NAVAL AVIATION IN WORLD WAR I

ISSUED BY THE OFFICE OF THE CHIEF OF NAVAL OPERATIONS
NAVAL AVIATION IN WORLD WAR I

BY ADRIAN O. VAN WYEN
Historian, Deputy Chief of Naval Operations (Air)

and the Editors of

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When the call to battle sounded in April 1917, the Navy air arm could muster at its one air station only 48 officers and 239 enlisted men with some experience in aviation, and 54 aircraft none of which was fit for patrol service. The problems of building this small force into an effective fighting unit were enormous. Yet, when the Armistice was signed 19 months later, there were 43 air stations in operation at home and abroad, an aircraft factory in production, and numerous schools, assembly plants, repair depots and other facilities providing the needed logistic support. Aviation personnel numbered over 39,000, a figure nearly equal to the total in the entire Navy at the start of the war.

Little had been published on the nature and extent of Naval air operations in the first World War until, in April 1967, Naval Aviation News began a series of monthly articles under the general title, "Naval Aviation in World War I." Using chronologies of significant events and narrative accounts of special phases of the war, this series told the story of how Naval Aviation met the challenge.

The series was conceived by and completed under the direction of the Assistant for Aviation History, Mr. A. O. Van Wyen, who also wrote many of the articles and arranged for the writing of others. While not a definitive history, it is the first published work to deal specifically with the accomplishments of Naval Aviation in the first World War. Based on official sources as well as the recollections of participants, it is authoritatively presented through an interesting combination of official and personal accounts.

It is also the history of a beginning made under stress of war — a beginning in which the men of Naval Aviation first demonstrated the potential of aviation as an arm of sea power and set the course for its future growth. The success with which they carried out their task is in large measure responsible for the position of aviation at the forefront of Naval power today.
HS-2 FLYING BOAT WITH DAVIS GUN IN BOW
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IN THE BEGINNING...

The declaration of war against Germany on April 6, 1917, found United States Naval Aviation unprepared for the task ahead. The strength—almost too optimistic a term—of Naval Aviation stood at 48 officers and 239 enlisted men with some aviation experience. 54 aircraft of training types, one free balloon, one kite balloon, one unsatisfactory dirigible and one air station. This was the nucleus around which an effective fighting force would be built.

Though it had been six years since the first aircraft had been acquired by the Navy and its first pilots trained, the Navy had nothing resembling a formally organized aviation force. Only the first faltering steps toward developing operational units had been taken.

Very naturally, the emphasis in the early years was on training. In April 1917, the training program was just recovering from the effects of a six-month hiatus that began in June 1916 when accidents underscored the unsatisfactory nature of the aircraft in use.

The effect of the $3½ million provided for aviation in the Naval Appropriations Act of August 29, 1916, had not been felt. The Naval Flying Corps, authorized by the same act, had not been established. Aircraft manufacturing was undergoing some measure of expansion as a result of orders from abroad, but not as a result of Navy orders. Although suitable sites for air bases along the East Coast had been selected, their establishment and construction were still in the planning stage.

Some advance had been made in flight training after the delivery of N-9's late in 1916 and the experiments conducted with shipboard catapults had borne some fruit. The USS North Carolina was equipped with gear necessary to carry and operate aircraft; the USS Huntington and the USS Seattle were being similarly equipped.

Outside the Navy, interest in aviation was widespread. Aviation elements existed in the Naval Militia and in the National Naval Volunteers and, without much practical Navy support, a start had been made in training men to fly the airplanes and mechanics to keep them flying. Student groups at universities, led by the unit formed at Yale, found the money to buy aircraft and hire instructors. Other young men not associated with the organized units were taking instruction on the chance of joining them.

Curtis and other enterprising manufacturers had set up schools not only to profit from the growing interest but also to stimulate its continued growth. Rear Admiral Robert E. Peary, an ardent advocate of aviation and one fully aware of the possibility of war, raised money by individual subscription to form the National Coastal Patrol Commission. Its first unit, Aerial Coastal Patrol No. 1, was composed mainly of men from the First Yale Unit. From these efforts, there were many fully or partially trained aviators when war came and many more who recognized the aviation potential.

The air station at Pensacola had opened in January 1914. Its flight
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THE FIRST
THREE MONTHS:
APRIL, MAY, JUNE, 1917

The small group of Navy and Marine Corps Aviators, whose enthusiasm and persistence had nurtured the early growth of aviation, was neither large enough nor well enough equipped to wage war. When the call came on 6 April 1917, only one air station was in operation, with 48 qualified pilots and student aviators and 239 enlisted men. The Navy had one airship and three balloons, and none of its 54 aircraft had been designed for the work that was now required.

The work of molding this force to meet the requirements of war began slowly and gathered momentum as it went. Its beginning, as marked by the events of the first three months, follows:

APRIL

O

MAY

Q

O
Pensacola.

On the rudder.

Curtiss Field at Newport News, Va., for flight in towers was given additional duties or orders to the Bureau red, white and blue vertical bands with blue forward, operation of lighter-than-air craft.

where it had been assembled. The pilot was R. H. placed on all naval aircraft. It was a red disc within by a resolution of the Council of National Defense, as of 20 major fields of material procurement.

Pondman of Goodyear.

Board of Aircraft. Commencing on 29 May, the design

Questions of aircraft production and procurement.

practical exercises especially adapted to mass production tech-

23—The initial production program to equip the

28—Enlisted men of the First Aeronautic Detach-

22—Change No. 11 to Navy Uniform Regulations

14—The establishment of coastal patrol stations in

17—Cdr. Noble E. Irwin was ordered to the M -

19—Seven student aviators comprising the Harvard

4—The construction of five prototype models of 8-

5—Pensacola reported on a test in which a Berthier

29—The Navy's first successful airship, the B-1, com-

12—Cdr. Noble E. Irwin was ordered to the M -

13—The development of a special provision for aviators. It pro-

30—The Navy's first successful airship, the B-1, com-

2 — The Navy's first successful airship, the B-1, com-

9 — The aircraft types were assigned briefly to cruisers, saw some service in flight training and were used in many
PILOTS WERE TRAINED IN FRENCH 'CAUDRON' BY FRENCH INSTRUCTORS

FIRST NAVAL AVIATION UNIT IN FRANCE

Of the many elements of the United States armed forces sent overseas immediately after the declaration of war, one of the first to get there was a detachment from Naval Aviation. This token aeronautical force, sent in response to a request from the French government to bolster morale, was made up of men only partially trained at Pensacola. Once their training was completed at French stations under French instructors, these men would make up the first cadres for United States air stations yet to be located and built. The story of these men is ably related by one of them.

E WERE really a split-up outfit that became attached to every man’s army and every man’s navy. One thing brought us together—mechanics, carpenters, college students, taxi drivers, farmers—we all wanted to fly. And soon—without much training—we did. We flew with the French, the British and the Italians. Some of us even flew with the United States Marines, but most of us never fired an American machine gun or dropped an American bomb, or even saw an American-made plane until we got back home.

There were only 122 of us, and we were probably the most oddly assorted outfit that ever sailed to France.

In early June, 1917, General Pershing was in England, still on the way to France, the First Division of the Army was still in America, the draft law was being implemented, and we, the First Aeronautic Detachment of the U.S. Navy, were landing in France.

We were the first fighting force from the United States to set foot on French soil after the declaration of war.

N APRIL 3, 1917, I enlisted in the United States Navy as a Landsman for Quartermaster (Aviation) after having served four years in the Illinois Naval Militia. I arrived the next day at NAS Pensacola for flight training. At that time, there was no cadet status for student aviators; in fact, there were no ground school or flight instruction provisions for such a large group. Only a few regular Naval Aviation officers were attached to the station at that time.

All of us were volunteers. We came from nearly every state in the Union and nearly every walk of life. We were utterly green and inexpressibly eager.

After about three weeks of drilling and some Navy indoctrination, where I found my Naval Militia experience a definite asset, volunteers were called for duty in a foreign country. Fifty Landsmen for Quartermaster and 50 Landsmen for Machinist Mate were selected. Quartermasters were to be trained
ONE AIRCRAFT ASSEMBLY CENTER WAS LOCATED IN HANGARS AT BREST
The instructor... gave you hell in French
while pointing to the English translation.

trouble, he will throw away his solos under these adverse conditions, genuity of American youth.

five hours of dual instruction, seaplane training. Our instructors, aviation maritime de Hourtin which is an indication of the in-
miles distant and return, a spot a small lake outside Bordeaux.

salad patch and an altitude test to stick on a small field we called the British flight school about 80 cross-country flight to Vendome, to tours, Hourtin and St. Raphael,

doors under the pine trees; our
table, boards placed on empty gas
wine. Our mess hall was the out-

V irg i l G r i f f i n , U S N . In a few days
able, so we pitched tents among F.B.A. (Franco-British Aviation) flying all types of French seaplanes

planes. It was much more difficult 15 minutes each, I soloed this lit-

My total flight time, including what I was than sent to

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\text{g e n u i t y  o f  A m e r i c a n  y o u t h .} & \\
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\text{w e  w e r e  t h a n  s e n t  t o} \end{align*} \]
Our designation was still that of Student Aviator after finishing three different French schools and qualifying in all types of French seaplanes, plus many months at Le Croisic flying convoy escort. It was not until I returned home that I became Naval Aviator No. 1832.

Lt. Corry was transferred to Brest and took command of that naval station. He had been my inspiration in the Navy and I was most anxious to serve under his command again. Therefore put in for duty at Brest, which was granted, and reported to that station in October 1918. Lt. Corry was relieved at Le Croisic by Lt. William Masek, USN.

A rest I saw my first American airplane. We had heard much, in glowing terms, about the Curtiss HS-1 seaplanes with the famous Liberty engine. These were arriving from the States. After all necessary equipment for submarine patrol, such as bombs, radio, alit lamp and battery, pigeons, machine guns, fire extinguishers and a full load of gas were loaded on the plane for a four-hour patrol, no body could get the plane off the water. In a short time, a modification was made on the plane by adding six feet to the wing span and this aircraft was designated the HS-2. It was still necessary to stall three strands of salmon cord on the right rudder bar to offset torque in order to fly this crate.

These planes were assembled at Brest and then delivered to our stations along the French coast. Planes were also being assembled for these stations at Pauillac, the main aviation supply base which had been established for the use of the U.S. Navy in France.

The French Naval Station
Many of the First Aeronautic Detachment on returning home were given the opportunity to continue with the Navy. Some became officers in the regular Navy; others made a career in civilian aviation. Harold Elliott became general manager of Eastern Air Lines, Paul Gillespie was managing director of the Roosevelt Flying School on Long Island. Later, he was with the Civil Aeronautics Administration and, during WW II, he was a captain in the Navy in command of NAS New Orleans. Pete Parker for many years was chief pilot for Eastern Airlines. Franklin Young spent many years as pilot-captain for Trans World Airlines. Duke Jernigan was head of the aviation department for Texaco, Inc., and was the first man to tow a glider across the United States. Eddie Nirmaier flew for a radio corporation for years. Charley Boylan operated an air service in New Orleans and was killed in a crash.

I have no idea what happened to many of the others not mentioned, but if any of them are still around and kicking, I hope they keep her nose down and fly straight. They were a great gang.
Although there was logic and order apparent in initial actions, neither the aeronautical training plans, nor their implementation, could keep pace with requirements. In 1917, the greatest need was to find some way of assimilating the volunteers who, paradoxically, while making expansion possible, by their very numbers also made it difficult. With more men on board than could be accommodated within the existing structure and others coming in faster than facilities could be provided, it was all too clear that something had to be done—and quickly. And that is the way it was done.

On July 23, 1917, 50 men, with beds and bedding, arrived in Cambridge on the campus of the Massachusetts Institute of Technology from the First Naval District headquarters in Boston. They were met by Ltjg. Edward H. McKitterick. These 50 men were the first increment of over 4,000 who would receive their introduction to the naval service at that school and go from there to carry out their duties in assignments at home and abroad. Many would go to flight training and become Naval Aviators, some would perform ground duties, but not one would forget his days at Tech and the men who set him on a proper course.

So far as the record is concerned, the idea of using the facilities of established civilian educational institutes for the initial stages of military training seems to have sprung full grown out of nowhere. Actually, the experience of the British, who had already been at war three years, established the precedent and appears to have planted the seed. An example of their program on this continent was the Royal Flying Corps School at Toronto.

The problem of training was discussed at a meeting of the National Advisory Committee for Aeronautics (NACA) in Washington on April 23, 1917. This discussion led directly, less than three weeks later, to the establishment of Army courses at six scientific schools across the country. Also involved was the Aircraft Production Board, the chairman of which informed the Secretary of the Navy of the

PIONEER TASK of organizing the school at MIT fell on Ltjg. Edward H. McKitterick.
FIRST NAVAL AVIATION DETACHMENT, FLIGHT A, AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY, 1917
M I T

18 prosse, new subjects were impending officer to the Royal Fyrs first six classes. In October 1917, as those taken earlier and by reducing conditioning - the hours assigned and a greater emphasis on physical nals and rigging. This expansion, a result of a brief visit by the com doubled - combined to bring over the earlier 40-hour week. Weeks to 428, a load considerably exceeded the 40-hour per ease by extending the course from to total hours of instruction for eight reduced to eight weeks and adding 12.

As the curriculum became stable, assignments to certain subjects again be tributed of scheduled hours, the contributors of the Institute. The de par t ment, made up of all academic board, and three de part ment of the president appointed by the Pres ident of the Tribu tio n of satisfactory progress. The com mentary was possible and on June 24, served which continued until January. In October 1917, a special adjustment throughout the pro gram rested wholly with the Tribu tio n of the Institute. The d e par t ment heads, passed up on the qual i ty of the train ing was also assigned a class of majors, consisting of the president of all student making un dergraduate, (e) Aeronautics, consisting of the president of Naval Avia-
LCDR. R. W. Cabaniss was the second officer in charge, serving for some seven months.
FLIGHT SONG

Flight “A”, Flight “A”, here at the Institute,
Studying aeronautics under Mac, our corking Lieut.,
And when we get to the Kiel Canal
We’ll do the job up neat-
Oh, Hans, oh Fritz, there’ll be no German Fleet.

-Ensign Donald McClellan, U.S.N.R.F.
who died in an airplane accident at
Brest, France, early in 1918.
The great aircraft force which was ultimately assembled in Europe had its beginnings with a small group of undergraduates.

By Captain Paul Jayson, USNR

THE FIRST YALE UNIT

The Yale Unit flyers of World War I were the first unit of reserve pilots in the Navy. In that conflict, they served with distinction. The man most responsible for the formation of the unit was F. Trubee Davison whose patriotism and can-do spirit put the Yale outfit into commission.

In 1966 the U.S. Navy paid its respects to Mr. Davison while celebrating the 50th Anniversary of the Naval Air Reserve. Vice Admiral Paul Ramsey, USN, then serving as Deputy Chief of Naval Operations (Air), presented him with a set of Navy wings and designation as an honorary Naval Aviator. For Mr. Davison, retired since 1951 after 18 years as president of the Museum of Natural History in New York, the wings became part of his Locust Valley, Long Island, memorabilia along with five college diplomas, Army and Navy commissioning papers, a citation for the Navy Cross and his Yale “Y” letter for crew.

It was his crew membership in June 1916 that started Davison, then a sophomore, on the road to organizing the men who were to be the first re-
THE FIRST YALE UNIT

INSPECTION of the first Yale Unit is conducted by Tuthill Davison at its training station, Huntington Beach, Long Island, New York. At right, the unit's Curtiss R-type, one of several seaplanes acquired by the group, is hauled up the facility's beaching ramp.

FIRST Yale Unit members hoist a 200-hp Curtiss V-2 engine. The group was later split up, some pilots becoming instructors at various stations, others going into combat. The Huntington experience provided good training for wartime activities.
been impossible to accomplish what fleet of battle ships, destroyers and coastal patrol boats.

we did that summer, "Davis says. Yale unit formed at Locus Valley that Aerial Coastal Patrol, too, took part in still civilians but serving as members of facilitate instruction, it would have summer's end, four students had fl
who later served the Navy as copilot of desire to labor in any way that could and enthusiasm of the pupils and their sea plane flight. Thus equipped the came one instructor, David McCulloch, over the airplane to keep it flying. At the NC-3 on the famous trans-Atlantic time and energy to that end."

Davis points out that use of Durinng the early fall, the students, student pilots worked on engines, and the rest were ready for solo. Curtis flying boat. With the airplane at Port Washington, Long Island.

turned to Rodman Wanamaker, the New York and Philadelphia merchant, Davis obliged by offering one "If it had not been for the interest of David IngaIs, '20; Robert Ireland, '18; Brush, '17; Reginald Coombe, '18; Charles Beach, '18; Graham pearced inevitable. They included Yale

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\begin{quote}
 n describing our sub-chasers, I have already paid tribute to the
 splendid qualities of reserve officers; and our indebtedness to this
 type of citizen was equally great in the aviation service. I can pay no
 finer tribute to American youth than to say that the great aircraft
 force which was ultimately assembled in Europe had its beginnings
 in a small group of undergraduates at Yale University. In recom-
mending Mr. Trubee Davison for a Distinguished Service Medal, the
 commander of our aviation forces wrote: "This officer was responsi-
 ble for the organization for the first Yale aviation unit of twenty-nine
 aviators who were later enrolled in the Naval Reserve Flying Corps.
 This group of aviators formed the nucleus of the first Naval Reserve
 Flying Corps, and, in fact, may be considered as the nucleus from
 which the U.S. Aviation Forces, Foreign Service, later grew."

 This group of college boys acted entirely on their own initiative.
 While the United States was still at peace, encouraged only by their
 own parents and a few friends, they took up the study of aviation.
 It was their conviction that the United States would certainly get
\end{quote}
into the war, and they selected this branch as the one in which they could render greatest service to their country. These young men worked all through the summer of 1916 at Port Washington, Long Island, learning how to fly; at this time they were an entirely unofficial body, paying their own expenses. Ultimately the unit comprised about twenty men; they kept constantly at work, even after college opened up in the fall of 1916, and when war broke out they were prepared — for they had actually learned to fly. When the submarine scares disturbed the Atlantic seaboard in the early months of the war, these Yale undergraduates were sent by the department scouting over Long Island Sound and other places looking for the imaginary Germans.

In February 1917, Secretary Daniels recognized their work by making Davison a member of the Committee on Aeronautics; in March practically every member of the unit was enrolled in the aviation service; and their names appear among the first one hundred aviators enrolled in the Navy — a list that ultimately included several thousand. So proficient had these undergraduates become that they were used as a nucleus to train our aircraft forces; they were impressed as instructors at Buffalo, Bayshore, Hampton Roads, the Massachusetts Institute of Technology, Key West and Morehead. They began to go abroad in the summer of 1917, and they were employed as instructors in schools in France and England. These young men not only rendered great material service, but they manifested an enthusiasm, an earnestness, and a tireless vigilance which exerted a wonderful influence in strengthening the morale of the whole aviation department. "I knew that whenever we had a member of that Yale unit," says Lieutenant-Commander Edwards, who was aide for aviation at the London headquarters in the latter part of the war, "everything was all right. Whenever the French and English asked us to send a couple of our crack men to reinforce a squadron, I would say, 'Let's get some of the Yale gang.' We never made a mistake when we did this."

—The Victory at Sea by Rear Admiral William S. Sims
Trained by the Royal Flying Corps

An Intelligence mission* could hardly have departed with less fanfare. Only the gold braid on the naval officers’ caps was conspicuous, although the naval khaki uniforms looked a bit like Theodore Roosevelt’s “Rough Riders.” They came through Boston’s old North Station singly and in groups of two or three and disappeared into the semi-darkness of the train shed outside.

Mostly strangers to each other, the 24 men found their billets in the last car of the Montreal Express. So began the mission of the group that later came to be known in United States

* Under the title of “A Mission to the Royal Flying Corps,” J. Sterling Halstead, Naval Aviator No. 160, wrote for the U.S. Naval Institute Proceedings, February, 1915, pp. 78-94, a detailed account of the training in 1917 of young candidates for Naval Aviation Wings. This article describing training in Canada is a précis of that account. The pictures are taken from the collection of Harold F. Gibson, Naval Aviator No. 156.

By J. Sterling Halstead
Naval Aviator No. 160

Naval Aviation as the “Canadians.”

We had expected to go to NAS SQUANTUM, Mass., but instead we had been ordered to active duty with the Royal Flying Corps at Toronto.

The detachment was made up of 11 Princetonians: Gavin Breckenridge, William F. Clarkson, James V. Forrestal, Harold F. Gibson, Harry B. Gordon, Robert Matter, Richard H. McCann, William F. Mudge, Edward L. Shea, William J. Warburton and Frank A. Zunino. The two ensigns in command, Frederick S. Allen and Francis I. Amory, were from Harvard as were Duval R. Goldthwaite, Paul S. McCoId and Duncan H. Read. I was a 1916 graduate of Yale and had entered Harvard Law School. Philip B. Frothingham was from Dartmouth and Stuart M. Butler, Thomas H. Chapman, Arthur H. Wright, Retig A. Griswold, Henry Swift and Robert D. Randolph had college affiliations which I do not recall.

The first time we assembled at the University of Toronto parade ground for drill, the Commandant of the Ground School greeted us and asked whether we had among us anyone who could instruct us in drill. Our replies being negative, Sgt. Sedgwick, a typical Rudyard Kipling soldier from the Coldstream Guards, was appointed our drill master.

We were told to take notes on everything so that we could bring back to the U.S. Navy complete information on the subjects taught, the equipment and the methods used. The first day, however, all we took back to our barracks were very sore feet and very tired muscles.

After two weeks of putting in long hours on the parade ground—four to six hours a day—we were all in wonderful shape. We finished our training with a lasting affection for Sgt. Sedgwick.
...gunnery, bombing, aerial photography, meteorology, now well-known system of reporting turrets and classes crowded our days. We reached the advanced flying school and the workings of the various types to live with the guns, to break down and direct artillery fire by 'wire-air.' In the ground school, the cadets each shot 'struck,' was reported by lights on the map below simulated the fit for sending key. A system of they were subject. We came to understand for the pilot hung high above and seated for the pilot hung high above and structured from specimen of wings from assembled various types of airplane. Our lectures covered the design, making, patching, and then painting with. The classes in bombing, aerial reconnaissance, contact patrol and map presented in lectures. We learned why trolled, plus a glossary of new terms. Many of them RFC cadets as well as selves. The prime mover in obtaining uniforms was to convince us that we were badly soldiers and the name stuck to us until several of us tried to have our own winter naval uniforms. We decided to do making to about our own winter naval maker Clan. Prince of Princeton, a member of the Wan...

...een Ontario at Deseronto, about 40 miles from Kingston.

...operations. Some of the Canadian officers...
Clarkie unscrewed, looking for all Clarkie alive.

apparently both of them were good died out quickly beyond the trees. At came "Hungry Liz" and stepped 28 the road. None of us expected to see this point the black ambulance which was drooping and the motor was missing in cross wind) because one wing

ished the undercarriage of another, and knew could happen but they never did. Dolph after his flight, "I sat up there showing the speed of the motor. We "feel" as we had no instruments excessively difficult to make landings. He

tached the pilot to land (though he was com-
spoiled a third, fortunately without luck because I soloed without mishap.

Getting him down without upsetting the aeroplane on top of him, however, was a precarious job.

Again Clarkie came in, executing the

On the first solo flight, our cadets

of 45 minutes compared with the ten

of 151

resent the wind, without warning, my engine,

when, without warning, my engine,

and darkness crowded in. I was seven-

but the sky was still light.

JN 4B' coming on at camp and in Deseronto, north, and headed for camp.

east along the lake for a while, then

and wood as it struck, leaving the pilot un-

but the hazard most constantly present in

for two days. A Canadian cadet took

of 45 minutes compared with the ten

of 151

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but the sky was still light.
mounted Lewis guns was given to pilot was sent by wireless in the now miles from camp and reporting the had a ground support device consisting regard as a suicide profession. Two pilots would often put themselves into passengers along with cadets being pilot riding in the training aircraft as bombing pilot sent down a "wireless" well known "clock code." As the by an enlisted man. The report by the reflection of the airplane whether observation and aerial gunnery.

Burgesse seaplane into San Diego Bay. The spring of 1918 as I spun a Navy neutral. I recalled this argument in rudder and aileron, which did not agree remedy given us for a spin was reverse either were apt to do the wrong thing. I stalled as it approached that height, portunity, he was apt to hunt for a tude test, 8,000 feet. The hazard of the latter was that the JN4 sometimes proximating an appearance in a circus spot to try such a landing. It was our Flight Commander. Whenever a cadet was in the air and had the oportunity to make landings in a 50-foot circle, to get towed by another airplane, was a clear chance for a burst of fire at the gunnery plane. The cadet fired from a sleeve target without the tow plane angle and sufficiently ahead to give a score a hit.

Some daily flying was devoted to

inching the motor at a stated altitude,
to making landings in a 50-foot circle,
829 trained pigeons flew 10,995 missions with Navy pilots, but carried only 230 messages from the planes – 219 successfully, with 11 messengers missing in action.
Gimbal-mounted orientators could provide the novice with sensations of flight variously described as "sailing, dipping, zooming and looping the loop." Photos show fledgings being whirled about in all directions in the specially designed frames.
In the second three months of WW I, the expansion program got underway. Although there was some evidence that those directing the expansion were profiting by the experience of our Allies across the ocean, their initial moves were both bold and imaginative in comparison with what had been done in aviation prior to our entry in the war. It was too early to see the results of their work or, in fact, how great the expansion would be, but the foundation laid in these months proved solid and sound for the growth that was to come.

JULY

4—The first eight-cylinder Liberty motor arrived in Washington, D. C., for test by the Bureau of Standards. It had been assembled at the Packard Motor Car Company from parts made by manufacturers in plants scattered from Philadelphia, Pa., to Berkeley, Calif. Design, manufacture, and assembly of this motor had taken less than six weeks.

9—Twenty-four potential Naval aviators, with Ens. Frederick S. Illen as officer-in-charge, reported at the University of Toronto to start flight training under the Canadian Royal Flying Corps. Many of the group were from the Princeton Unit which had been in training at East Greenwich, R. I., while awaiting call to active duty.

23—The ground-school at the Massachusetts Institute of Technology went into operation with the arrival of the first commanding officer, Lt. Edward H. McKittrick, and a group of 50 men comprising the first class (see N NEWS, August 1967, pages 24-27). In this and in supplementary programs later established at the University of Washington in Seattle and at Dunwoody Institute in Minneapolis, large numbers of prospective aviators and ground officers were indoctrinated into the service and introduced to the fundamentals of aviation.

24—A large obstacle to the effective expansion of aircraft production was removed by the formation of the Manufacturers Aircraft Association to handle the business of cross-licensing patents between all aircraft manufacturers in the United States.

26—The navy-Navyanship Board considered a proposal by the Bureau of Mines that the experimental production of helium be undertaken and, in its approval, recommended the allotment of $100,000 to construct a small plant for the purpose. This action, subsequently approved by both Departments, was the beginning of the helium production program in the United States.

27—The Act of Congress authorized the President to take possession of North Island so that the Navy and Navy could establish permanent aviation stations and schools. The arrival of Lt. Earle W. Spencer on 8 November 1917, under orders to establish and command a station for the purpose of training pilots and mechanics and maintaining coastal patrol, marked the beginning of the present Naval Station, North Island.

27—Construction of a Naval aircraft Factory at the Philadelphia Navy Yard was authorized for purposes of constructing aircraft, undertaking aeronautical development, and providing aircraft construction cost data.
Factory at the Philadelphia Navy Yard.

France, the first of several plans dealing with an over-

of serious Navy interest in launching torpedoes from air-

air units were operating at the close of the war.

establish one training and three coastal patrol stations in

States [Liberty] Motor 'gives good promise of success, and if

expanded to include lighter-than-air operations.

nearly striking the plane. This test marked the beginning

sea plane. It struck the water at a bad angle and ricocheted,

in France, England, Ireland and Italy from which naval

cessively expanded and it ultimately provided 27 locations

air plane needed in war and directed his staff to make fur-

Atlantic to avoid difficulties of delivery, etc.

we can push ahead on the airplane end, it seems to me that

Radio Station, New Orleans, over 140 miles away.

sea plane construction program. This program was su-

eralinary to being ordered into mass production.

In August 1917, NAS M

an ideal solution would be big flying boats,

from the air. The idea solution would be big flying boats,

antificially to being ordered into mass production.

billion to be in operation by 1

bers were to have, in addition, facilities for oper-

pilots, were subsequently assigned Naval Aviator num-

bers and requested their designation as Naval Aviators (di-

kite balloon from USS

up on deck. For this act of heroism, McGunigal was later

onship, as well as on the deck. He was later awarded the Medal of Honor.

Bellingham commanding.

Five of them were to have, in addition, facilities for oper-

11 students, including himself, as lighter-than-air pilots,
Aircraft, bases and men were the three keys to success in the wartime expansion of Naval Aviation. Base construction, which began within a month of the declaration of war, would soon provide a network of stations to support operations on both sides of the Atlantic. Provisions for training large numbers of officers and men had been made and would shortly produce the much needed qualified personnel. Only the aircraft procurement problem remained. The prospect that needs would quickly outstrip the existing manufacturing potential made the situation urgent.

By Izetta Winter Robb

THE NAVY BUILDS AN AIRCRAFT FACTORY
THE H-16 FLYING BOAT WAS THE FIRST AIRCRAFT NAVY PRODUCED AT PHILADELPHIA
Commander F. G. Coburn, therefore authorized whose direction this plant was required an upward revision of schedule called for delivery of a facturing plant. An enormous exceeding not only the number on order of the H-16 or similar type by January 1919. The total requirement exceeded $500,000 was needed to cover the cost over $4,000,000.

By December 1917, expansion of the original plant was in full development. It was estimated that $3,250,000 was spent on equipment, buildings, and improvements. In addition to the $50,000,000 needed for new buildings, an enormous increase in production, the new ones were very large as to total investment of a little more than $1,000,000.

By the end of World War I, over 1,500 employees were working at the plant. Almost every machine was under the trusses. A 100-foot bay was equipped with a two-and-a-half-ton small crane. Each of the side bays was equipped with two ten-ton, three-crane assembly plans. Because there were some 7,000 others employed in the factory or organization which main-
In June 1918, production had reached the point of one aircraft a day. On July 7, the last of the original order of 50 H-16 flying boats was completed. The average cost of the last 20, including overhead, was less than half the average of the cost of the first ten.

The total output of the Naval Aircraft Factory to December 31, 1918, included 183 twin-engine patrol flying boats, with 50 sets of spare parts. Of the 183, the last 33 were F-5-L's. To appreciate fully the magnitude of the job accomplished, one must remember that the Navy was only six years away from its purchase of its first aircraft, the A-1, and all the main advances in manufacture in quantity were still in the future. To start from scratch as the Naval Aircraft Factory did and require at the same time to turn an inexperienced group of people into a force of skilled workers might well have turned into a shambles of an obstacle race gone wrong. But it did not, and the record shows that the Navy planners and designers did a magnificent job in record time.

In addition to the production figures cited, the factory also began an aircraft repair program in December 1917 and built its first experimental plane in 1918, the Navy-designed N-1 Davis Gun Carrier. Two of these were built during the war. From the receipt of the plans and specifications on January 24, 1918, it required all of four months to complete the first on May 22. When this plane met with an unfortunate accident before taking to the air, a second was ready for flight on July 25 and two days later made its first (of many) in-flight test of the Davis gun.

And then the Armistice! The NAF log for that day bears quoting: "Monday — clear: (a) Employees paraded around factory in celebration of Germany's defeat. (b) Manager Coburn spoke to all hands in front of New Office Building. (c) Factory closed down at 11:30 A.M."

Not a day was lost in cutting back, for an entry for November 12 includes this item: "Contracts for all sub-contractor tractors were cancelled, all boats prior to 6th operation will not be completed." By the summer of 1919, the Naval Aircraft Factory had reduced its force to approximately 1,400 men. But the factory went on. Over the years, reorganization drew off its functions and redesign gave it new titles, but neither could take away the record of its accomplishment as a Naval Aircraft Factory. No longer having an entity of its own but existing as a number of subordinate commands of the Naval Engineering Center, the record it set as a factory in producing twin-engine flying boats during WWI will stand as one of the great accomplishments of the war and a challenge to all its progeny.
On May 29, 1917, the Navy made a contract with the Goodyear Tire & Rubber Company of Akron, Ohio, to train 20 men in free ballooning and in the operation of kite balloons and dirigibles. Negotiations for this training began before the declaration of war. Goodyear had already started construction of a training field and, when the contract was signed, was ready to receive the students. The story of the first men to be trained there is told by one of them, Naval Aviator No. 101.

First Lighter-Than-
LOOKING SOUTH from the landing field at Akron (left); above, the French dirigible "Capitaine Caussin," a sight well known to Akron men reporting for duty in France.

A TRANSFER at sea off NAS Key West, Fla., where some of the Akron students reported for duty after completing their training.
First Lighter-Than-Air Class at Akron

AT PENSACOLA. April 1920, ground handling crew holds the C-7, later to become the first airship inflated with helium. The C ships arrived too late for extensive use in the war.
We began with kite balloons which much of which was practical work, in spite of my previous experience in it. It carried two students who would on the ground. Three flights were there by a cable to a winch. Lift-off was uneventful. We sailed the sensation of being in the air but sand feet, primarily to accustom us to instruments. But the wind and air currents and can be controlled to free balloons. These ride the general direction of desired travel. The air and wind current and can be controlled to free balloons. These ride the altitude to meet air moving in the turn to base in a pickup truck.

One of my darkest moments occurred about one hour each. On the later, these flight that was the student supervised inflation, doing three types of lighter-than-air craft. Maxfield was the skipper and there Williams, Talbot, Little, Brewer, Hamlen, Strader, Crompton (of year), Maxfield (C.O.) and Coil. The mascot is Maxfield's Lanny.
First Lighter Than Air Class at Akron

measure pads, switches and phones would look. Visions of khakis, greens and dress blues, leather puttees, made, complete with tapes, chalk, proper action. Within the week, to graphs gallore — to show how we and I could now be sworn in. After orders involving actual flying of naval and straighter.


Eventually these experiments were done. As particularly true.

On June 22nd, Lt. Maxfield issued raining went along schedule.

With preliminary ground school.

As July, however, after a distinguished looking, middle going on, however — we were flying close to blimps about the middle of balloons the next week and then progressed to balloons on June 16, moved to free August. We accomplished something carefully carrying a glass tube or bottle aged gentleman arrived on the station, like crazy. This realize it. We knew what was development.

Eventually these experiments were done. As particularly true.

...
FREE BALLOON
AFTER SIX MONTHS OF WAR

The program was beginning to roll. Units were being organized, stations were going into operation, war patrols were being flown and the number of qualified aviators was about to be quadrupled. Much remained to be done but actions taken early in the war were producing tangible evidence of steady progress toward expansion.

OCTOBER 1917

NOVEMBER 1917
L e C r o i s i c u p o n c o m m i s s i o n i n g , b a c k : C .  W h e a t l e y ( M C ) ,  P a y m a s t e r f o r a u t o m a t i c o p e r a t i o n a s f l y i n g b o m b s t h a t w e r e c l o s e l y m i l e s a n d t o p s p e e d o f 90 m i l e s p e r h o u r .  I n a d d i t i o n t o f l y i n g b o m b w a s d e s i g n e d f o r a u t o m a t i c o p e r a t i o n , c a r r y t h i s s p e c i a l l y d e s i g n e d a i r c r a f t , N ’ s w e r e a l s o c o n v e r t e r e l a t e d t o t h e g u i d e d m i s s i l e o f t o d a y . W W I a i r c r a f t p r o d u c t i o n p r o g r a m w a s t a k e n w h e n t h e f o r a e r o n a u t i c a l u s e .

General G e o r g e O . S q u i e r , U S A , l e d t h e A r m y t o e s t a b l i s h t i s s C o m p a n y , w a s d e l i v e r e d f o r t e s t t o t h e S p e r r y F l y i n g t h e s C o m p a n y , w a s d e l i v e r e d f o r t e s t t o t h e S p e r r y F l y i n g r e s c u e d b y a F r e n c h d e s t r o y e r a n d m i n u t e s a f t e r b e i n g t a k e n s t r u c t o r J . C . H u n s a k e r a m e m b e r , w a s e s t a b l i s h e d w i t h i n a r m s e a p l a n e b a s e s . "

W e x p l o s i v e c h a r g e l a r g e e n o u g h t o s e r i o u s l y d a m a g e a m o d e r n development i n W W I a n d c o n t i n u e d a s a n i m p o r t a n t f a c t o r i n p o s t w a r y e a r s .

A i r c r a f t c a r r y a l o a d o f n o t m o r e t h a n 600 p o u n d s e x p l o s i v e s a t a s p e c i f i e d r a n g e o f 50 a n d 27 — N A S L E C R O I S I C , F r a n c e , w a s c o m m i s s i o n e d w i t h 10— A N a v y " f l y i n g b o m b , " m a n u f a c t u r e d b y t h e C u r t i s s 27 — N A S L E C R O I S I C , F r a n c e , w a s c o m m i s s i o n e d w i t h 10— A N a v y " f l y i n g b o m b , " m a n u f a c t u r e d b y t h e C u r t i s s
WE ARE NOT positive of our location but are going to sea. Send help. If you should not find us, say we died game to the end."

Such was the message Ens. Kenneth R. Smith sent by carrier pigeon from his seaplane drifting somewhere in the Bay of Biscay on 23 November 1917. With water rising rapidly and the prospects of rescue all but abandoned, the young Naval Aviator and his two crewmen faced the end.

It was Naval Aviation's first air-plane to crash land while on a combat patrol in Europe in WW I. The communication and air/sea rescue techniques were a far cry from the effective speed of such operations today.

Base of the crashed seaplane was a little fishing village of about 3000 inhabitants 18 miles from St. Nazaire, called Le Croisic. The United States had established there on the French coast its first Naval Air Station overseas as a part of WW I operations.

In The History of the Yale Unit, it is pointed out that young Smith and fellow members of the unit, which had become part of Naval Aviation, were sent to Le Croisic in order that the American forces might "help to drive German submarines farther away from the coast and to protect the immense amount of transport traffic in and out of Saint-Nazaire . . . ."

"The air station was situated on a tiny island separated from the main street of the village by a moat or canal. A rugged indentation of the coast formed a little sheltered harbor which was favorable for seaplanes at high water. An eighteen-foot rise and fall of tide, however, made it necessary to lower machines by means of a crane when the bay was mostly sand and mud."

The building of this station on the Bay of Biscay commenced on 26 July 1917 when 19 German prisoners started to level the ground on which were later erected hangars and barracks.

By 29 October, three ensigns, 13 enlisted men (two of whom were pilots), and 11 observers arrived, some from the United States and others from the French flying schools at Tours and St. Raphael.

Though the first flight from Le Croisic was made 13 November 1917, it was not until five days later that the first patrol flight was made and operations officially started. From that date, weather permitting, patrol and convoy flights were made regularly with six French seaplanes of the Tellier type. Communication facilities were inadequate, and since the time and position of passing convoys were uncertain and there were no adjoining air stations to cooperate in escorting convoys along the coast, long flights were necessary.

A contemporary record gives this schedule: "At the commencement of patrol and convoy flights, an 'Alert Section' consisting of one fourth of the total handling crews, two observers and two pilots, was put on watch. They stood watch from daylight to darkness, always holding two planes in readiness with bombs attached, all instruments and equipment either in the planes or close at hand, so that it was but a matter of five minutes to lower the planes and get off the water in case a submarine warning was received."

On 20 November when two German mines were reported off Les Grandes Cardinaux, two seaplanes were sent out and the district was patrolled, but the mines were not discovered. On 22 November submarines were sighted south of Belle Isle and a seaplane was sent out on patrol, piloted by Ens. Kenneth R. Smith with Homer N. Wilkinson, Electrical Mechanic, and T.J. Brady, MM2C.

The Tellier, which carried only enough fuel for a four-hour flight, failed to return. The search was begun, but even with some idea of where the aircraft might be, it could not be found.

Meanwhile, on the Tellier as the hours passed, so did hope. Thinking they faced death, Ens. Smith wrote an account of what had happened. The very use of the past tense reflected his sense of finality. His notes are now part of Naval History.

Thursday, Nov. 22, 1917

Weather conditions were not ideal for flying, clouds being very low and quite a sea running.

After leaving Le Croisic, we started south steering course 195. On reaching Ile d'Yeu, we found our drift to be considerably to the East. After picking up Point Breton on Ile d'Yeu, we sighted a four-masted bark, in ballast with auxiliary engine, to the N.E. We circled over her a number of times, increasing our radius on each turn until we were nearly out of sight of Ile d'Yeu. We then left the bark and headed for Ile d'Yeu. After searching the shore for mines and submarines, we returned to Pt. Breton. From Pt. Breton we steered course 29 for 45 minutes. We then headed due East for 30 minutes at altitude 50 meters. Motor died and we were forced to make a tail-to-wind landing. We found it possible to land the Tellier in rough water. Dispatched at 2:30 P.M. pigeon with following message:

'Left Ile d'Yeu at 1:10 P.M., headed 29 for 45 minutes. Then direct East 30 min. had to come down, big sea running. Send all aid...'

Could not tell for certain our location. We
SPIRIT OF CAMARADERIE BETWEEN LE CROISIC AND NAVAL AIR STATION WAS MEMORABLE. U. S. NAVY SEAPLANE FLOATS OFF SHORE
NAVAL AIRCRAFT OF WORLD WAR I

HS-IL PHOTOGRAPHED IN JULY 1919 WAS BUILT BY CURTISS
a portfolio

HS-2, similar to HS-1, had 25 percent more wing area.

Curtiss N-9 was Navy version of famed ‘Jenny’.
H-16, SHOWN WITH POSTWAR MARKINGS, WAS THE FIRST AIRCRAFT BUILT AT THE NAVAL AIRCRAFT FACTORY
THE F-BOAT, ANOTHER CURTISS DESIGN, WAS PRIMARILY A TRAINING CRAFT

U.S. NAVY VERSIONS OF H-12 WERE USED FOR TRAINING AND DID NOT GET OVERSEAS
F5L WAS BRITISH DESIGN ADAPTED TO AMERICAN MANUFACTURE

POSTWAR MARKINGS ON F5L IDENTIFIED STATUS OF AIRCRAFT COMMANDER

THE NAVY N-1, one of several wartime experimental aircraft, was designed especially to use the Davis recoiless gun, mounted in the bow, against enemy submarines.

FIRST DESIGN OF NAVAL AIRCRAFT FACTORY WAS N-1
CURTISS R6L DROPS TORPEDO IN SAN DIEGO HARBOR

DH-4, ANOTHER BRITISH DESIGN, WAS BUILT FOR NAVY BY DAYTON-WRIGHT
GIANT FLYING BOATS

As a result of wartime requirements for an antisubmarine aircraft capable of flying the Atlantic, the NC seaplanes emerged as the largest flying boats of their time. Developed by Naval Constructors in cooperation with the Curtiss Aeroplane and Motor Corporation, the first (NC-1, right) was completed in September 1918, flew in October, and on November 27 carried a record 51 men into the air (below). Of the ten NC’s built, three four-engined versions attempted the postwar trans-Atlantic flight; the NC-4 succeeded in May 1919. While most later NC’s had three engines, the NC-9 was configured in a manner similar to the NC-4. Final flights were made in 1922.
THE NC-2, WITH TWIN TANDEM ENGINES, IN APRIL 1919
The story of the First Yale Unit and the accomplishments of its members are well known. Few know that there were also Second and Third Yale Units. A change in Navy policy prevented the Third from completing its training as a unit and only a narrow margin separated the Second from the same fate. But, like its earlier and larger counterpart, the Second completed its own training under Navy supervision and its members served in many capacities at home and abroad, compiling a record equally embellished with promotions and citations. This is its story as told by one of its members.

By RAdm. J. J. Schieffelin
USNR (Retired)
His administrative talent, spotted early, in persuading Adm. Benson to allow binary powers of persuasion, good United States had not his life been cut

However, Depew obtained the service unit and sending its members to the further participation in the war.

and such serious injuries to his part

boat crashed, causing Zimmer's death that Ganson Depew saved the unit tion Day, May 30, 1917, with misfortune.

U.S. had not his life been cut

civil flying boat with 1,500 hands. This enabled them to learn the essentials of airplane construction.

He displayed practical common sense with amused tolerance, never losing takeoffs and landings.

fundamentals. Manuals, pamphlets and textbooks, sent up from NAS Pensacola, told the basic facts of submarine construction.

wise use of one's dedication and potential. This enabled them to learn the essentials of airplane construction.

sight of their dedication and potential. This enabled them to learn the essentials of airplane construction.

of the unit were successful, three acres of the almost miraculous approval

of the unit were successful, three acres of the almost miraculous approval

Hans Curtis F boat, began on December 30, 1917, with considerable gust to.

motive with considered gus against the buoy.

ruled officers in the indoctrination school at Washington, D.C. Two of the Pensacola exercises sent up from Pensacola and

together, found the F boat at a height of 2,000 feet of a marker buoy. While at other locations being protected by a breakwater.

overs sea during WW I from late 1917 until after the Armistice. After a

1941 through June 1946 with assignment to the training station at Felixstowe, England, and NAS Quonset Point, duty on the

Overseas during WW II from February 1941 through June 1946 with assignment to the training station at Felixstowe, England, and NAS Quonset Point, duty on the

About the Author

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98
g inni flying boats, perhaps the finest leged in that they were at the Royal by Wing Commander J. C. Porte, Naval Air Station where the two-engine Curtiss boats with It had been purchased by the British stowe) were not only seaworthy, but timing F2A flying boats (F for Felix- flying boats was limited to a maximum distance reconnaissance mission. The using five hours, carrying two 230-lb. RN. He started with the pre-WW I flying thousand of convoy escort of seven and a half hours in the air, ing the F2A to the Danish coast. To overcome this deficiency, Wing Smith flew fighters with British Air French aviation and distinguished him- himself in antisubmarine and other missions. The pilots at Felixstowe were priv- 

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Horizon attracted their attention and as dawn was breaking, they dove into some 30 minutes, both pilots agreed.

After several hours of fruitless search, after maintaining this heading for that the speck was the planet Mars.

A reddish speck close to the clouded going out in stormy weather, airmen, as his second pilot or navigator, in fog, at night, and truly made him mend for lieutenant commander.

Pensacola, was assigned to NAS Pensacola, and was qualified him, in DI E Class of 1916, after instructing at ENSACOLA Pensacola, and was assigned to NAS Pensacola.

As an H-16 flying boat's crew, he took off in an H-16 flying boat,10,000 feet. There were no moon and they searched the stary skies for signs of a Zeppelin.

With Lt.jg. G. R. Eagle, as his second pilot or navigator, in October, 1918.

With Lt.jg. G. R. Eagle, as his second pilot or navigator, in October, 1918.

As a Sandy-haired, tall, and unlettered man, as a British trawler, followed by another.

Hauled up on the concrete apron, the mouth of the river Tyne, 80 miles westward.

They sighted close aboard, there are many rocky cliffs girding the position of C.O. of the Service and met to jump.

How many airmen, as this weather? With a slow smile, they greeted them with the question:

Four were awarded Navy Crosses.

At the ramp, their flying boat was hauled up on the concrete apron, the mouth of the river Tyne, 80 miles westward. They sighted close aboard, there are many rocky cliffs girding the position of C.O. of the Service and met to jump.

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AT THE TURN OF THE YEAR

The growth was accelerating and Naval Aviation was gaining stature and recognition. Training programs were adjusted to war needs, new aircraft were delivered, more stations were put into operation and the coverage of war patrols was extended.

JANUARY 1918

1—The Experimental and Test Department at Pensacola was transferred to the air station at Hampton Roads to overcome difficulties arising from the remoteness of Pensacola from principal manufacturing and industrial plants in the northern states.

1—NAS DUNKIRK, France, was commissioned with Lt. Godfrey deC. Chevalier in command.

7—Progress in building H-16 flying boats at the Naval Aircraft Factory was marked by the start of planking the first hull.

19—NAS ANACOSTIA was established to provide a base for short test flights, to provide housing and repair services for seaplanes on test flights from Hampton Roads and Langley Field, and to display new seaplane types for study by men working in Navy Department offices concerned with their construction and improvement.

21—The First Marine Aeronautic Company, Capt. F. T. Evans commanding, arrived at Naval Base 13, Ponta Delgada in the Azores, to establish a base from which it would fly antisubmarine patrols. It was the first American aviation unit completely trained and equipped to be sent overseas.

24—Specifications and blueprints drawn up by the Bureau of Construction and Repair for the Davis gun carrier were received at the Naval Aircraft Factory. Later designated N-1, this was the first airplane designed and built by the Navy for the attack role.

25—The Supervisor, Naval Reserve Flying Corps, requested that Dr. Alexander McAdie, Director of Blue Hill Observatory, Harvard University, be enrolled as a lieutenant commander in the Naval Reserve and assigned to the Aviation Office in CNO to direct the establishment of a Naval Aerological Organization.

28—A group of 50 enlisted men from Pensacola reported to the Naval Aircraft Factory for training in aircraft repair prior to assignment overseas.

During January, NAS CHATHAM, Mass., was commissioned with Lt. E. H. McKitterick in command.

FEBRUARY

1—The first H-16 flying boat assigned to operational service was delivered to the air station at Hampton Roads. A twin-engine tractor biplane built by Curtiss and the Naval Aircraft Factory, the H-16 was used on antisubmarine patrol from stations on the East Coast and in Europe and for that purpose was equipped to carry two 230-pound bombs and five Lewis machine guns, one forward, two aft and two amidships.

3—Aerial gunnery training for prospective Naval Aviators and enlisted men began under RCAF instructors at the Army field at Camp Taliaferro, Fort Worth, Texas. Although the program was of short duration, 38 officers and 80 enlisted men completed the course before its closing on 16 March 1918.

8—A change in national aircraft insignia was promulgated to the Navy. It discarded the white star design and replaced it with concentric circles of red and blue around white and reversed the order of the red, white and blue vertical bands on the rudder, placing the red nearest the rudder post.

10—The Marine Aeronautic Detachment, Capt. Roy S. Geiger commanding, transferred from Philadelphia to Miami to set up a Marine Flying Field for landplane training adjacent to the naval air station.

13—Lt. G. C. Dichman took command of the air station at Brest which served as a base for seaplane and kite balloon operations and an assembly plant for aircraft shipped overseas. This is considered the beginning of NAS BREST.

21—NAS BOLSENA was commissioned with Ens. W. B. Atwater in command. The first of two stations established in Italy, Bolsena was used primarily for training.

22—The Director of Naval Communications was requested to provide wireless transmitting and receiving equipment at five naval air stations on the Atlantic coast and at San Diego and Coco Solo to permit pilots on patrol to communicate with their bases.

22—NAS QUEENSTOWN, an assembly and repair station serving all naval air stations in Ireland, was commissioned with LCdr. P. J. Peyton in command.

26—The Chief of Naval Operations established an aeronautical equipment allowance list for air station abroad.

28—The President issued a Proclamation, effective in 30 days, prohibiting private flying over the United States,
since November 1917, was taken over by American forces of aviation personnel had been on duty with the French and commissioned as a Naval Air Station, Lcdr. Louis H. just as the plane took off, the port bomb fell into the water through two altimeters and a clock for service plane; as observer, started on patrol from NAS L.

Corps arrived at the Naval Aircraft Factory to deliver French two days before, made its first flight under American control at Paimboeuf.

HS-2 patrolled at home and abroad

March 18—The Receiving Ship of the Naval Air Detachment of England, made the first attack on a German sea plane, or Dunkirk fighter, made its

March 19—A formation of flying boats, on long-range reconnaissance

March 20—The Canvas Blimp Hangar at NAS Paimboeuf

March 21—Capt. F. T. Evans, USMC

March 22—The Curtis 18-T or Kirkham triplane fighter was

March 23—The office of the Director of Naval Aviation was

March 24—The Office of the Director of Naval Aviation was

March 25—The Office of the Director of Naval Aviation was

March 26—The Office of the Director of Naval Aviation was

March 27—The Office of the Director of Naval Aviation was

March 28—The Office of the Director of Naval Aviation was

March 29—The Office of the Director of Naval Aviation was

March 30—The Curtis 18-T or Kirkham triplane fighter was

March 31—The Curtis 18-T or Kirkham triplane fighter was
May 19, 1917, the first United States national insignia for aircraft was described in General Order 299 and ordered placed on all Navy aircraft. The design called for a red disc within a five-pointed white star on a blue circular field. Rudders were marked with vertical red, white and blue bands with the blue band forward, nearest the rudder post. The color shades were the same as those of the American flag.

February 8, 1918, the roundel was adopted by the United States “to avoid confusion with enemy markings and to conform with Allied markings.” Britain, France and Italy all used a variation of the roundel. The U.S. roundel consisted of concentric circles of red and blue around a white ball. Tail band colors were reversed, with the red band nearest the rudder post.

In August 1919, the Secretary of the Navy ordered that naval aircraft markings revert to the 1917 star insignia and that the tail bands again be reversed with the blue band nearest the rudder post.
AS A RESULT of General Orders which changed U.S. markings during WWI, pre-painted parts might appear on aircraft of a different period. HS-2, top, has only one roundel in evidence; tail stripes are reversed. Above, N-9 has 1918 roundels but 1917 stripes. N-9, below, has correct markings for period after August 1919. Researchers' problems are complicated by photographs in which the tonal density of red and blue colors is not always consistent, as in photographs above.
AFTER ONE YEAR

MAKING READY FOR THE FIRST FLIGHT OVERSEAS OF HS-1 AFTER IT WAS ASSEMBLED AT PAUILLAC LT. HENRY BARTON CECIL

WE WERE COVERING. THE PLANE PILOTED BY ENSM. SMITH DROPPED TWO AVIATION SQUADRONS WERE MERGED AT MIAMI TO FORM THE ALFRED A. CUNNINGHAM, USMC.

LAND-BASED AIR OFFENSIVE AGAINST GERMAN U-BOAT 64

BOMBS WHICH BROUGHT BITS OF WRECKAGE AND SEA GROWTH QM2c(A), THE OTHER BY ENSM. K. R. SMITH AND O. E. STATION IN EUROPE.

WILLIAMS, ATTACKED A SUBMARINE STALKING THE CONVOY THEY SERVED WILLIAMS WERE OFFICIALLY CREDITED BY FRENCH NAVALステーション・リオ・デ・ジャネイロ, ONCE PLACED IN COMMISSION.

TO MEET THEM, IT WAS DIRECTED THAT EIGHT ELEMENTARY TRAINING SCHOOLS BE FORMED, TWO AT KEY WEST, FOUR AT MIAMI, Began arriving overseas.

TO THE SURFACE AND APPEARED SO EFFECTIVE THAT THE SECOND BOATS, THIS WAS ONE OF THE FIRST RADIO SETS WIDELY USED IN, MARCONI SE1100 TRANSMITTER HAD DEMONSTRATED LIEUT. R. G. PENNOYER COMMANDING, AS A BASE FOR SEAPLANE SUPPORT FACILITIES. NAVY AND MARINE CORPS UNITS BEGAN ARRIVING OVERSEAS.

TIES BY A SPECIALLY ORGANIZED UNIT, LATER DESIGNATED THE COMMANDING OFFICER AND CREW WERE OFFICIALLY COMMISSIONED.

FOR THE FIRST FORMALLY TRAINED NAVY AEROLGISTS, A DEPENDABILITY IN VOICE COMMUNICATION AT DISTANCES UP TO

RELANDED, THE FIRST TUBE SET DEVELOPED FOR, NAVAL AIRCRAFT.


THE FIRST SHIPMENT OF LIBERTY ENGINES TO NAVAL AVI—
a and two at Bay Shore and that advanced squadrons be organized at Pensacola where advanced training would be given as soon as elementary students on board were graduated.

22 — Construction of the first N-1, an experimental sea-plane, was completed at the Naval Aircraft Factory.

24 — The first shipment of American-built planes, six HS-1's on board the USS Houston and two on board Lake Placid, was delivered at NAS Paulille, France.

4 — The first D.H-4's assigned to service were delivered to Miami. A two-seat, single-engine land plane built by Dayton-Wright and obtained from the Army by the Navy, the D.H-4 was used principally by the Marines.

4 — Naval Air Station L'Aber Vrach, was commissioned with Lt. Henry B. Cecil in command. Located on the rocky island of Erre in the harbor of Vrach near Brest, its seaplanes covered the western English Channel.

5 — The E-1, a single-engine pusher type airship, was ordered from the Good year Tire & Rubber Company.

8 — Naval Air Station Arcachon, southernmost of the seaplane stations in France, was commissioned. Ens. J. N. Brown was acting commanding officer until June 15.

13 — The first American-built aircraft to be assembled in France, an HS-1 made its first flight at NAS Paulille, piloted by Lt. Charles P. Mason with Cdr. J. B. Patton and Lt. W. B. Jameson as passengers. This was also the first flight overseas of a Liberty-equipped plane.

16 — A headquarters company and four land plane squadrons, designated A, B, C and D, were organized within the First Marine Aviation Force at Miami. Commanding officers of the new squadrons were Capt. Roy S. Geiger, William M. McIlvain, Douglas B. Roberts and 1st Lt. Russell A. Presley.

19 — The practice of taking regular upper air soundings began at NAS Enscola to provide information on wind velocity and direction needed for navigation training flights. Recording instruments were carried aloft in a kite balloon, a technique developed by the station meteorological officer, Lt. W. F. Reed.

30 — The first Navy pilots of the Night Wing, Northwestern Bombing Group, to take special training with British units marked the completion of their course by participating in a night bombing raid with RAF Squadron 214.
RARE BIRDS

UNIQUE among aircraft which did not go into wartime production was the Gallaudet seaplane. It featured a four-bladed propeller amidships driven by a Duesenberg engine. Above is 59-A at Pensacola in February 1917. Note the anchor design on the rudder, a frequent marking on naval aircraft before the war. Only one 59-A was accepted. Later, in March 1918, two similar craft (Liberty-powered D-4s) were tested. Gallaudet pilots included Richardson, Read, Mitscher, Stone, participants in 1919 trans-Atlantic project.

CURTISS L-2 TRIPLANE 'SCHOOL BOAT'

SPEEDY CURTISS 18-T 'KIRKHAM FIGHTER'
THOMAS-MORSE S-5 (L) WAS INFLUENCED BY SOPWITH 'BABY' FOR SCOUT AND TRAINING WORK

CURTISS HA WAS TWO-SEAT FIGHTER DESIGN

THE STURTEVANT FEATURED STEEL FRAMEWORK
Get off a quick accurate burst, with the gun properly aimed, before the enemy does, and the combat is won.
THE DAVIS GUN
Developing the Flying Bomb

One of the antecedents of the guided missile, generally considered a WW II development, was the flying bomb of WW I. In 1936, over a decade after the WW I efforts lapsed, L.Cdr. D. S. Fahrney (now Rear Admiral, USN, Ret.) was assigned the task of developing radio-controlled target aircraft. Out of this effort emerged the assault drone of WW II, a forerunner of the modern missile. In developing radio-controlled target aircraft, Fahrney first reviewed at the Naval Research Laboratory the radio aspects of the flying bomb of WW I days and the early 1920's. Thus, the work done in WW I, as well as the experience acquired by NRL and the Sperry Gyroscope Co., contributed to the development of guided missiles. This article is based on RAdm. Fahrney’s ‘History of Radio-Controlled Aircraft and Guided Missiles.’

The development of guided missiles was one of the more obscure and interesting areas of endeavor during World War I. Marconi’s first successful wireless transmission in 1896 and the invention of the airplane less than a decade later opened the technological field of electronics and aviation. Of the many areas of utilization in which these two fields have merged, none is more obvious nor more complex than that of the guided missile.

Before WW I, the possibility of using radio to control aircraft intrigued many an able man. One of these, Elmer Sperry, succeeded in arousing the Navy's interest. Although his efforts were visionary, they also had a serendipitous effect and made contributions to such fields as automatic pilots, gyro-stabilized bomb sights, flight instruments and catapults.

By Lee Pearson, Historian
Naval Air Systems Command

Sperry was, in many ways, the epitome of the Yankee inventor—with a college education added. His varied and widespread interests included mining machinery, automotive and street railways and electro-chemistry. By 1896, he had added to these an interest in gyroscopes which, during the next 15 years, he adapted to naval use—gyro-compasses for battleships and gyro-stabilizers for destroyers. In 1911, the application of radio control to aircraft intrigued him.

He realized at once that for radio control to be effective, automatic stabilization would be essential, so he again turned to the gyroscope as a promising device. Two years later, in the summer of 1913, the Navy provided assistance in the form of a flying boat, piloted by Lt. P. N. L. Bellingher, which was used to test and evaluate the gyroscopic stabilizer or autopilot. Elmer Sperry's son, Lawrence, served as engineer during these trials.

The next year, using an improved autopilot, Lawrence won a French prize of 15,000 gold francs. The instrument, though placed in production, proved to be too crude for operational use. On a second trip to Europe, Lawrence, observing the developing techniques of aerial warfare, became convinced that the gyroscope had many applications in aerial warfare. Acting upon this recommendation, the Navy Department awarded contracts for the development of such diverse devices as a bombsight, a stable reference line (called a “base line indicator,” but the forerunner of the turn and bank indicator) and a gyro-com-
out experimental work with aerial torpedoes in the form of automatically consulting board which requested that he was supported by the Naval did not possess a degree of accuracy so reported that the aerial torpedo and would mount to a predetermined bomb or dive to the ground. Wilkin regulated height, servo-motors for control Elmer Sperry eventually succeeding to Aeronautics and Aeronautical Motors, of a gyroscopic stabilizer, a directive aerial torpedo. This torpedo consisted T. S. Wilson, to examine their and facilities for utilizing the national very every and facilitate in the bomb set a mechanism in motion out corrections via radio. A receiver attached to the bomb and marked trolley to a conventional bomb by which Sperry to believe that the solution to every a more or less successful with their gyro-Westerly was working on audion apparatus. The fact that Westerning early development of radio in the interim, Sperry proceeded upon winding the control gears took time. By 1916, the Sperrys had not tempted to develop aeronautical uses of Ordinance and half by the Bureau signed November 11, 1918. Thus by combining the ability of the second phase, development of radio were tried out in well over a hundred wares were established there with a Marine half to be administered by the Bureau of Engineering. The Navy would furnish officials. The Navy would furnish spending $200,000 on this project, was obtained. A number of hangars Sperry would construct hangars, fur- in the [Senate} that the torpedo should be completely automatic and the other ve. Bred sho before the Armistice was velocities. With this recommendation and the early tests, the curren-
In large quantity without interfering facilities were to be obliged in order to be set up by the Army at McSquire caused a somewhat parallel demonstration of the flying bomb.

Officer of the Army, to witness a operate effectively after a pilotless vehicle with much greater emphasis upon proof sure that the control mechanism would work. It was necessary to obtain a territory related, difficulties with the launching control mechanism.

Since these problems were involved solving of several serious problems volved solution of several serious problems.

W ith regard to the airframe, little addressing in the design of the launching mechanism led the craft as a flying bomb led to the craft's flying gear and taxiing over the ice for the time got plane #2 into the air. When the plane fitted with a seat and stand made; two flights of 100 yards were made; two launching attempts, one successful and one unsuccessful. Finally, the Sperrys had built a open-air wind tunnel test. Finally, over the Long Island Motor Parkway one unsuccessful.

In August and September 1918, two successful testing of the Curtiss flying bomb were made; a pulley consisting of a 150-foot track. Clearly something more was required in favor of a return to the N-9. In the meantime, the Sperrys had built a open-air wind tunnel test. Finally, over the Long Island Motor Parkway one unsuccessful.

In any event, when the Sperrys made his first takeoff, the plane struck a some rault and was completely wrecked. Sperry walked away unhurt.

Time got plane #2 into the air. When the plane fitted with a seat and stand made; two flights of 100 yards were made; two launching attempts, one successful and one unsuccessful. Finally, the Sperrys had built a open-air wind tunnel test. Finally, over the Long Island Motor Parkway one unsuccessful.

A Curtiss-Sperry flying bomb is shown here mounted for a catapult launch.
The third area of problems concerned the gyroscopes. These failures were followed by the third trial on September 26, 1918, when the flying bomb made a successful flight with the N-9 returning to favor. The single gyroscope or the airframe stabilization system or the gyroscopes proved unsatisfactory. The tests on the unmaned plane had made a smooth, justed, a launch was actually made with the Marmo automobile. After the detailed design work, the Sperry airplane development was completed. At the same time, additional engineering was made in order to prevent this—the gyroscopes were used. Demonstration settings were made for the last flight—the gyroscopes did not operate satisfactorily; if so, it was to no avail. Sperry's. In 1921, the project was again reoriented to emphasize the radio control aspect. The control gear was designed to accommodate the flying bomb development. Despite this, at war's end, the Navy sponsored similar projects. When interest waned and the project lapsed. The Navy continued to press its interests in target drones and trolley aspect. The control gear was designed to accommodate the flying bomb development. When interest waned and the project lapsed.

AN AUTOMOBILE IS SUBSTITUTED FOR A WIND TUNNEL IN A TEST OF A FLYING BOMB
The Evolution of the Aviation Green Working Uniform

AT NAS LE CROISIC IN THE UNIFORM ADJUSTMENT DAYS
The Origin of Navy Wings
THE WAR AGAINST THE U-BOAT
down, Carson dropped two bombs, one...

F. Carson, left NAS D four seaplanes, one piloted by Ens. J.

At ing position. The submarine cleared machine guns and moved into bomb immediately returned fire with his once again against an airship, the U-boats it carried no identification marks, ing on the surface at high speed. Since passively to these attacks. On at least by the timely bombing. "

S. Montgomery, in seaplane LF-4, was his submarine returned to base in...
over and operate the air station at mission that Admiral H. T. Mayo, the Americans' arrival at Port Cor
nance, the Italian government had Port Corsini in Italian planes.
Naval Aviators who operated out of Hazelton Hammann, USNR. He it off is exceeded by that starring
Port Corsini, some 50 miles south of outing a bombing attack, fortunately.
Seventy-three men in all completed and his fellow pilots were a unit of naval aviation around when the Italian government put the new station in commission and US Navy forces in Europe."
The school had been formally opened since was signaled by their carrying
arranged for a special draft of men included ground work and flying. Hoisting the
station had "the distinction of being the most heavily engaged unit of the station had a detachment of officers and over 250 tons of supplies been trained in the handling of Italian
little later from Lake Bolsena, 60 miles
in the direction of the canal. This disadvantage. All
Austrian submarine went out from
arrangement for the US Navy to take
operations commenced. So success-
Austrian sailors were coming in the
which transported 331 men, certain
which landing had to be made on a
tactic, which equaled the width.
In the middle of the morning, five
c caught engaged in this activity would
popular had this mission become on occasion in a special train

A MEDAL OF HONOR EXPLOIT
Undeterred by these considerations, had used in his exploit over Pola. For reasons never discovered, the Austrians were still in the vicinity. It seemed the Maccini was built to carry the Vultee in the air, Hammann had no idea. The tiny Maccini was built to carry the Vultee easily capture them and the fate of spies would be theirs — execution.

Looking down, Hammann saw Ludlow's wrecked plane and watched it sink; he was not going to leave the man fired his remaining ammo into the sea. Beppe saw that the Maccini was damaged and he might not be able to take off. Furthermore, he was unable to get into the air. Moreover, he had followed by Parker, Vorhees.

At Pola, the first awarded a U.S. Naval Silver Medal to Ens. Ludlow. Ens. Ludlow also gave the signal to tote into the air, Hammers took the lead who tried to quick burst of fire, then swung over looking down, Hammann saw Ludlow and Hammers got in the air, Hammers sprial down and drew up after the fighters flown by Ensigns. Hammann could rescue Ludlow and the wrecked plane and watch it sink; he was not going to leave the man and the fate of spies would be theirs — execution.

Below the water poured through the bow and holes in the hull, kicked holes in the struts to keep from being swept away. To land his plane in such a sea was bad enough, but worse still, the engines were still in the vicinity. It seemed the Maccini was built to carry the Vultee easily capture them and the fate of spies would be theirs — execution.
SEPTEMBER, 1918

Tw was sunk by gunfire from British destroyers. Point L'Ervi. Both attacked what was assumed to be a board. It was an all-British crew except Wadsworth who attacked a U-boat which surfaced after he left the scene and tracted for 50 H-16 flying boats.

C. J. Boyle left NAS Ile Tudy in answer to an “allo” of off patrols were extended and intensified, U-boat commanders bomb kicked the stern clear of the water and the sub and Lt. Col. Porte, Maj. Partidge and Maj. Wadsworth on.

Although too early to predict when the war sive began. The 1,000th Naval Aviator won his wings and sighted the USS station. Lcdr. Kenneth Whiting in command.

Factory made it maiden flight with Flt Cdr. McGill, pilot, on Washington, Seattle, in a program similar to that established many others near that goal while training continued to expand. The Northern Bomber Group off found the going progressively more difficult. Marine air was placed in commission. Western most of our seaplane units reached France; the Northern Bombing Group.

JULY

1 – NAD Lough Foyle, Ireland, was commissioned to provide seaplane patrol over the North Channel entrance to.
2 – NAD Widdy Island, located on Bantry Bay, Ireland,
3 – Ground school classes began at the University of
4 – NAD St. Trojan, France, near the mouth of the
5 – NAD St. Trojan, France, near the mouth of the
6 – NAD St. Trojan, France, near the mouth of the
7 – NAD St. Trojan, France, near the mouth of the

AUGUST

11 – Ens. J. B. Taylor made the initial flight in the
12 – Ens. J. J. Schieffelin, on a flight out of Killingholme,
13 – Ens. J. J. Schieffelin, on a flight out of Killingholme,
14 – NAS St. Trojan, France, near the mouth of the
15 – The first F5L completed at the Naval Aircraft Factory, made its first test of the Davis recoilless
16 – F5L
17 –...
NASHAMPTON ROADS was placed in commission with Lcdr. George H. Ludlow was hit and forced down off the harbor. Corsini was intercepted by a superior force of Austrian pilots, took him aboard, and flew back to base. For his was credited with a sinking by the French government and into bombing position. His bombs hit as the submarine was damaged, evaded his pursuers, landed alongside the downed. Squadron One piloted a Caproni bomber on a night raid on assigned to many who preceded him, however, he was not air-cooled radial engine.

More about the events and actions of the submarine, including its destruction of the French warship and the subsequent rescue efforts. The efforts of the NAS
Pensacola Bay, pulled out the gunner, and held him above water. The wreck in an unsuccessful attempt to rescue the pilot.

Kitten (center) is not a giant; the plane is a midge. Kirkham 18-T, a two-seat experimental fighter. Davis Gun.
Navy's First Ace

By Izetta Winter Robb

Such a maneuver deserved an encore. Thus it was on September 15 that Ingalls repeated at the German aerodrome at Uytterke the same tactic he had used at Varsenaere. He made a low-level attack out of the clouds upon the German hangars and fired 400 rounds from his Lewis machine gun into the canvas structures. Then, as he swung up, he cut free four bombs upon the Fokkers parked on the field below.

On the return flight, Ingalls sighted an enemy two-seater Rumpler west of Ostend at 6,000 feet. With Lt. H. C. Smith, RAF, also flying a Camel, Ingalls went after the two-seater. The enemy turned and dived toward Ostend, but that did not save him, for Ingalls and Smith followed him down, firing 400 rounds at close range which sent the enemy crashing in flames just off the beach.

Getting back to his base was always exciting and usually hazardous. On one occasion, Lt. Ingalls described for his parents the flight back: "I turned and dove down to the ground... for when way over the lines and not high enough to be safe from Archie, the stunt is to race along just over the ground at about 200 to 300 feet.... The only danger in this low flying is from the machine guns. The Huns had these scattered all over their country to get aeroplanes in similar predicaments. I knew fairly well where they were thickest and went along for at least five minutes without a shot. Then suddenly I heard a rat-tat, my motor [faltering], gas poured out of the tank below the seat, and clouds of white vapor rose from it...."

"Evidently I had run into a bad place, for I was shot at till I crossed the lines. Usually one turns, zooms, etc., when in this predicament, but I expected the controls to go any second and even with what I had, I could not do any trick flying, so I sat still and by using the rudder kept going as fast as possible in little turns toward home. It was a big relief to get out of [range] across the lines. Then I had to land... I came in slowly over the trees on the side and, using the
just before the balloon burst into ammunition trains as their preferred ers, seeking out German hangars and remaining enemy planes spun away. flattened out very low down. The out is uncertain; it is believed to have targets. On this round, Ingalls dropped as it dived. Whether it was knocked T h e F o k k e r , d i v i n g v e r t i c a l l y a n d l e a v - i n g o u t o f c o n t r o l , v e r y l o w , n e a r B r u g e s , i n d i v i n g a w h i t e s m o k e t r a i l , w a s l a s t s e e n w a s p u r s i n g a D H 9. In glalls fired 100 quarry was one of the Fokkers which r o n h e a d i n g f o r B r u g e s , t h e f o r m a t i o n while on escort for a bombing squadron. In glalls pursued a B o m b e n s L o c k e y , m a n a g e d t o l a n d . 

In glalls then attacked another Fokker. Describing this, Lt. Ingalls wrote, whether it was killed or not, returned home safely. He said that he had been back and, of course, there were a few "targets."

On September 18, Lt. Ingalls and his next big attack. On September 20, got a new machine next day. "The machine was well shot up."

"His keenness, courage and utter brilliance, the British Air Ministry honored with the citation with these words: "His keenness, courage and utter brilliance, the British Air Ministry honored with the citation with these words:"

FIRST NAVY ACE BECAME ASSISTANT SECRETARY OF NAVY (AIR)
The Northern Bombing Group
June and July 1918, and 80 during Aviation. The agreement called for representative and certain allocation States to Italy. All planes completed to Dijon, to Paris, and from there to us was nine during July and nine were flown from the acceptance park were to be delivered to the U.S. Army acceptance, they were further tested these planes would be replaced by the firm's output.

The material required for building route decided on was from Milan to there to the fields of the Group. The entire to the incorrect estimate of the number agreed upon was due during August. The failure to deliver 30 Caproni planes during deal of weather unfavorable for flying and the first part of August, a great failure, proved unsatisfactory. To hope of eradicating the cause of engines engines were giving considerable trouble. Test after test, made in the night of August 15; objective the

The agreement entered into with Caproni biplane, equipped with Marine DH-4's of Day Wing, Northern Bombing Group, at Pauillac, France
CAPRONI 450: The type in which Navy pilots, destined to operate with the night wing, received their training in multi-engine landplanes at Malpensa, Italy (Pete Bowers’ photo).
**Summary of Operations**

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total pounds of bombs dropped</td>
<td>155,998</td>
</tr>
<tr>
<td><strong>While operating with the Northern Bombing Group:</strong></td>
<td></td>
</tr>
<tr>
<td>Night wing</td>
<td>2,670</td>
</tr>
<tr>
<td>Day wing</td>
<td>11,614</td>
</tr>
<tr>
<td><strong>While operating with RAF units:</strong></td>
<td></td>
</tr>
<tr>
<td>Night Wing—pilots</td>
<td>17,200</td>
</tr>
<tr>
<td>— observers</td>
<td>121,984</td>
</tr>
<tr>
<td>Day wing — pilots</td>
<td>1,905</td>
</tr>
<tr>
<td>— observers</td>
<td>625</td>
</tr>
</tbody>
</table>

CRASHES marked the route flown from the Caproni plant in Italy to St. Inglevert, France. At Dijon, France, pilot and copilot were injured but survived this landing on soft ground.
Forty-two days of war remained, but action against the U-boat continued at the pace of previous months. Another station was commissioned; several under construction neared completion. As the end came into sight, some cutbacks were initiated in training, and plans for an orderly demobilization were discussed. Otherwise, the momentum gained by months of hard effort showed no sign of slackening until the Armistice abruptly shut off further need.

OCTOBER 1918

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NOVEMBER 1918

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THE FRENCH

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  h HS f ST gu F f u p d
  p h h F h f g - f d h f f gh
  f S R k O 1918 d k 51 p h
The war was over. For the time being at least, the world

The aviation staff in France at the close of the war. Captain T. T. Craven, center front