

Curtiss R series served as both trainer and ASW aircraft in WW I. The R-6L shown above was used for torpedo launching.

somewhat surprised to find that Ellyson, not Curtiss, would be training him. The training field, said Towers, "was a little cow pasture where they kept the training planes and a few old wrecks in a sort of an old barn." The field was barely a quarter-mile long and ended in Lake Keuka. As small as the aircraft was, it was still too big for the little field. The aviators had to take off toward the lake when they could get a favorable wind, and do their flying over the water. Towers later recalled two occasions when the aircraft landed in the lake itself.

Ellyson began training Towers with the same format that Curtiss had used — ground runs. He whittled a small plug of wood and placed it under the throttle to act as a governor, so his student would not attain flight speed and leave the ground. Ellyson tested conditions before letting Towers get in the plane. He made a ground run to his own satisfaction and then turned the craft over to Towers, assuring him that he could run at full throttle with the governor and not leave

the ground. On his first run, a puff of wind caught Towers and he found himself flying the airplane 20 feet in the air without the slightest idea of how to fly or how to land. He crashed. The plane was wrecked and Towers broke an ankle. Neither the student nor the instructor had stopped to consider that Ellyson weighed 25 pounds more than Towers. The difference in poundage, along with the puff of wind, got them a wrecked aircraft and an injured student.

Aviation training was not confined to long to the Curtiss and Wright factories. In August 1911, those officers on duty at Hammondsport and Dayton received orders to report for duty at the Engineering Experiment Station at the Naval Academy "... in connection with the test of gasoline motors and other experimental work in the development of aviation, including instruction at the aviation school." The site of the aviation camp at the Academy was Greenbury Point.

The Greenbury Point station has not

come in for its fair measure of recognition in the history of Naval Aviation. It was a very small affair, and it shared its location with the Academy as its host. Nonetheless, its establishment was a landmark event. It was the Navy's first air station and it was at Greenbury Point that the Navy began to conduct its first formal aviation training program.

One of the most notable aspects of aviation at that time was how little anyone knew about it. In later years, the stories told by pioneer aviators revealed an almost comical ignorance. Bellinger recounted an event that occurred early in 1913 when the aviators were on their first exercises with the fleet. Aloft in his aircraft over Guantanamo Bay, Bellinger was testing his ability to track a submerged submarine in the clear waters below. The test went well and he tracked the sub successfully until he saw it heading directly into a large mass of submerged rock. At the point where he lost sight of the sub, he was certain it had met with misfortune until he saw it

surface. When he was back ashore, the captain of the vessel was surprised by Bellinger's story and explained that the rocks were considerably below the depth of his submarine. At that point, the Naval Aviators realized they had a lot to learn about visual depth perception from an airplane.

Everything the aviators did with the aircraft of those days seemed to fall into the category of training. The aircraft in use at the time were of both the landplane and seaplane type, all used as trainers. The early planes were the bamboo-tail type.

The first one the Navy bought was called the *Triad* by its builder Glenn Curtiss and was designated the A-1 by the Navy. The A-1 was a 28-foot-long biplane with an empty weight of 1,065 pounds. It had a wing span of 37 feet and was about nine feet high. It was powered by a Curtiss 75-horsepower, 8-cylinder engine with a 7-foot, 9-inch wooden propeller behind the pilot. The A-1 was a seaplane built on a single central float with a small float at each wing tip, and also had a tricycle wheel arrangement that could be used for land operations. The A-1 was equipped with partial dual controls. It had a bench seat to accommodate the pilot and passenger either of whom could control the aircraft. There was only one stick, in the form of a steering wheel, that could be shifted right to left to allow either person to use it to fly the plane. These early machines had no instruments and flew at 55 to 60 mph. The whole point of training was to teach the student how to get the plane into the air, keep it aloft and under control, and finally land it safely.

It was not until April 1913 that the Navy established truly formal performance standards for qualification as a flyer. Until then there had been no certificate issued by the Navy designating an officer as qualified to operate an airplane, so there was no need for standards. On April 10, 1913, the Secretary approved the standards and authorized issuing certification as a Naval Air Pilot to a successful candidate. But it was not until April 1914 that the Bureau of Navigation, which had cognizance over all Navy training, approved formal courses of instruction for student flyers and aviation mechanics.

Curtiss N-9 was an essential part of the training fleet in WW I. The Navy procured large numbers of this version of the famous Army "Jenny."

In January 1914 the Navy flyers found a permanent home. Greenbury Point was too small and the weather did not lend itself to aviation exercises the year round. The aviators had resumed some work at San Diego, but North Island was not yet Navy property. Available was the old, abandoned navy yard at Pensacola, Fla.

By this time, the Navy had accumulated three years of actual flight experience. The small group of flyers numbered mostly lieutenants, JGs and some ensigns. There was one lieutenant commander, Henry C. Mustin. As the ranking aviator, Mustin had the responsibility to turn the unused Pensacola Navy Yard into a functioning air station.

Pensacola immediately became the center for Naval Air activities. Training, experiments, test, evaluation and modification soon became commonplace activities. Because the aviators envisioned the integration of aircraft with fleet operations, it was necessary for them to develop some type of catapult to launch planes from the decks of ships. Their earliest work with powered catapults was conducted at Annapolis in 1912. By November 1915, a shipboard catapult had been developed to the point where Lt.Cdr. Mustin was launched in an AB-2 from the stern of *North Carolina* in Pensacola Bay.

The need for a catapult placed a requirement on naval flyers that Army and commercial pilots did not have. When the Bureau of Navigation issued its *Course of Instructions and Required Qualifications of Personnel for the Air Service of the Navy*, January 1916, it revealed the distinctive character of Naval Aviation. The syllabus included "Starts from Catapults" and "Landing in Deep Sea Waves." The same syllabus

listed 11 classifications for personnel assigned to aeronautic duty. An officer could be designated Student Naval Aviator; Naval Aviator; Navy Air Pilot, aeroplane; Navy Air Pilot, dirigible; Military Aviator. An enlisted member on the other hand could be Student Airman; Airman; Quartermaster, aeroplane; Quartermaster, dirigible; Machinist, aeronautic.

It is interesting to note that by the time this syllabus was issued, the Navy had already ordered its first dirigible. Designated the DN-1, this lighter-than-air vehicle was built by the Connecticut Aircraft Co. but it did not arrive at Pensacola until April 1917.

For the first three years of its existence, Naval Aviation was confined entirely to the Regular Navy. Early in 1914, however, the government acted to increase the efficiency of the National Naval Militia. Empowered by a new law that year, the Secretary of the Navy Josephus Daniels issued a general order establishing the Aeronautic Force of the Naval Militia. In this new division of the militia, officers were commissioned only for aviation duty. They received thorough training in Navy discipline and procedures, besides learning to fly. They also learned the principles of scouting operations. Enlisted members also served in the Aeronautic Force of the Naval Militia. Training of officers and men was conducted at the state militia level in the same manner as the rest of the Naval Militia.

The expense of these state aeronautic forces was borne by the states themselves and by private subscription. The Aero Club of America proved to be a valuable motive force in acquiring aircraft and money for use in developing this branch of naval aeronautics. New



York and Massachusetts were the first states to establish an Aeronautic Force in their Naval Militias, but by the time the United States entered WW I, 11 more states and the District of Columbia had followed the New York lead.

Besides the Naval Militias, there was also a Naval Reserve Flying Corps. The Naval Appropriation Act of fiscal year 1917, passed August 29, 1916, provided for the establishment of a Naval Reserve Force, to include a Reserve Flying Corps. The officers and men of the new flying reserve were to train at Pensacola. This approach taxed the Pensacola facilities because they were barely adequate to handle the small annual classes offered for the Regular Navy. A sizable number of students who came to Pensacola as reservists had little familiarity with basic Navy subjects and had to learn them. The aeronautics instructors found themselves having to go over material that was regularly taught to midshipmen at the Naval Academy. This situation posed an additional problem because in some cases candidates would finish basic indoctrination and begin flight training, only to learn that they were either physically or temperamentally not suited for aviation.

The number of students coming to Pensacola was large enough to establish a need for additional training aircraft and, in the fall of 1916, the Navy ordered a considerable number of N-9 aircraft from Curtiss, Boeing, Burgess, and Aeromarine. The R-6 was also ordered from Curtiss.

The naval aeronautical establishment entered WW I as a very small organization. In no way can it be said that Naval Aviation was ready to fight a war. There were 54 aircraft in the inventory. But the structure of the organization was surprisingly sound. A good curriculum had been established and there was a clear understanding of operations. There were not enough men, facilities or equipment to fight a war, but the foundation to build on was solid enough to take the strain.

The Navy moved to expand Pensacola's facilities and establish other stations as training sites, but it was impossible to expand fast enough to absorb the numbers of men entering the Navy. Some coastal militia stations were taken over for training; lighter-than-air training was established at the Goodyear plant at Akron, Ohio; and ground instruction was begun at the Massachusetts Institute of Technology.

Courses in military training at civilian universities had no true precedent in the United States, although they had become nearly a tradition in England. The choice by the Navy of MIT was a natural one because Naval Constructor Jerome Hunsaker had previously been on campus teaching at the Aeronautical Engineering School. In the summer of 1917, arrangements were made with MIT by which students would arrive on campus in groups of 50 every two weeks up to 200 students at a time. A two-month course of instruction would be provided by the faculty covering aircraft engines, theory of flight, general flying, gunnery, signalling and wireless, and general naval studies. The Navy would furnish one officer in a supervisory capacity to oversee the instruction, and command the students and a handful of enlisted men qualified to teach basic Navy subjects.

The Navy detailed Lieutenant Junior Grade Edward H. McKitterick to MIT, as officer in charge and to organize the program. Lt. McKitterick was a Naval Aviator on duty at Pensacola when assigned to the University. He arrived at Cambridge late in July 1917, where he found the facilities waiting as promised by the University but absolutely no organization, which was his job to provide. He had one advantage — MIT had already set up a similar program for the Army, so there was a precedent. McKitterick availed himself of everything to be had and soon got the program going.

The course of instruction was interesting enough to deserve some telling in detail. The program was at first organized in a 40-hour week: five hours for navigation, six for signalling, five for Navy regulations, six for seamanship, five for boat drill and calisthenics, five for drill, five for study, and three for examinations. As time passed there were, of course, changes. Courses were added and existing ones expanded. It eventually burgeoned to a total course time of 428 hours for eight weeks, which yielded 108 hours more than the 40-hour week provided. Finally, the program extended to 10 weeks, and the hours were expanded to a total of 440. A chronic complaint throughout the war was that Naval Aviation training, at all levels, attempted to do too much in the time allotted.

Also established at MIT was the Inspectors School, which trained men to inspect the quality of aviation material being accepted by the Navy from

manufacturers. An aerography school was set up to train students in the science of meteorology as it pertained to aviation, which was Naval Aviation's initial venture into this important aspect of aeronautics.

The training at MIT lasted throughout the war, and the final class graduated in January 1919. By that time, the MIT detachment had graduated 3,622 candidates.

MIT was not the only university to have an impact on Naval Aviation during the conflict. Some of the more colorful units in aviation training during WW I came from the universities. Yale, Harvard and Princeton organized groups of students to train in the Naval Reserve Flying Corps. The Navy's first university unit of reserve aviators came from Yale where the students had begun to organize an aviation unit prior to their country's entry into the conflict being waged in Europe.

In June 1916, F. Trubee Davison's Yale crew was training for its traditional race with Harvard. The decision by President Wilson to send troops to the southern border to counter a threat of war with Mexico turned Davison's attention from oars to aircraft. He contacted the Aero Club of America which had congressional blessing to organize an Aerial Coastal Patrol. As mentioned above, the Aero Club had close involvement with the Naval Militia's air division. Davison hoped to involve the Aero Club in a project to teach his Yale Group how to fly.

The Aero Club put him in touch with a wealthy Philadelphian, Rodman Wanamaker, who out of his own pocket furnished Davison with a Curtiss flying boat and an instructor named David McCulloch. It was McCulloch and the Curtiss flying boat that taught the Yale unit to fly, and it was the Aero Club of America that enrolled them as members of the Aerial Coastal Patrol. The unit trained at the submarine base at New London, Conn. In the spring of 1917, they were enrolled by the Navy in the Reserve, and qualified as Navy flyers at Huntington, Long Island.

The Yale unit — and those from Harvard and Princeton — demonstrated the extent of civilian interest in aviation and the conviction that aircraft could effectively serve the Navy. When war came, some members of the unit went overseas into command positions at shore facilities, while others saw action. David Ingalls, Yale Class of 1920, became the Navy's first ace.

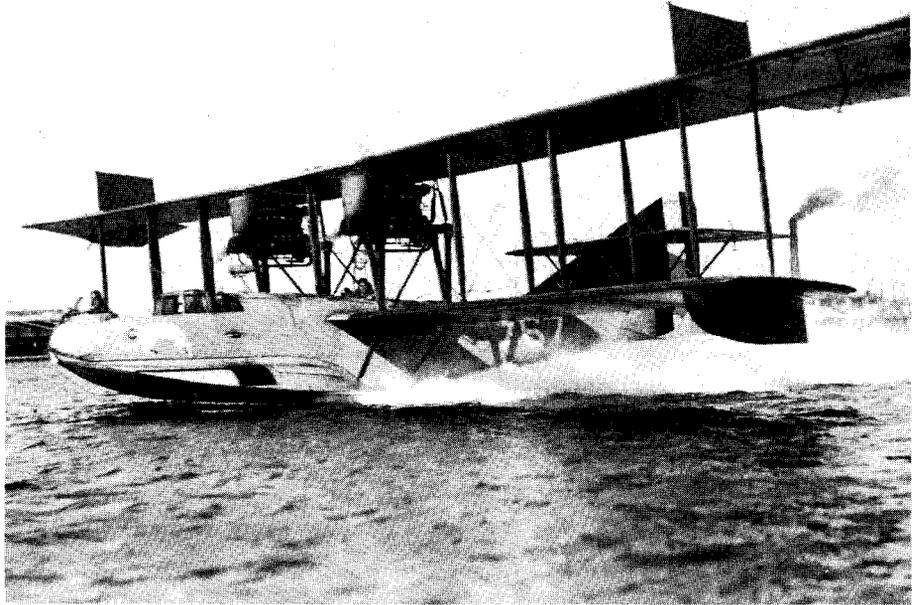
The actual structure of flight training remained virtually the same throughout the war. After ground school, the students entered elementary flight training. The elementary course was 10 weeks long. It was a continuation of ground school for the most part, of which flying was only a small portion. The first session involved 10 hours of dual flying and 20 hours solo. This was followed by stunting — which by then was recognized as good experience — in both dual and solo. Finally, there were five hours of dual and 10 hours of solo in the big flying boats. Elementary training was followed by three to four months of advanced training. The advanced course taught navigation, gunnery and bombing. All flyers earned their final qualification in the large flying boats.

The training aircraft were all seaplanes. The Curtiss F-boat, the H-12, the N-9, and the R series all saw heavy use as training machines. The H-12 was built at the Naval Aircraft Factory to a Curtiss' design and was used solely for training and patrol of United States coastal waters; it did not get overseas during WW I.

In England, an eight-week armament course was given at Uxbridge. A course at Rockhampton taught kite ballooning. Some Navy flyers trained at Bolsena, Italy, in the Macchi L-3, and M-5, and in the Caproni landplane. Training was also conducted at some bases in Ireland.

Because the Northern Bombing Group planned to operate at night, training for this type of flying was considered essential. Night instruction was offered in the United States, England and Italy. But this was not new to U.S. Naval Aviation; the early flyers had practiced night operations at Pensacola before the war.

The training of flyers for operation of lighter-than-air craft was conducted in elementary and advanced sessions. Elementary training was given at Akron, Ohio, at the Kite and Free Balloon School established by contract with the Goodyear Company. All students were trained in free ballooning and subsequently divided between kite ballooning and operation of dirigibles. All advanced training in dirigibles was conducted at Pensacola. The LTA students took the same courses in navigation, seamanship, motors, radio and photography as did the trainees in heavier-than-air flight. Advanced LTA work called for 20 flights totaling 15 hours with an instructor. There were no



Curtiss H-12 planing just before takeoff. The H-12s procured by the Navy were used for training and ASW over U.S. coastal waters.

solo flights possible in dirigible training or operations. These pilots took gunnery instruction in seaplanes but practiced bombing from their dirigibles.

The Navy aeronautics ground and flight schools throughout the United States were under Supervisor, Naval Reserve Flying Corps, Lt. John H. Towers, who had trained under Lt. Ellyson at the Curtiss factory in 1911. All training manuals were published by authority of the Bureau of Navigation. By the end of the war, about 3,000 aviators and ground officers had been trained and commissioned, while an additional 4,000 were in training when hostilities ceased. Technical training in aeronautics had been given to over 35,000 men.

At the end of the war, rapid demobilization greatly reduced the naval aeronautic establishment. There were also some important developments in administration. In August 1919, complete responsibility for the detail and training of personnel in aviation photography, aerography and navigation instruments was assigned to the Bureau of Navigation, but Naval Aviation itself remained a splintered affair. The Bureau of Steam Engineering had the responsibility for aircraft engines while Construction and Repair had cognizance over airframes. There was a Director of Naval Aviation in the Aviation Section of the Chief of Naval Operations' office.

This desperate arrangement was largely solved in 1921 with the establishment of the Bureau of Aeronautics. But the assignment of responsibility for training was far from

clearcut. The Bureau of Aeronautics had a training section in its Flight Division, but Navigation still exercised control over aviation training. Navigation was required to receive and consider the recommendations which Aeronautics submitted on all matters concerning training, but implementation of these recommendations was not required and certainly not always carried out. Many points of contention were inevitable.

Aeronautics, for example, might try to gain authorization to increase the number of men in aviation, but Navigation would oppose it because of a feeling that such action might upset the Navy's equilibrium. Aeronautics always maintained that because aviation was a specialty, aviators should not have to serve tours of sea duty in non-aviation status. Navigation opposed this position on the grounds that Navy flyers were naval officers and should have the same experience as all other naval officers. Aeronautics would prepare syllabi and training manuals but had to submit them to Navigation for approval. Aeronautics believed certain specialty schools were necessary; Navigation uniformly balked at approving them. Such was the situation in Naval Aviation training in the early 1920s. ■

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