changes, it is still basically the same approach used in the today's United States Air Force.

Each phase of training will now be looked at in detail to determine whether it successfully met the objective of preparing pilots for combat. The remainder of this chapter will focus on how the Air Service accomplished the ground training.

## **Ground Training**

The primary purpose of the ground training was not only to teach the basics, but also to weed out those cadets who were not considered good candidates for actual flight training. The leaders of the Air Service believed it was better to eliminate as many undesirable candidates as possible at the relatively inexpensive ground schools than to waste valuable flight instructor time and equally valuable space at expensive airdrome facilities.<sup>4</sup> All prospective pilots were filtered through the ground school system. The men accepted into the Air Service became flying cadets where they were given the rank of buck private in the Enlisted Reserve Corps earning 30 dollars a month.<sup>5</sup>

The Air Service decided to conduct ground training at colleges and universities around the country. The schools had much to offer as they had professional academic instructors, and they could provide the facilities to setup the necessary laboratories and classrooms. As a result, the Air Service initially selected six prominent engineering schools, which also offered courses in military training, to accomplish the instruction of cadets. These institutions, the Universities of California, Texas, Illinois, and Ohio, Massachusetts Institutes of Technology, and Cornell University, were each capable of accommodating 25 new students per week.<sup>6</sup>

In terms of the course content and flow, the Air Service decided it could do no better than to simply copy the Royal Flying Corps ground school curriculum. Therefore, the

ground training course was divided into two separate phases lasting a total of eight weeks (later expanded to 12 weeks). The first phase focused mainly on indoctrinating the new recruits into the military. This phase, called the Junior Wing, lasted three weeks and included "intensive military training, instruction in military topics, and practical work on the machine gun."<sup>7</sup>

The second phase, or Senior Wing, of ground training lasted five weeks. Subjects in this phase were centered on the basics of aviation and basic knowledge required by combat pilots. Subjects included, theory of flight, types of airplanes, principles and care of engines, guns and bombs, rigging and repairing, map reading, artillery spotting, wireless telegraphy and meteorology.<sup>8</sup> The courses on aircraft and aircraft engine repair were particularly significant. The aircraft of those days were prone to breaking down far from the home airfield. Aviators had to have thorough knowledge of the aircraft systems to repair the plane without the benefit of the services of a trained mechanic.<sup>9</sup> If a cadet successfully finished ground training, he then moved on to one of the preliminary flight training schools. Those who failed were either transferred to ground jobs or discharged.

The method of instruction at the schools appears to have been efficient. All of the ground schools were run by a military commandant. The men in these positions were older officers who had previous experience in teaching. Although responsible for overall training, the commandant and his staff handled the military aspects of training. The respective institutions provided the instructors who actually taught the technical courses. By the end of the war, these schools had more than met the challenge before them by graduating a tremendous number of cadets. In all, these six schools plus two others,

Princeton and Georgia Tech, received 22,689 cadets, graduated 17,540 and discharged the remainder.<sup>10</sup>

Overall, the schools accomplished their mission. They had taught much of the fundamental knowledge that the pilots would require as they went through flight training and then into combat. In the end, the majority of the 17,000 cadets were pleased by the instruction they had received. On the other hand, many who became pursuit pilots felt that the ground school had been a complete waste of time. They had no occasion to use much of the training they received in ground school, specifically using radios, operating a Lewis machine gun, and flying with the Curtiss or Hall-Scott motor.<sup>11</sup> What these pilots failed to appreciate, however, was that the ground schools had likely helped to speed up their flight training by successfully meeting the primary goal of eliminating unqualified cadets.

#### Notes

<sup>1</sup> James J. Hudson, *Hostile Skies. A Combat History of the American Air Service in World War I* (Syracuse, N.Y.: Syracuse University Press, 1968), 5.

<sup>2</sup> Col Edgar S. Gorrell, *The Measure of America's World War Aeronautical Effort* (Northfield, Vt.: Norwich University, 1940), 11.

<sup>3</sup> "Colleges to Train Fliers," *New York Times*, 21 May 1917, 1.

<sup>4</sup> Hiram Bingham, *An Explorer in the Air Service*, (New Haven, Conn.: Yale University Press, 1920) 20.

<sup>5</sup> Stuart E. Elliot, *Wooden Crates and Gallant Pilots* (Philadelphia: Dorrance & Company, 1974), 18.

<sup>6</sup> "Colleges to Train Fliers," 1.

<sup>7</sup> Bingham, 37

<sup>8</sup> *Ibid.*, 37-38

<sup>9</sup> David R. Mets, *Master of Airpower* (Novato, Calif.: Presidio Press, 1988), 15.

<sup>10</sup> Gorrell, 14.

<sup>11</sup> Bingham, 52. The Lewis machine gun and the Curtiss or Hall-Scott motors were the only equipment available in the early days of the ground schools.

## Chapter 3

### Preliminary Training

After completing ground school, cadets were sent to a preliminary flight training (sometimes called primary training) school. Most cadets had their first encounter with a real airplane upon entering preliminary training. Elliot writes of his experiences: "Like most trainees of those days, I had scarcely even seen a plane before coming to Mineola, and my first flight was a confusing experience."<sup>1</sup> The primary purpose of preliminary training was to teach the cadet the basic skills of flying an aircraft. A cadet who successfully moved through the course and passed his flight test became a Reserve Military Aviator and received his commission.

Compared to the ground training program, the question of where to send cadets for preliminary flight training was a complicated issue. It was obvious from the size of the anticipated training program that the Air Service would have to conduct the bulk of its flight training in the United States since the facilities overseas could not completely absorb the influx of American cadets. However, the lack of training facilities in the United States in the early summer of 1917 made it doubtful that the Air Service could produce more than 500 preliminary trained pilots by the new year.<sup>2</sup> This number would not nearly fill the requirements of the follow-on advanced training program contemplated at that time. This situation not only highlighted the need for the Air Service to build additional airfields in

the United States, it also forced them to enlist the help of the Allies and the American Expeditionary Forces (AEF) facilities overseas to initially carry a large share of the preliminary training load.

### **Preliminary Training in Europe**

In response to the request for help, the Allies agreed to accommodate a number of American cadets. They began to abridge their own training schedules for the summer of 1917 to make room for the anticipated influx of American cadets. On 26 June 1917, the Bolling mission, which had been sent abroad to coordinate aircraft production and the trailing of United States airmen, sent a request to the United States to send 100 cadets per month overseas beginning 1 July 1917.<sup>3</sup> The importance of sending cadets over in the summer months could not be overstated. Colonel Bolling wanted to take advantage of both the favorable summer flying weather and the longer days to permit the accomplishment of as much training as possible.<sup>4</sup>

Sending cadets to train at Allied schools appeared to be an excellent solution for several reasons. First, it would relieve some of the preliminary training pressures on the overburdened United States schools and give the Air Service time to build more airfields to eventually accommodate all of its cadets. At the same time, Allied training would boost the Air Service's capability to fill slots in its advanced training programs. Additionally, the prospects of training overseas filled the eager cadets with the hope that they might get to the front more quickly. Many cadets also perceived the Allied schools, especially the French schools, to have higher quality training. An article in the New York Times describing the French program from the viewpoint of a young flier already in training

notes how trainees were “appreciative of the extremely high point to which the French had raised military aviation and were desirous of training under such coaching before assuming military duties elsewhere.”<sup>5</sup>

From a logistical point of view, however, the program failed to meet even the most modest of expectations. Although the Air Service began to send cadets to the allied schools by mid-July, candidates in adequate numbers did not begin to arrive overseas until the autumn of 1917 due to delays in processing and shipping. By this time, weather conditions were no longer favorable for training new pilots, the Italians had suffered a setback along their front, and the Allied schools could not train many American cadets due to the increase in requirements for their own air forces.<sup>6</sup> As a result, many cadets who thought they had been given an extraordinary privilege in being chosen to train in the front line European schools were sent to various AEF facilities to perform whatever chores (e.g., construction, cooking, guard duty) were necessary while they awaited a training opportunity.<sup>7</sup>

### **Training in French Schools**

In spite of the problems, some cadets did receive preliminary training in Allied schools. In France, the first group of cadets arrived from the United States to begin their training at Tours (later to become an AEF facility) in mid-August 1917. Also among the first to receive training at Tours were several cadets who had been Red Cross ambulance drivers stationed in France including America’s top ace of the war, Eddie Rickenbacker.<sup>8</sup> In addition to Tours, the French also trained cadets at Voves, Chateauroux, and Avord. The bulk of preliminary training provided by the French during the war took place at Voves and Chateauroux where 163 pilots and 269 pilots earned their wings respectively.<sup>9</sup>

Although fewer cadets were trained than planned, the assistance the French provided in preliminary training helped immensely in easing the training burden of the Air Service. In all, 444 American students graduated from preliminary training courses in France.<sup>10</sup>

The French had a unique system for training the cadets. This system used a series of single-seat aircraft in build-up approach to more difficult maneuvers until the student actually flew. Using this method, the student started their training in an aircraft with the wings clipped so that it could not fly. These aircraft, typically either a 25-horsepower Blériot or Morane-Saulnier monoplane with a 3-cylinder engine, came to be called Penguins.<sup>11</sup> The purpose of this phase was to teach the student how to steer the aircraft in a straight line in the takeoff attitude.

The next phase, called the *rouleur* class, used an aircraft with more horsepower and full-size wings. Lt Hamilton Coolidge, later to be an ace in the 94<sup>th</sup> Pursuit Squadron, described the *rouleurs* as able to “go a frightful speed, can’t quite fly, and are very difficult for a beginner to handle...but once a pupil can guide a *rouleur* down the field in a straight line, he has mastered one of the most important parts of flying without ever leaving the ground.”<sup>12</sup> The French primarily utilized Caudron and Farman aircraft to conduct the actual flying phase of training. Using these planes, the cadet was gradually allowed to fly at higher altitudes and accomplish more complex maneuvers such as airfield patterns, “spirals,” and cross-country flights.<sup>13</sup> The student completed preliminary training after receiving an average of 25 to 30 hours of instruction. Cadets who successfully completed the course were awarded the French brevet, which was considered the equivalent of RMA rating.<sup>14</sup>

As mentioned before, the French did provide a valuable service in easing the burden of Air Service preliminary training program. However, if the purpose of preliminary training was to teach the basics of flying, then the French preliminary training system failed to completely achieve that goal. Although the training did help cadets develop some "air sense," flying the Caudron, the aircraft actually hindered progress in the follow-on advanced training programs.

The flight control systems of the Caudron differed significantly from those of the Nieuports used in advanced training. For example, the Caudron used the method of warping wings to initiate a turn, whereas modern aircraft such as the Nieuports used ailerons to turn. The Caudron was also a very slow aircraft, therefore, it was fairly safe to fly. On the other hand, the Nieuport was very quick, sensitive on the controls, and difficult to land. These differences made the transition difficult for the new pilots. Col Hiram Bingham, one of the primary coordinators of the Air Service training program, aptly summarized the failure of French preliminary training when he stated:

When one considers that the next step in advanced flying, after having mastered the Caudron, was to learn to fly a Nieuport, which is almost the exact opposite of the Caudron, it seems as though the French officers who had designed this system had purposely made it as difficult as possible.<sup>15</sup>

### **Training in British Schools**

The British also provided preliminary training opportunities for the United States Cadets bound for the British schools began to arrive in early September with the remainder of the group arriving by 1 October 1917. Actually, many of the cadets had been originally bound for schools in Italy, but a mix-up in orders landed them in the British schools. Adding to their displeasure was the fact that they would not immediately start

flight training, but instead would have to once more go through ground training at the British ground school at Oxford.<sup>16</sup> Once cadets completed ground training, they were sent to flight training at various locations in England; a few cadets trained at the British school at Vendome, France. The overall British contribution to preliminary training consisted of 204 cadets from Oxford and 23 cadets at Vendome.<sup>17</sup> In addition, the Air Service sent a number of cadets to train in Canada. Through a reciprocal arrangement with England, use of Canadian flight training facilities were provided in return for use of newly built American fields in the South during the winter of 1917.<sup>18</sup>

In contrast to the French single-seat aircraft training method, the British adopted a method utilizing dual-control planes. Devised by then British Major R.R Smith-Barry, the system became known as the Gosport System, named after the Gosport school in England.<sup>19</sup> In this system, student and instructor flew together in a dual-place aircraft with the instructor coaching the cadet via a speaking tube connecting the front and back cockpits. After a short period of dual instruction, the cadet went on his first solo flight. Students often soloed after only three or four hours of instruction in either Farman or Jenny-type aircraft. Like many other cadets, Lt Field Kindley, one of the top American aces of the war, finished his primary training in the Farman aircraft after approximately eight hours of flying time.<sup>20</sup> Unlike students in the American and French system, however, cadets in the British training course did not receive their wings and commission until after they had completed the entire course of preliminary through advanced training.

Overall, primary training in England proved to be satisfactory. The ability to provide cadets instant feedback during dual instruction flights was the principle strength of the Gosport method. As a result, students could be taught to solo within a few days. Other

countries, including a number of schools in France, eventually embraced this method as it offered the possibility of training pilots quickly.<sup>21</sup> On the other hand, cadets had little flight experience upon completing the preliminary training phase. However, the British offset the lack of experience by continuing to provide dual instruction as necessary in the subsequent advanced training phase.

### **Training in Italian Schools**

In Italy, the Italian government offered to build a school at Foggia to help handle American training requirements. The school soon became home to the Air Service's 8<sup>th</sup> Aviation Instruction Center (AIC). Although the Italians provided all of the instruction, the Americans remained under administrative control of the Air Service. Although several cadets arrived near the end of September 1917, the majority of the cadets did not arrive until mid-October. The school began providing preliminary training on 28 September 1917. In all, the school at Foggia eventually graduated 406 pilots out of the 450 students sent to the course.<sup>22</sup>

Like the British, the Italians also employed the dual instruction system. Although this system was normally known for the capability to quickly train cadets, this fact did not hold true in Italy. Training proceeded at an excruciatingly slow pace even though flying weather at Foggia was typically better than in England or France. Brigadier General (Retired) Claude Duncan explains his experience:

I had my first flight on the 10<sup>th</sup> of October. The Italians had a belief that you couldn't absorb more than ten minutes of flying per day, so you would go out and get your ten minute hop and that was all for the day. Of course, you stayed out on the line; observed, listened and picked up what you could. It took a long time, at ten minutes a day, to get any time in. I think the average for solo was somewhere between three and four hours, and if I

remember, I completed training with about eighteen hours. I completed my training on the 22<sup>nd</sup> of February 1918.<sup>23</sup>

In some ways, the Italian method of instruction also resembled that of the French build-up approach to flying. Instruction, conducted in two-place Farman aircraft, started by practicing high-speed runs across the field in much the same fashion as in French "penguin" training. Following that, cadets learned to take off, fly approximately 30 feet above the ground for a short distance and land. The instructors then guided the student through progressively more difficult maneuvers such as circles, contra-circles, and figure-eights.<sup>24</sup> Once he had learned these basics, the cadet progressed to the solo flight. Finally, after receiving more instruction and successfully completing a series of two flight tests, the cadet earned Italian wings (equivalent to the RMA) and was commissioned as a second lieutenant.

The preliminary training provided in Italy proved to be far from satisfactory. Pilots sent to obtain advanced training in France after training at Foggia had to obtain additional training at the AEF schools. The trouble lay with the Farman aircraft which were the only type the Italians could procure for preliminary training purposes. The Farman differed so much from the aircraft in advanced schools that instructors there experienced as much difficulty teaching the new pilots as would have been the case if they had never received preliminary training.<sup>25</sup>

### **Training in the United States and in the AEF**

The United States only had three facilities capable of training military pilots when it entered the war. These schools were located at San Diego, California; Mineola, Long Island; and Essington, Pennsylvania. With the formation of the ground schools, it soon

became obvious that these three flight schools would not be able to keep pace with the anticipated output of the universities. Realizing the problem it encountered, the Air Service began an aggressive construction program to build additional airfields to ultimately accommodate their entire training needs. By the end of May 1917, plans had been made to construct nine airfields.<sup>26</sup>

Later that summer, an airfield selection board, headed by Major H. H. Arnold, had selected sites for several other airfields to be constructed. By Christmas, the Air Service had built 18 training airfields and had a total of 25 fields in use by the end of the war.<sup>27</sup> Preliminary training was conducted at 14 of the fields including historic ones such as March Field, Riverside, California; Mather Field, Sacramento, California; and Kelly Field, San Antonio Texas. By the end of the war, the airfields had actually accomplished the bulk of the preliminary training load. At the time of the Armistice, 15, 627 cadets had been sent to flying fields in the United States for training compared to 1,791 cadets at overseas facilities.<sup>28</sup>

In its stateside schools, the Air Service tried to mold the best features of all the Allied training methods into its own system of preliminary training. One foreign officer watching this process observed: "The British tell them to go North, the French tell them to go South, the Italians tell them to go West, so they usually do what they think best, and go East."<sup>29</sup> The Air Service finally settled on an "Americanized" version of the Gosport method since training could be conducted more quickly.

In contrast to the British, the preliminary course of training in the United States included from 30 to 50 hours of actual flight training, typically in the Curtiss JN-4 (Jenny). The course lasted over a period of six to eight weeks depending on the skill level of the

student. The cadets initially soloed with as little as three hours of instruction and in some cases were threatened with elimination from the program if they went over six hours before soloing.<sup>30</sup> The preliminary phase of training ended when the prospective pilot earned his RMA rating and a commission by successfully demonstrating basic aircraft maneuvers and completing a cross-country flight.

Once built, the preliminary training schools in the United States proved to be highly successful. Pilots were sufficiently trained with the basic flying skills required to proceed advanced stages of training. The Curtiss Jenny training aircraft proved to be one of the strengths of the American training program. Although some significant differences did exist between the Jenny trainer and advanced aircraft like the Nieuport, the Jenny was overall better adapted than Farmans and Caudrons to teach preliminary flying skills which pilots could then easily transfer to the advanced aircraft.<sup>31</sup> On the negative side, the schools initially lacked sufficient numbers of qualified instructors to teach cadets. The Air Service eventually overcame this problem by retaining the most promising graduates as teachers, who despite having no combat experience, did their jobs well.<sup>32</sup>

Finally, the AEF conducted preliminary training at Tours, France. The Americans assumed responsibility for the school from the French in early November 1917 and Tours became home to the 2<sup>d</sup> AIC. The Air Service's over original purpose in acquiring Tours had been to fill their needs for an advanced training site for observers and observer pilots. However, the more pressing need to train new cadets forced the AEF to use the facility for preliminary training.<sup>33</sup>

The output of trained pilots at Tours fell far short of the goal of 100 graduates per month. Although the AEF operated the airfield, the French instructors had been retained

to teach the cadets. Therefore, students at Tours were instructed according to the slower French system. In addition, the Caudron remained the primary aircraft for instruction. These aircraft were old and most of them in a state of disrepair which also contributed to the slow output. Production increased in early 1918 as the AEF replaced French instructors with their own personnel and changed to the American RMA system of training; by August, 682 cadets had received preliminary training at Tours.<sup>34</sup> Unfortunately for these pilots, the effect of training in the Caudron only served to create problems in transitioning to advanced aircraft much as it had for those pilots trained exclusively at the French schools.

By the summer of 1918, preliminary training of Americans at Tours and other allied schools was virtually completed. At that point, the Air Service decided that the preliminary training task would be taken over by schools in the United States since continuing this training overseas would only impede the production of fully-trained personnel. Thereafter, preliminary training overseas was provided to only a few deserving enlisted men who had been previously selected to receive training at AEF schools as a reward for the "excellence of their service."<sup>35</sup>

#### Notes

<sup>1</sup> Elliot, 32.

<sup>2</sup> Mauer, 58.

<sup>3</sup> Ibid., 94.

<sup>4</sup> Lt Lucien B. Thayer, *America's First Eagles: The Official History of the United States Air Service, AEF (1917-1918)*, ed. Donald Joseph McGee and Roger James Bender (Mesa, Ariz.: Champlin Fighter Museum Press, 1983), 41.

<sup>5</sup> "Our Fliers Want French Training," *New York Times*, Sunday, 3 June 1917, sec. 3, 4.

<sup>6</sup> Mauer, 94.

<sup>7</sup> Sam Hager Frank, "American Air Service Observation in World War I" (PhD diss., University of Florida, 1961), 174.

## Notes

<sup>8</sup> Edward V. Rickenbacker, *Rickenbacker* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1967), 90.

<sup>9</sup> Thayer, 64.

<sup>10</sup> Mauer, 101.

<sup>11</sup> Lee Kennett, *The First Air War, 1914-1918* (New York: The Free Press, 1991), 124.

<sup>12</sup> Hamilton Coolidge, *Letters of an American Airman, Being the War Record of Capt. Hamilton Coolidge, U.S.A., 1917-1918* (Boston: Norwood, Plimpton Press, 1919), 34.

<sup>13</sup> Kennett, 125.

<sup>14</sup> Frank, 179.

<sup>15</sup> Bingham, 84.

<sup>16</sup> John MacGavock Grider, *War Birds: Diary of an Unknown Aviator*, ed. Elliot White Springs (1926; reprint, College Station, Tex.: Texas A&M University Press, 1988), 25.

<sup>17</sup> Mauer, 103.

<sup>18</sup> Gorrell, 16.

<sup>19</sup> H.A. Jones, *The War in the Air*, vol. 5, *Being the Story of the Part Played in the Great War by the Royal Air Force* (Oxford: The Clarendon Press, 1935), 429.

<sup>20</sup> James J. Hudson, "Air Knight of the Ozarks: Captain Field E. Kindley," *American Aviation Historical Society Journal* 4, no. 4 (4<sup>th</sup> Quarter 1959): 238.

<sup>21</sup> Kennett, 124.

<sup>22</sup> Mauer, 101-2.

<sup>23</sup> John Sloan and George Hocutt, ed., "The Real Italian Detachment: Transcription of a Tape Recorded Interview with Brigadier General Claude E. Duncan, U.S.A.F. (Retired)," *Cross & Cockade Journal* 1, no. 2 (Spring 1960): 43.

<sup>24</sup> Fiorello H. La Guardia, *The Making of an Insurgent: An Autobiography: 1882-1919* (Philadelphia: J.B. Lippincott Co., 1948), 170.

<sup>25</sup> Mauer, 101.

<sup>26</sup> "Nine Aviation Training Fields to be Established for Completion of Course," *New York Times*, 21 May 1917, 1.

<sup>27</sup> Gorrell, 12.

<sup>28</sup> *Ibid.*, 14.

<sup>29</sup> H.H. Arnold, *Global Mission* (New York: Harper & Brothers, 1949) 65.

<sup>30</sup> Elliot, 32.

<sup>31</sup> Bingham, 84.

<sup>32</sup> Frank, 154-5.

<sup>33</sup> Mauer, 97.

<sup>34</sup> Frank, 180.

<sup>35</sup> Mauer, 95.

## **Chapter 4**

### **Advanced Training**

Once a cadet received his RMA or equivalent rating, he went on to receive further training before going to the front. This training was absolutely necessary as the new pilot only knew the basics of flying an airplane. He now needed to develop the skills required to fly more advanced combat-type aircraft and demanding combat missions. This type of training was called advanced training. Advanced training can be broken down into two parts. The first describes the type of training conducted to teach pilots how to fly advanced aircraft and simple aerobatic maneuvers. The second consisted of specialized pursuit mission training. For clarity, this paper will make the distinction between these subsets by referring to the first part as "basic advanced training" and the second part by its mission-specific name (e.g., pursuit training).

As stated before, it was obvious the Air Service would have to conduct as much training as possible (preliminary and advanced) in the United States due to the size of the training program approved by Congress. However, several problems prevented them from initially achieving that goal. The lack of adequate training facilities in the United States has already been discussed the previous chapter. The Air Service also lacked instructors qualified to teach new pilots the necessary advanced skills since they had never flown in the type of aerial combat developed over the western front. In addition, the Air Service

did not own any combat-type aircraft suitable for providing advanced training. Therefore, the Air Service found it necessary to build large several training facilities in Europe and to use Allied schools to take advantage of both the equipment and qualified instructors available overseas.<sup>1</sup> The AEF eventually built (or took over from the Allies) several training facilities overseas which then became Aviation Instruction Centers. Each center was designed to accommodate a specific type of training, however, some centers (e.g., the 3<sup>rd</sup> AIC at Issoudun) accommodated more than one type.<sup>2</sup>

### **Basic Advanced Training**

Basic advanced training taught the new pilot to fly more powerful and modern aircraft. This training was necessary simply because newer front-line aircraft were faster, more powerful and often completely different from basic training aircraft. The previously described flight control system differences between the Caudron and the Nieuport is one example of major differences that existed between older and more modern aircraft. In other cases, basic advanced training proved necessary because significant disparities in aircraft handling characteristics existed between primary trainers and service-type aircraft due to their different engine types. For example, the American ace Charles R. D'Olive, describes his experience handling the rotary engine Nieuport as being "like trying to fly a gyroscope."<sup>3</sup>

Basic advanced training also taught newly trained pilots some of the basic aerobatic maneuvers, or stunts as they were sometimes called, they would later need in combat. Possibly due the flimsy condition of early aircraft, the United States Army had prohibited aerobatics as being too dangerous prior to America's entry into the war.<sup>4</sup> However,

aerobatics were considered essential to saving lives in combat flying , especially for pursuit and observation pilots. In addition, aerobic instruction was designed to help student build confidence in the aircraft and to determine if “there was anything radically wrong with his power to overcome dizziness and keep his head level under trying circumstances.”<sup>5</sup>

Several schools in Europe provided basic advanced training. The French school at Avord, which had earlier provided preliminary training to cadets, now opened its doors to accommodate a surplus of untrained American pilots in the summer of 1918. Here, pilots underwent training with French instructors and completed an intermediate course in Nieuport and Sopwith aircraft before moving on to pursuit training at other locations. The school successfully graduated 148 pilots in all.<sup>6</sup>

In Britain, basic advanced training began immediately after the cadet completed primary training. In this training phase, the British continued to use the Gosport system of alternating dual instruction with solo flights. They followed a build-up approach to more challenging aircraft. Students typically flew an Avro for a period of time, moved up to a Sopwith Pup, and then to the SE 5.<sup>7</sup> Once the cadet completed this phase of training, he moved on to Scotland to complete the final, combat phase of training.

Italy also conducted basic advanced training at Foggia. The program began in January 1918, but the program was short-lived. The S.I.A. biplane used in the program had excellent performance characteristics but proved to be dangerous. Several American pilots died in training as a result of the aircraft buckling in flight. After an investigation revealed the aircraft to be structurally weak, it was withdrawn from use and the training program halted.<sup>8</sup> The program was a failure.

The great American school at Issoudun, France (3<sup>rd</sup> AIC) became the primary center for basic advanced training although the school also served in the role of providing pursuit and observation pilot training. The first contingents of instructors at Issoudun were veteran French flyers just back from the front. As a result, the school basically developed along the lines of the French method of training described in the previous chapter with students starting out in the “penguins” and moving up to more powerful and faster aircraft. After penguins, the student advanced to the old and slow 23-meter Nieuport (23 square meter wing area), then to the 18-meter Nieuport which was a little faster, and finally on to the 15-meter which was small, fast, and sensitive on the controls.<sup>9</sup>

At Issoudun, training took place on a series of 10 fields with pilots moving from one field to another as training progressed. Training on the first three fields were devoted to providing the pilot with experiences in the more advanced aircraft as described above. After Field 3, pilots were sent to Field 9 to fly simple aerobatic maneuvers in the 18-meter Nieuport. In addition to teaching aerobatics, training at this field also served the purpose of filtering pilots into mission-specific training. A student’s capabilities at the end of training at Field 9 decided his fate. At this point, if the student found difficulty handling the more delicate and speedier aircraft or if he showed less ability in the maneuvers, he was advised to go in for reconnaissance or bombing training instead of pursuit training; pilots who satisfied their instructors went back to Field 4 to begin training towards becoming a pursuit pilot.<sup>10</sup>

The quality of instruction from French instructors was one of the great successes at Issoudun. These combat veterans added valuable experience to the training program. Unfortunately, the French schools badly needed the experienced instructors to train their

own pilots. Therefore, the Air Service made great efforts to replace them with a cadre of some of the best of the newly trained American pilots.<sup>11</sup> However, plucking out a pilot eager to go to the front was often a tremendous setback to him. Luckily, most did the job without complaining even as they saw their opportunity to become an ace begin to slip away. As a result, the school instituted a program allowing the instructors to take turns on the front for a month at a time to gain ideas and experiences as an incentive to remain an instructor. This action not only had the effect of increasing the morale of the instructor, it also increased their prestige with their students especially if they had come back from the front with a couple of kills to their credit.<sup>12</sup>

As a subset of the overall concept of advanced training, the "basic advanced training" course appears to only have been employed in Europe by the Allies and the AEF. Advanced training Since aircraft Pilots attending these courses were mainly those on their way to becoming either pursuit or observation pilots; bombardment pilots did not have a need to learn aerobatics due to the heavier type aircraft they flew in combat. These courses Students could be eliminated from further instruction if found to be deficient in the basic advanced training phase. The next few paragraphs summarize advance training accomplished in Europe

### **Pursuit Training**

Those pilots selected for pursuit duty received specialized pursuit training. Normally only the best pilots were picked for pursuit duty since pursuit planes tended to be more difficult to fly and required better piloting skills. To become a fully trained in pursuit, the pilot underwent two phases of advanced training: the first taught the art of pursuit flying,

the second, which will be discussed in a later section, taught aerial gunnery. Courses in the first phase were designed to: (1) teach the advanced aerobatic maneuvers typically used in combat; (2) teach formation flying to enhance mutual support in combat; (3) practice mock dogfights to learn the defensive and offensive maneuvering required to kill an opponent or survive an attack.

Overseas, the 3d AIC at Issoudun successfully trained most of the American pursuit pilots in the war. By the end of the war, 829 pursuit pilots had graduated from the school.<sup>13</sup> General and advanced aerobatic skills were taught and perfected on Fields 4 through 6 in the 15-meter Nieuport. Although many considered the 15-meter Nieuport to be almost too difficult to fly, the instructors at Issoudun continued to use it in the belief that a pilot who mastered this airplane could handle any aircraft at the front.<sup>14</sup> At these fields students learned several maneuvers considered essential to aerial combat. For instance the vrille (spin) could often be used to delude an enemy pilot into believing he had won the battle, while the reinversement provided the quickest means of turning 180 degrees.<sup>15</sup>

After completing aerobatic training, students moved over to Field 7 to learn basic and advanced formation flying. Formation flying was fundamental to aerial combat. While learning how to fly in formations, the student acquired the skills to fight the enemy as a team. Instructors also impressed upon students a principal lesson learned from experience at the front: that formation flying skills were basic to survival since most kills in the war occurred when pilots strayed away from the safety of the group.<sup>16</sup> Finally, students went to Field 8 to learn aerial combat tactics in aircraft equipped with gun cameras. Through extensive in-flight training with combat veteran instructors, students in this stage learned

techniques for maneuvering against an opponent. Most importantly, pilots learned through training the critical lesson that seeing the enemy aircraft first often meant the difference between success or death.<sup>17</sup>

In England, the final phase of Gosport training also centered on teaching aerial combat techniques. The British curriculum taught many of the same aerobatic, formation, and aerial fighting lessons taught at Issoudun since they were the essential skills required by the pursuit pilot. After spending a few hours transitioning to the modern SE 5 pursuit aircraft, the students moved to the School of Aerial Fighting where they were exposed to very realistic aerial combat training. Lt George Vaughn's experience was typical of the training given to students:

...we went to Scotland to the School of Aerial Fighting. Most of the equipment there was SE-5s and Sopwith Camels. They did have some captured German types there too. Every Monday they used to divide the school up into two sections: the Reds and the Blues, then have an aerial combat between the two, using gun cameras. This was very good experience, practicing like this. Each section was led by an experienced flight leader back from the front.<sup>18</sup>

After completing this phase, the pilots were awarded their wings, commissioned, and prepared to go to the front.

Since the British desperately needed pursuit pilots, most of the American pilots trained by the British were trained in this role. At the end of the war, the British had trained 156 pursuit pilots who either served in a Royal Air Force squadron, or in one of the two American pursuit squadrons (17<sup>th</sup> and 148<sup>th</sup> Aero Squadrons) which were completely trained and equipped by the Royal Air Force and operated on the British front; another 5 pursuit pilots were furnished directly to the American Air Service.<sup>19</sup>

By the end of the war, several fields in the United States were in the process of providing pursuit training. Rockwell Field in San Diego and Dorr and Carlstrom Fields in Arcadia, Florida were used for both pursuit and gunnery training while Taliaferro Field in Fort Worth, Selfridge Field in Mt Clemens, Michigan, and Wilbur Wright Field in Dayton provided gunnery training.<sup>20</sup> By the summer of 1918, these schools had expanded enough that tremendous efforts were being made to relieve the pressure on overseas facilities by providing fully trained pilots to the AEF. Once a pilot arrived in France, he would then be quickly trained to fly the front-line aircraft and then sent to one of the pursuit squadrons. By the end of summer in 1918, several fully trained pilots prepared to go overseas. Unfortunately, due to delays in transit, not a single pursuit pilot trained in the United States reached the front before the end of the war.<sup>21</sup>

Generally speaking, the pursuit pilots received satisfactory instruction. The Allies provided outstanding support in this area. As in basic advanced training, many of the initial instructors at Issoudun were by necessity experienced French instructors. As American pilots gained experience, they replaced the French pursuit instructors. On the other hand, most instructors in the United States lacked combat experience. As a result, they instructed as well as they could, but they knew only theory, and they could only teach what they knew.<sup>22</sup>

In summary, the best instructors for the aerial combat phase of the training were those who had experience at the front. Part of the training included pitting students against these instructors in mock dogfights. This type of vigorous training undoubtedly saved many lives. At the end of the war, those responsible for providing training felt that the

confidence pilots gained from this type of training led to the success the graduates had at the front of bringing down far more enemy planes than they themselves lost.<sup>23</sup>

The type and the lack of equipment available greatly complicated pursuit training. In fact, the type of equipment available in the United States was another major factor why no fully trained pursuit pilots ever made it directly from the United States to the front. These pursuit schools, although they had an adequate curriculum, simply did not possess the type of aircraft being used at the front. At the end of the war, the schools were using Thomas Morse "scouts" and Curtiss machines which were quite inadequate for the type of training.<sup>24</sup> Overseas, the problem in France was more the lack rather than the quality of equipment. This problem forced the schools to use several different types of airplanes. This resulted in pilots being often required to learn how to fly six different kinds of planes before completing the required work.

### **Aerial Gunnery Training**

For pursuit pilots, training did not end after finishing the advanced courses of instruction. After graduating from the pursuit course, the pilot then went on to learn aerial gunnery. Gunnery training did not become a course of instruction until around the time the United States entered the war. Initially, the British and the French had not thought it necessary to teach their pilots how to use the weapons mounted on their aircraft. This lack of instruction produced unsatisfactory results as most British and French pilots were forced to fly their first combat missions without ever having fired a shot from a synchronized machine gun mounted on a service machine.<sup>25</sup>

Two schools, one run by the French and the other run by the Americans, provided almost all gunnery training to the AEF. The French school located at Cazaux provided the bulk of all the aerial gunnery training to AEF pilots since the Americans did not build a school until late in the war. From the time its doors opened in December 1917, until the war ended, the French school trained 495 pursuit pilots.<sup>26</sup> Despite the help of the French in many other aspects of training, the use of the facilities at Cazaux solved a critical need in training until the AEF school could be built. Therefore, the training provided by the French in aerial gunnery was by far the most important contribution they made to the American Air Service.<sup>27</sup>

Once the need for aerial gunnery training had been recognized, the Air Service quickly tried to establish its own school in France to provide the training. Due to the French reluctance to allow the promiscuous firing of machine guns in the air near populated areas, it took time to find a suitable location.<sup>28</sup> After several months of searching, the Air Service found an acceptable site on the west coast near St. Jean-de-Monts. The school finally opened its doors in August 1918. The Air Service soon took over all aerial gunnery training responsibilities for American pursuit pilots providing much needed relief to Cazaux. However, St. Jean-de-Monts opened too late to have much of an impact. Original plans called for the school to train 200 to 300 students per month, however, by the end of the war it had only trained a total of 54 pursuit pilots.<sup>29</sup>

In April 1918, the Italians opened a school for aerial gunnery in Furbara to relieve some of the pressure on Cazaux. The school closed after only two classes because of aircraft shortages, poor instruction, and logistical problems due to the school's distance

from other training centers. When the school closed its doors, it had only graduated 52 pilots.<sup>30</sup>

Although courses differed somewhat, the curriculum at Cazaux provides a good example of the type of training that occurred in an aerial gunnery school. The course of instruction at Cazaux consisted of two parts. Initial instruction was conducted on a lake and consisted of shooting a 30-caliber rifle from a small boat at target being towed by another boat.<sup>31</sup> This exercise familiarized students with the concept of aiming and shooting at moving targets. The second phase consisted of airborne practice where the student shot at targets towed by another aircraft until he could hit it repeatedly. The duration of training at the aerial gunnery course was approximately one month.

The quality of instruction depended on the school. Overall, the instruction provided at the Cazaux appears to have been adequate with the French providing "competent enough French officers and instructors."<sup>32</sup> On the other hand, instruction at the Italian school at Furbara was not as good. Language difficulties prevented the training from ever being very effective. Lt. Leland Carver, a pilot with the 90<sup>th</sup> Aero Squadron, describes the difficulties he encountered stated, "Ground school lectures were given by Italian officers in French which I translated into English for the Americans."<sup>33</sup>

As with other courses of training, equipment somewhat limited the ability to provide training. For example, the equipment at Cazaux consisted of several American owned 15-meter Nieuports. The condition of the aircraft left something to be desired, however. Most aircraft were generally out of rig and alignment and otherwise not fit for duty. One airman disparagingly referred to the aircraft as "the most beaten up old crocks...ever

collected together by a junkman.”<sup>34</sup> In Italy, the site at Furbara simply lacked the machines to provide adequate training.

### Notes

- <sup>1</sup> Mauer, 93.
- <sup>2</sup> H.A. Toulmin Jr, *Air Service, American Expeditionary Force, 1918* (New York: D. Van Nostrand Co., 1927), 279.
- <sup>3</sup> Quoted in Hudson, *Hostile Skies*, 32.
- <sup>4</sup> Mets, 21.
- <sup>5</sup> Bingham, 140.
- <sup>6</sup> Mauer, 101.
- <sup>7</sup> H. Ralph Muise, ed., “1st Lt George A. Vaughn, 84 Squadron, R.A.F. 17<sup>th</sup> Aero Squadron, U.S.A.S.,” *Cross & Cockade Journal* 2, no. 2 (Summer 1961), 164.
- <sup>8</sup> La Guardia, 175.
- <sup>9</sup> Rickenbacker, 93.
- <sup>10</sup> Bingham, 142.
- <sup>11</sup> Mets, 25.
- <sup>12</sup> Bingham, 129.
- <sup>13</sup> Toulmin, 292.
- <sup>14</sup> Bingham, 144.
- <sup>15</sup> Frank, 156.
- <sup>16</sup> *Ibid.*, 151.
- <sup>17</sup> Bingham, 162-8.
- <sup>18</sup> Muise, 164.
- <sup>19</sup> Gorrell, 19.
- <sup>20</sup> Frank, 149.
- <sup>21</sup> Mauer, 104.
- <sup>22</sup> Frank, 154-5.
- <sup>23</sup> Bingham, 162.
- <sup>24</sup> Thayer, 67.
- <sup>25</sup> Mauer, 108.
- <sup>26</sup> Frank, 185.
- <sup>27</sup> Mauer, 101.
- <sup>28</sup> Mauer, 109.
- <sup>29</sup> Frank, 185-6.
- <sup>30</sup> Mauer, 101.
- <sup>31</sup> Rickenbacker, 95.
- <sup>32</sup> Elliot, 119.
- <sup>33</sup> Quoted in Hudson, *Hostile Skies*, 37.
- <sup>34</sup> Elliot, 119.

## Chapter 5

### Over the Lines

The direct results of performance in battle can tell a lot about the quality of a training program. This chapter will present a very brief look at some of the training which took place and the overall performance of the various pursuit squadrons during the major operations in which the American Air Service participated.

The operations can more or less be broken down into four time periods, all in 1918. The first fully trained pursuit unit, the 94<sup>th</sup> Aero Squadron, arrived at the front early in April and others soon followed. Most operations were conducted in what was called the Toul sector where many of the initial squadrons had the opportunity to have a break-in period along a relatively quiet part of the front before experiencing serious combat. The first serious test of Air Service capability came around the middle of July during the German offensive near Chateau-Thierry. Next, operations began in conjunction with the American 1st Army's first major battle which was the effort to reduce the St. Mihiel salient. This quick operation, lasting only from September 12 to September 15, featured the largest assembly of aviation that had ever been engaged in one operation.<sup>1</sup> Finally, the Argonne-Meuse offensive saw several squadrons in combat from September 26 to the end of the war. It was during this time, chiefly as a result of Air Service actions during the St.

Mihiel offensive, that many felt that Air Service units had finely developed into trained combat units.<sup>2</sup>

Pursuit pilots posted an excellent record throughout their involvement in the war. Part of the reason for this success was undoubtedly due to the aggressive nature of the men who eventually became pursuit pilots. However, these pilots had generally received quality training throughout their course of instruction. This training went a long way towards preparing them to attain their success.

As good as their training had been, in some respects, it was just beginning as they reached the front in the Toul sector. Much of the training at the instruction centers had been by necessity mechanical, stressing the accomplishment of certain tasks in order to proceed to the next phase of training. Once at the front, however, these new pilots quickly discovered that no amount of training at the rear, even though the instructors were French pilots who had served at the front, would give the pilot the atmosphere and point of view of a fighting pilot.<sup>3</sup>

The squadrons took advantage of the quiet at Toul to perfect some of the basics they would need to fight as an effective force. Experienced leaders, some who had served with the Lafayette Escadrille, brought the new pilots on patrols along the front lines teaching and sharing valuable knowledge learned from experience. One especially important lesson taught was the necessity for fighting in formation. Although they had been taught formation flying in advanced training, many pilots had the preconceived idea that aerial combat was done individually.<sup>4</sup> Here they learned that survival depended on teamwork. Another weaknesses of advanced training was discovered during this time frame; that of cross country navigation. Pilots had a tendency to get lost on their first few flights near

the front. This was no doubt due to in large measure to the fact that pilots were free to devote their entire concentration on the ground during cross-country training at the flying schools while at the front they had to devote almost all their attention to watching for enemy airplanes.<sup>5</sup>

Success varied by operation, but the pursuit squadrons achieved superb results overall. The first taste of success occurred within one day of commencing operations in the Toul sector. Here, on April 14, Lieutenants Alan Winslow and Douglas Campbell shot down two German pursuit planes at Gengoult airfield while taking their turn on alert status. (Coolidge, pp. 116-7) Although German aerial activity in the Toul sector was generally light and non-aggressive, the Air Service did get some combat experience. By June, the 1st Pursuit Group had claimed 60 kills (27 confirmed) to 14 losses.<sup>6</sup>

At Chateau-Thierry, the relatively inexperienced pilots of the American pursuit squadrons took many more casualties from the numerically superior and more experience German squadrons. Training opportunities at the front became non-existent. Although replacement pilots were received, they were inexperienced; instead of being broken in gradually they were immediately put into combat.<sup>7</sup> The hard lessons of Chateau-Thierry provided invaluable experience, however.

During the remaining battles of the war, the squadrons continued to gain experience and improve. By the time of the St. Mihiel offensive many pursuit pilots were already aces. As a result, newer pilots had the opportunity to gain from their experiences. The gap between kills and casualties began to open up. For example, on the last day of the St. Mihiel offensive American pursuit units scored 15 victories to only one loss (although some of the success could be attributed to the Germans being outnumbered).<sup>8</sup>

At the beginning of the Argonne-Meuse offensive, American pursuit aviation began to overwhelm the German Air Service. The Germans were in retreat and most battles were now being fought on the German side of the lines. Subsequently, the number of kills against the Germans skyrocketed. By the end of the war pursuit aviation consisted of three groups of highly organized squadrons and pilots who, taught by their own experiences and those of the French and the British, now ranked equal to the pursuit units of the other nations.<sup>9</sup>

Ultimately, the Air Service and Allied schools contributed to the success of the pursuit pilots. The schools, particularly the advanced schools, gave pilots all the tools they need to survive and excel in combat. However, nothing but actual combat could complete the training. Although the pilots suffered a high percentage of casualties early on, they learned, matured, and turned the percentages around. The proof of their success is in the numbers. At the close of the war, Air Service pursuit pilots had 544 confirmed kills while losing 166 of their own—a ratio of over 3 to 1.<sup>10</sup>

#### Notes

<sup>1</sup> Gen John J. Pershing, *Final Report of Gen John J. Pershing, Commander-in-Chief, American Expeditionary Forces* (Washington, D.C.: Government Printing Office, 1920), 42.

<sup>2</sup> Mauer, 40.

<sup>3</sup> *Ibid.*, 285.

<sup>4</sup> *Ibid.*

<sup>5</sup> *Ibid.*, 286.

<sup>6</sup> *Ibid.*, 351.

<sup>7</sup> Frank, 302.

<sup>8</sup> Hudson, *Hostile Skies*, 181-3.

<sup>9</sup> Mauer, 319.

<sup>10</sup> Mauer, 352.

## **Chapter 6**

### **Conclusions**

Training did not end once a pursuit pilot reached the front. In some respects his real training began as he arrived. In the end, the training programs were not designed to supply highly experienced pilots to the front. They were designed to train as completely as possible pilots who would then gain experience at the front. The focus of the Air Service training system was on sending as many pilots as possible to the front in the shortest possible time. By the end of the war, the United States training system was getting there.

The early decision by the Air Service to use a three-phase training system proved to be crucial. It served to organize the previously disjointed and basically non-existent training system into an efficient means of training pilots. The organized approach saved the Air Service valuable time and money by providing the capability to evaluate student progress and eliminate cadets who were not competent to continue. The fact that it is still basically the model in use today is the proof of the validity of the concept.

The ground phase of training may have been the most successful feature of the program. Using colleges and universities to conduct the training offered the cadets the opportunity to receive professional instruction at excellent facilities. Although many pursuit pilot later complained about the adequacy of some of the training, most subjects

covered in the ground schools were directly applicable to future flight training and combat flying. In the end, the ground schools likely helped to speed up the pilots' progress through flight schools by weeding out over 5,000 unqualified candidates.

On the other hand, the quality of preliminary training proved to be erratic depending on where the cadet was instructed. For instance, the outdated equipment of both the French and Italian schools hindered initial student progress in the follow-on advanced training phase. The British schools provided better instruction due to the Gosport method. The quality of the instruction offset the lack of experience received in the primary training portion of the course. Finally, the schools in the United States proved to be highly successful. The primary training aircraft, the Curtiss JN-4 Jenny, was among the best primary trainers in the world. By the end of the war, the quality of American instructors had improved dramatically, and the United States was essentially conducting all of its preliminary training at its stateside airfields.

By the time pursuit pilots emerged from the advanced phases of training, they were sufficiently prepared to go to the front. Combat hardened British, French, and American instructors played a large role in this success by providing the most vigorous and up-to-date training possible. The students successfully worked beyond the problems caused by sometimes inadequate training aircraft. By the time they reached the front, most pilots felt confident that the aerobatic, formation, aerial combat, and gunnery skills they had acquired would allow them to succeed in combat against the enemy.

In the end, the war results generally point to the overall success of the air service training programs. Although it could never be a substitute for actual experience, the training had given the pursuit pilots the key tools they needed to fight. By the end of the

war, the pursuit pilots had posted an excellent record throughout all of the campaigns. Without the air arm the United States put into battle, the war would undoubtedly might have lasted much longer. The Air Service had accomplished a great deal.

## *Glossary*

AEF	American Expeditionary Forces
AIC	Aviation Instruction Center
RMA	Reserve Military Aviator

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