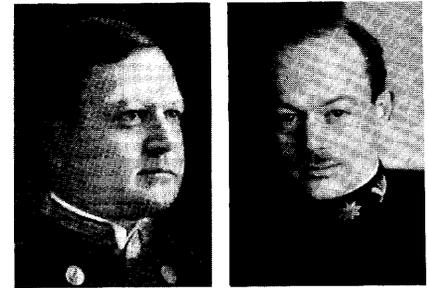
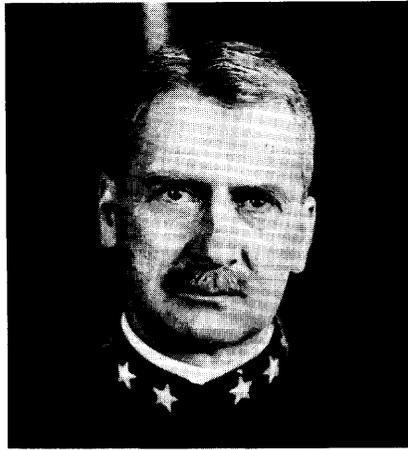


THE FIRST FLIGHT ACROSS THE ATLANTIC

*RAdm. Taylor cut corners
with a centralized project
and a joint team.*

*Mission: Build and fly
Navy-Curtiss No. One*



RADM. TAYLOR, left, sent Cdr. Westervelt (above, left) to Curtiss' Buffalo plant while Cdr. J. C. Hunsaker, aviation head, Bureau of Construction and Repair, managed the program from Washington, D.C.

IN SEPTEMBER of 1917, the chief of the Navy's Construction Corps, Admiral David W. Taylor, called in his key men, Commanders G. C. Westervelt, Holden C. Richardson and Jerome C. Hunsaker. These Naval Constructors were ordered, in effect, to create what the combined efforts of England, France and Italy had been unable to achieve in three years of war: long-range flying boats capable of carrying adequate loads of bombs and depth charges as well as defensive armament sufficient to counteract the operations of enemy submarines. After the meeting, Glenn Curtiss was summoned.

Within three days of his Washington meeting, Curtiss and his engineers submitted general plans based on two different proposals: one was a three-motored machine, the other a behemoth with five engines. Both were similar in appearance, but they opposed conventional flying boats of the period in that the hulls were much shorter, vaguely resembling a Dutch wooden shoe. The tail assembly, for which there were several alternates, was to be supported by hollow wooden booms rooted in the wings and hull. This tail, twice the size of an ordinary single-seat fighter aeroplane, would be braced by steel cables and was situated high enough to remain clear of breaking seas during surface operations. It also permitted machine gun fire directly aft from the stern compartment without the usual danger of blasting the controls to pieces.

This interesting concept had been embodied in a previous Curtiss design for a "flying lifeboat." The keys to success lay in two factors: a seaworthy hull which had good "planing" characteristics and reliable engines which provided sufficient power for their weight. The entire machine, of course, had to be relatively light, yet strong enough to withstand the severe treatment frequently encountered at sea.

It was not practical to build larger and larger airplanes and keep adding more engines to keep the whole affair in the sky unless the load-carrying potential also increased. This "useful load" included crew, fuel, equipment, accessories and armaments — things not part of the basic aeroplane. Thus, the plan for the smaller, three-engined aero-boat was decided upon, and the light *Liberty* engine solved the power problem.

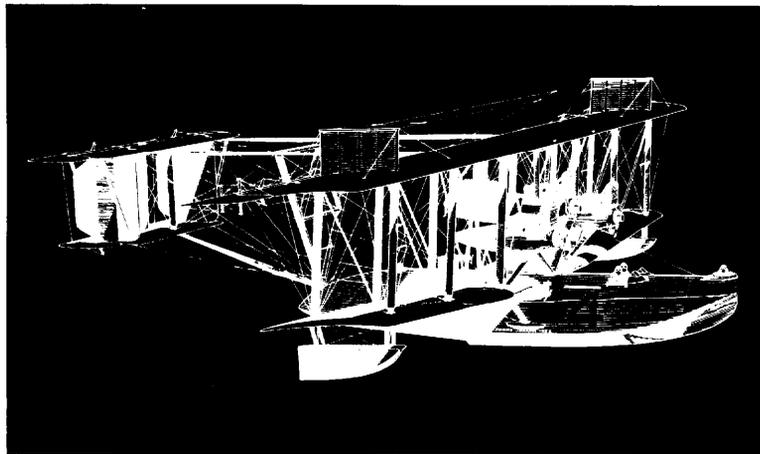
Pressure was on. The German undersea-boat situation was reaching ominous proportions. The United States was producing patrol planes as fast as possible, but the matter of shipment was an endless frustration. Even when good fortune allocated the use of a large cargo ship, its entire cargo consisting of crated flying boats and their accessories, the total manifest would be only 25 machines! The Royal Navy was grinding out planes under the supervision of Commander Porte, but his relatively small flying boats, operating from coastal stations, had a fuel and depth charge capacity limiting them to only a few hours on

station. If the convoy were much more than 100 miles at sea, their use became impractical.

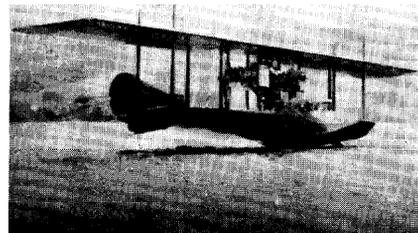
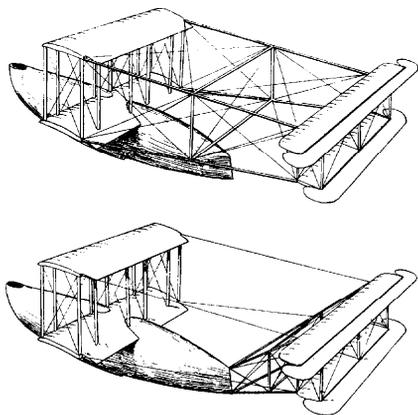
In view of the immediacy of the problem, Chief Constructor Taylor knew he had to cut corners. Under normal circumstances, development of a flying war machine, the engines, hull, wings, fittings and armaments, would require study and sanction by respective divisions within the Navy, a time-consuming process. Admiral Taylor centralized the project. A design contract was let with the Curtiss Company, and Commanders Westervelt and Richardson were sent to the Buffalo plant. Without red tape, the Navy engineers would work closely with the Curtiss people at full speed.

One of the first problems readily resolved was the plane's name. At first, Westervelt applied the initials of his boss: DWT. A little reflection brought realization that Taylor might take a dim view of that, so Westervelt changed it to "Navy-Curtiss Number One," or simply, "NC-1."

Even by 1917 there was a wealth of aerodynamic data available from both wind tunnel testing and practical application. The Navy-Curtiss team drew heavily on the experience of others, especially the British. Nevertheless, the construction of a boat with wings, large enough to cross the Atlantic, presented unique problems of its own. Foremost was the hull. The "wooden shoe" was Commander Richardson's baby. In time to come, it would seem the albatross around his neck.



CDR. H. C. Richardson helped plan and build the four NC's. Its hull design was unique; the entire machine (upper right), unorthodox. Various configurations (below) were considered; new design concepts and construction techniques were adapted.



THE AMERICA was built by Curtiss in 1914 to be flown across Atlantic by Cdr. Towers and Cyril Porte. WW I disrupted that plan.

HOLDEN C. RICHARDSON loved things that went through the air or on water. As a boy he tested his own parachute from the roof of the family barn. By 1895, his design experience with home-built canoes was laying a foundation for future designs of seaplanes. Graduating from the Naval Academy as an officer of the line, he transferred to the Construction Corps in order to pursue what fascinated him. Both he and Jerry Hunsaker were sent to M.I.T. for the special course in aeronautics. Hunsaker was later to make a study of aviation progress in Europe while Dick Richardson decided to learn how to fly. Reasoning that he could build better aeroplanes if he had a pilot's viewpoint, he trained and qualified as a Naval Aviator in 1913. By testing his ideas for boat hulls and pontoons in the model towing tank at the Washington Navy Yard, and later in the air as test pilot, Richardson soon earned a reputation as the hydro-aeroplane expert of the Navy.

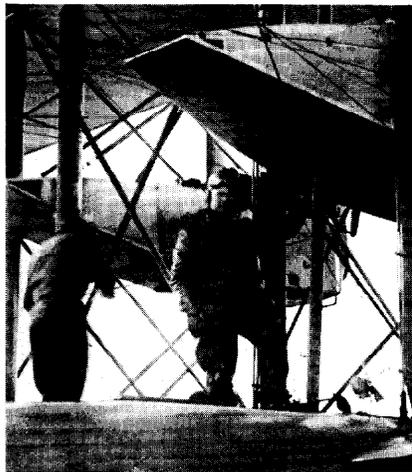
By the time he arrived at the Curtiss Buffalo plant in the fall of 1917, preliminary design of the NC-1 was half complete. One look at the drawings for a three-engined, 140-foot biplane convinced Richardson that the craft was under-powered. Armed with new scientific data fresh from Great Britain, Jerry Hunsaker backed him up. Such a machine, with the *Liberty* engines then available, would not have the range sufficient to fly over the

1,900 miles from Newfoundland to Ireland unless provision were made for mid-ocean refueling from a ship, a dubious proposition in view of the notorious North Atlantic seas. Richardson was right. A decision was made to plan something smaller and use the Azores route to Europe.

Hydroplane hulls were another matter. Unless properly fashioned, a high speed surface established a suction effect with water; some early seaplanes had been known to leave the bottoms of their hulls upon the sea as the remainder took to the sky. Richardson, working with the Curtiss engineers and using his own experience along with the ideas of Commander Porte, had a small scale model built. When it was tested in the towing tank, results were so poor he discarded the plan and drew up a new design.

Light weight was a basic requirement, yet enormous strength was necessary to support the wings, engines and tail structure, while at the same time enclosing gas tanks, the crew and all their equipment. When Richardson's new design was tried out in the towing tank, it performed very well. But when construction of the full-size hull was observed by Commander Porte during a visit to the States, the British seaplane authority would only comment that it was "very interesting." Soon afterward, word filtered back from England that the project was not to be taken seriously; the hull was considered heretical! Richardson remained undaunted.

**THE FIRST FLIGHT
ACROSS THE ATLANTIC**



SEPARATE components were delivered to Garden City, N. Y., for assembly. Richardson (above) prepares for test flight. Below, the NC-1 goes down the Rockaway ramp, taxis and flies off for the first time.

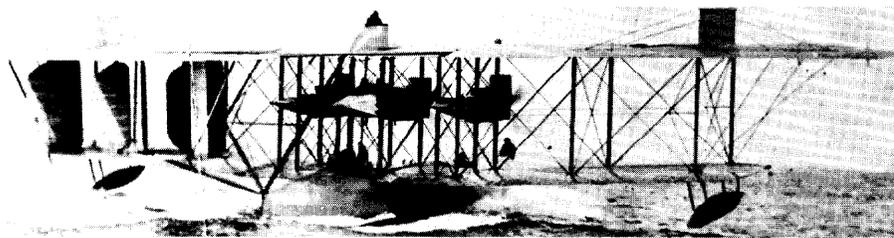
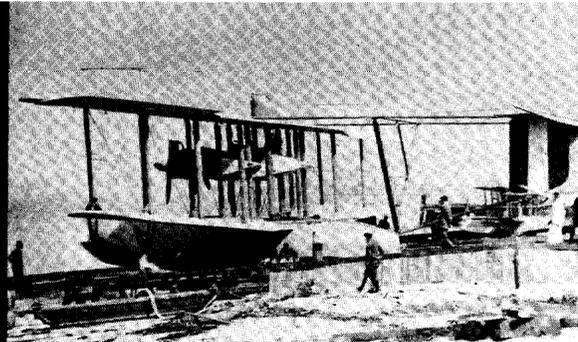
BY DECEMBER 1917, design work by the Navy-Curtiss team had progressed to the satisfaction of Washington. Secretary of the Navy Josephus Daniels put his approval on a contract calling for four flying boats of the NC type. Manufacturers were engaged to produce various components — the hulls, wings, tanks and engines — all of which would be shipped to the Curtiss plant at Garden City, Long Island, for assembly. At the nearby Naval Air Station, Rockaway Beach, a huge hangar was built to house two of the NC's and a special marine railway was constructed to facilitate movement and beaching.

Among the subcontractors was the Locke Body Company of New York City which had agreed to produce the wing and tail frameworks. Since there were to be 68 fragile panels, some of them 12 feet wide by 40 feet long, safe transportation from the Locke Company in the heart of Manhattan, over 23 miles of well-travelled streets to the Garden City assembly building, presented quite a task. Cdr. Westervelt assigned a young officer to it.

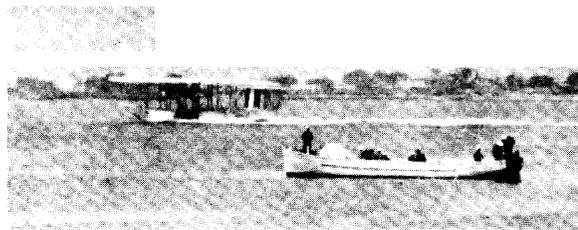
Lt. Wetherill applied himself with vigor — and a vow to plunge himself into the East River should he fail. He decided to move the delicate, hand-made sections, with their hundreds of ribs and intricate composition, at night when traffic would be at a minimum. Having no trucks large enough to accommodate the size of the panels, he used theatrical scenery-moving, horse-drawn wagons.

During the months to come, for those people living along the transfer route who had an inclination to stay up late, the vigil was rewarding: Out of the dead of night would come a strange cavalcade. First to appear was a motorcar, mounted by Wetherill's assistant, Ens. Hutchins, waving a red lantern. Then came an eerie wagon, fringed with more lanterns, its rickety-looking cargo creaking, the varnished frames reflecting a sanguine glitter. Just behind was another vehicle from which Wetherill himself was swinging his red lantern. All 68 panels arrived safely in Garden City.

*In just
one year
from the
time they
started...*



Success!



In July 1918, construction of the NC-1 was far enough along to warrant scrutiny by the head of the British Aviation Commission. In the report, it was stated, "The hull of this machine was examined. The machine is impossible and is not likely to be of any use whatever."

Near the end of August, just as Westervelt was preparing to sail to England on an inspection trip of his own, Richardson paid him a visit. Things had been going well: the NC-1 was almost finished, enough flying boats had been delivered to European patrol stations to ease the submarine menace, and the Allies were winning the war. All in all, Westervelt thought it was a pretty nice day. But Dick Richardson was depressed — he had been reviewing the data from the towing tank tests and now calculated that the NC-1 would be unable to get off the water with the fuel load required to reach the Azores. America's foremost authority on pontoons and hulls had lost faith in his own design. Westervelt went to Europe.

DURING SEPTEMBER, the NC-1 was delivered to Rockaway and on the 4th of October was "ready." The test pilot in charge of the flight was Commander Richardson.

Before a huge crowd of spectators, the crew of five clambered aboard the gigantic flying boat. Nestled in its cradle at the top of the ramp, its varnished wings flashing in the sunlight, the gray and yellow biplane looked impressive.

Climbing through a hole in the bottom of the center engine nacelle, the pilots took their places. The cockpit was situated between the wings, behind the middle engine. Thus the two pilots were surrounded — on the bottom by the hull wherein crew members and the main fuel tanks resided, on the sides by the outboard engines, and on top by the upper wing with its open station for the lookout watch or machine gunner.

Engines were started, and 36 cylinders roared to life. When Richardson

waved his arm, the carriage was eased down the inclined railway and into the water until the NC-1 floated free. Back and forth it taxied as Richardson felt out the controls. The crowd waited silently. Then he swung into the wind and, within moments, a rising cheer accompanied the world's largest flying boat into the air.

In just one year from the time they started, the Navy-Curtiss team had met with success: the *Nancy* flew. Richardson's fears were allayed; he'd had a mild case of buck fever. His design was vindicated, more than he had hoped for. Soon the NC-1 would establish a record by carrying 51 men aloft, including the first deliberate stowaway in aviation history. But on the 11th of November, World War I ended, and with it the need for a long-range, antisubmarine flying boat to do battle with the Hun.

Not long afterward, the \$50,000 London *Daily Mail* enticement was revived.

Within the Navy, there had been growing interest in the trans-Atlantic flight. On the 9th of July 1918, Lt. Richard E. Byrd, a Naval Aviator engaged in the study of crashes at Pensacola, had written to Washington, "It is requested that I be detailed to make a trans-Atlantic flight in an NC-1 type of flying boat when this boat is completed."

His request had been forwarded, with approving endorsement, by Byrd's commanding officer. Two weeks later he was in Washington where, with mixed emotions, he accepted orders sending him to Nova Scotia as Commander of U.S. Naval Air Forces in Canada. His disappointment at not being assigned to the trans-Atlantic flight was tempered by instructions to seek out, on the coast of Newfoundland, a rest and refueling station suitable for the handling and maintenance of *large seaplanes!* With the help of a close friend, Ltjg. Walter Hinton, Byrd spent every spare minute on navigational problems associated with a flight across the Atlantic. He thought there might yet be a chance to join the team.

But someone else was ahead of him.

JOHAN HENRY TOWERS was the third officer to be designated a Naval Aviator. Going into flying at a time when airplanes were regarded as toys dangerous to both life and a Navy career, Towers was a pioneer. As a passenger in 1913, while ticking around at 1,500 feet in a primitive contraption of bamboo, cloth and wire, he encountered a violent gust which threw the machine out of control and hurled its pilot to his death. As the frail little seaplane plummeted earthward, Towers was caught in the wires. He clutched the wooden frame, hanging on for dear life. Somehow, just before striking the waters of the bay, the wings levelled, and the fledgling aviator found himself emerging from the wreck, wet but unhurt. His suggestion that safety belts be used in aeroplanes was noted and approved.

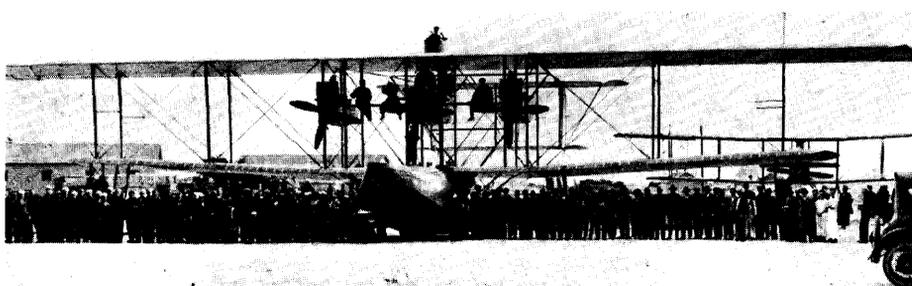


THE FATHER of aquatic aviation, Glenn H. Curtiss (L), taught Naval Aviator #3, John Towers, to fly in 1911 at Hammondsport.

Towers' career covered the early period of aviation development in the Navy. As a close associate of Glenn Curtiss, he had been a natural choice for participation in the abortive 1914 plans for the trans-Atlantic flight of the *America*. In 1916, after diplomatic duty in London, Towers was ordered to Washington where he had little time to think about flying the Atlantic, that is, until the design for the NC boat came to his attention.

At first, he didn't care for its unconventional appearance. The short hull looked a little queer and he disliked it. But the fire was rekindled; Commander Towers requested assignment to the project as officer-in-charge.

THE FIRST FLIGHT ACROSS THE ATLANTIC



ON NOVEMBER 27, 1918, the NC-1, above, established a world record by carrying 51 men (including a stowaway) into the air. As work progressed at Rockaway, Read, Byrd and Hinton (right) tried out new equipment on F5L seaplanes. The drift indicator, used later on the epochal flight of the NC's, was developed from an Italian design for use on their airships.



IN DECEMBER 1918, Westervelt returned from Europe and found that test flights of the NC-1 indicated a need for major modifications. Urgency of the antisubmarine mission was no longer in effect, so changes were being made in the NC-1 at a leisurely pace. The NC-2 would be based on knowledge gained from the first boat. Until problems were solved, construction of the NC-3 and NC-4 would be held up.

This was a frustrating development. In Europe, Westervelt had learned that several organizations were making preparations for a trans-Atlantic flight. He knew that Great Britain had long been anxious and now had aeroplanes large enough to do the job. France and Italy were considering the venture, and there were at least four independent private interests active in the States.

Upon his return to Washington, Westervelt found that a Trans-Atlantic Flight Planning Committee had been set up within the Navy. He lost no time in submitting a detailed recommendation. His 5,000-word report expressed the need for government backing and said, "The first accomplishment of this feat will give to the organization of the government achieving it a considerable amount of deserved prestige." He outlined the most logical route and the best time of year. His proposal included "stake boats" at 100-mile intervals along the path to serve as navigational aids, weather stations and points of replenishment or rescue in case something went wrong. He explored the possibility of using oil

from a destroyer to smooth the waters of a possible emergency landing area. His plan was complete down to the thermos bottles of refreshments and sleeping bags for the crews.

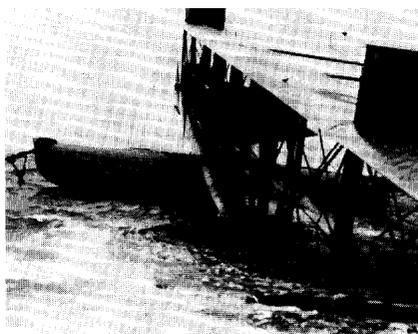
Two weeks later, Westervelt's report was given to Navy Secretary Daniels. The planning committee had amplified it: "As it seems probable that Great Britain will make every effort to attain the same relative standing in aerial strength as she has in naval strength, the prestige that she would attain by successfully carrying out the first trans-Atlantic flight would be of great assistance to her. . . . In view of the fact that the first successful airplane was produced in this country and that the United States developed the first seaplane, it would seem most fitting that the first trans-Atlantic flight should be carried out upon the initiative of the United States Navy."

The committee also concluded that, since the flight involved the use of St. John's, Newfoundland, a British colonial port, and that Great Britain was also contemplating a similar expedition at about the same time of year, from the same place, an awkward situation might develop unless there were to be mutual cooperation in the utilization of patrols, ships and facilities. Furthermore, the governments of France and Italy should also be invited to participate. "It is believed that the prestige obtained by the United States Navy in thus initiating and making possible a great international flight of this nature will equal or exceed that obtained by attempting the flight

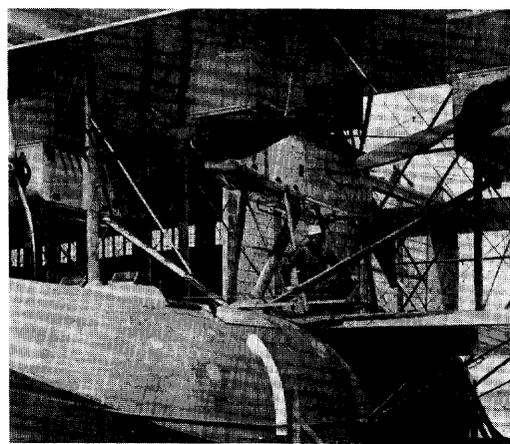
alone and all chance of international jealousies will be avoided."

Secretary Daniels approved the basic plan. However, all correspondence relating to the project was to be classified *Secret*. Curiously, when orders were written for Commander Towers, somehow the injunction to secrecy was overlooked. The reasons are obscure. Perhaps it was just an administrative error. In accordance with peacetime practice, newspapers were allowed to publish summaries of officers' orders. Towers' assignment to "duty in connection with preparation for trans-Atlantic flight" was handed

While organizing the bases in Canada, Lt. Byrd worked with Lt. Hinton on the transoceanic problem. Hours were spent charting courses and plotting requirements until all that was needed was the big NC-1 itself. But Washington's silence on the subject during the fall of 1918 was nearly as ominous as the increasing frequency of the coastal storms. With the Armistice, Byrd's dream came crashing down. The Allies' victory had wrecked his hopes. Closing his stations and sending his men back to the States, he headed for Washington. Then, during his trip south, he heard the trans-Atlantic flight was still on, after all. Upon arrival in the Capital, his spirits were further buoyed when he heard that his friend, Commander Towers, was to be in charge of the operation. The Great



CAUGHT by storm, the NC-1 was battered (above) for three days. Later repaired, it was configured in a 4-engine arrangement similar to the other seaplanes, NC-3 and -4.



to the press and swarms of reporters pounced on the Secretary. As a former newspaperman himself, Josephus Daniels appreciated the situation. He held a press conference, and the story hit the front pages of the world. The race was on!

THE WORK on Long Island progressed at a feverish pace. Since the NC boat cruised at about 75 miles per hour, the 1,300-mile hop from Newfoundland to the Azores would have to be at night in order to arrive during

Hop was going forward; surely there would be a place for him. Then he received the next report:

"No officer or man who has had foreign duty will be permitted to be a member of the trans-Atlantic flight expedition. This includes those who have been on Canadian detail."

The final blow came when he heard that the Navy's Director of Aviation, Captain N. E. Irwin, was sending him back to Pensacola. This was too much! He went to see the Director.

There is no record of the ensuing conversation between Lt. Byrd and Captain Irwin, but the young officer must have presented his case well, for, in February 1919, Byrd joined the "Trans-Atlantic Flight Section in Washington" — and Walter Hinton was at Rockaway.

daytime. A target date in May was set, when the ice would be broken up and the period of darkness not too long. There would also be a full moon.

Trials on the NC-1 had resulted in many changes. A four-engine configuration had worked so well on the NC-2 that the concept was adapted for the other planes. The cockpit was moved from the center engine-nacelle to the hull. The NC-3 and NC-4 were far from complete, so the Navy-Curtiss team began to work past midnight every day of the week.

In Washington, the so-called TA (trans-Atlantic) section kept busy, too. Although the cat was out of the bag, information on progress was restricted. To Towers fell the task of keeping newsmen "satisfied and happy, but not telling them anything." Of this chore he was later to say, "It was a most interesting work and very educational."

Invitations to the Allies to participate were handled through the State Department. The same channels secured permits for the use of the Canadian, Portuguese and British ports. All personnel had to be selected not only for the seaplanes but also for the handling crews on base ships. Voluminous lists of necessary materials were drawn up, some for equipment not yet in existence. The largest problem was that of the ships.

According to Towers, "Base ships had to be selected that could meet requirements, be fitted with gasoline tanks and special equipment. The destroyers had to have special radio

installations, star shells and meteorological apparatus. The number of dreadnaughts was astonishing. Our final plan called for a ship every 50 miles, and there were approximately 4,000 miles to be covered."

By March, while no pilots as yet had actual orders to go on the flight itself, it was assumed that most of the officers of the TA section would be included. Knowing he would remain in charge if progress was satisfactory, Towers submitted his choice of members for the crews. It would not be until mid-April that final selections were made, and by then certain changes would be made to Towers' original list.

Late in March, a violent storm caught the NC-1 at anchor. Dragged from her moorings, she was battered against the beach for three days. Her hull was damaged and her lower left wing shattered, and so were the hopes of a four-boat flight. It was decided to use the NC-2 for experiments until the latest possible date, then shift one of her wings to the NC-1, which would meanwhile be repaired and converted to a configuration similar to the NC-3 and NC-4.

The near-wrecking of the NC-1 served a good purpose. Inspection of the damage revealed that the pilots' dual control column had torn loose, and the critical wing and tail surfaces were flapping freely. Installation had been faulty. The record flight on which the NC-1 carried 51 men into the air could easily have been the world's first great air catastrophe.