

# The Twenties

1920–1929

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**T**he twenties stand out in the history of Naval Aviation as a decade of growth. The air arm steadily increased in size and strength while improving its administrative and operational position within the Navy. The period began under the leadership of a director without authority to direct. It ended with a flourishing Bureau of Aeronautics. In the early 1920s a small air detachment in each ocean fleet proved themselves effective under conditions at sea. At the end, three carriers were in full operation, patrol squadrons were performing scouting functions, and aircraft were regularly assigned to battleships and cruisers. Together these elements played important roles in the annual fleet war games.

Impressive technical progress also characterized the period. With slim funds, the radial air-cooled engine was developed into an efficient and reliable source of propulsion. Better instruments came into use, and an accurate bomb-sight was developed. Aircraft equipped with oleo struts and folding wings enhanced the operating capability of carriers. Each year, aircraft flew faster, higher and longer. Of the many world records placed on the books, U.S. Naval aircraft set their share.

Tactics were developed. Dive bombing was established almost before anyone knew enough about it to call it by name. Marine Corps expeditionary troops learned through experience the value of air support. The techniques of torpedo attack, scouting, spotting for gunfire and operating from advanced bases, were investigated and learned. The skills of naval pilots turned the airplane to new uses in polar exploration and photographic survey. It was evident everywhere that the Navy was solving its basic and unique problem of taking aviation to the sea.

But the period was also one of controversy that went beyond the Navy. Newspapers reported angry statements by the proponents of air power and virulent retorts from its opponents. There were charges of duplication, inefficiency, prejudice and jealousy. There was discussion over the role of air power and such issues as the role of the services in coastal defense. Even the further need for a Navy was questioned. Naval Aviators were unhappy with their career limita-

tions and lack of command responsibility. The aircraft industry was discontented with small peacetime orders and government procurement policies and government competition. Most of this controversy was typical of a new technology developing at a rapid pace, but not all of the questions would be answered before the decade's end.

## 1920

**8 January** The policy of the Army and Navy relating to aircraft was published for the information and guidance of the services. It defined the functions of Army, Navy and Marine aircraft as a guide to procurement, training and expansion of operating facilities; it set forth the conditions under which air operations would be coordinated in coast defense; it enunciated the means by which duplication of effort would be avoided; and it provided for the free exchange of technical information. An outgrowth of discussion in the previous year, this statement was one of many in a long line of interservice agreements on function and mission which spanned the years to and beyond the more familiar Key West and Newport agreements reached by the Joint Chiefs of Staff in 1948.

**19 January** Commandant, NAS Pensacola, Fla., reported that in the future no student would be designated a Naval Aviator or given a certificate of qualification as a Navy Air Pilot unless he could send and receive 20 words a minute on radio telegraph.

**20 January** The development and purchase of 200-hp radial air-cooled engines from the Lawrance Aero Engine Corporation was initiated with an allocation of \$100,000 to the Bureau of Steam Engineering for this purpose.

**17 March** To overcome an acute shortage of pilots, a change in the flight training program was approved which separated the heavier-than-air (seaplane) and the lighter-than-air (dirigible) courses; and reduced the overall training period from nine to six months for the duration of the shortage.

1920—Continued

**27 March** A successful test of the Sperry gyrostabilized automatic pilot system in an F-5L was completed at Hampton Roads, Va.

**2 April** NAS Hampton Roads, Va., reported that successful night weather soundings had been made since January, using candlelighted free balloons to measure the force and direction of the wind.

**1 May** Developmental and experimental work in metal construction for aircraft was disclosed in a Bureau of Construction and Repair report. Twelve German Fokker D-VII planes, which used welded steel extensively, were to be obtained from the Army and two sets of metal wings for the HS-3 flying boat were being procured from Charles Ward Hall.

**18 June** A reversible pitch propeller designed by Seth Hart and manufactured by the Engineering Division, Army Air Service, was installed on the C-10 airship at Rockaway Beach. That same month a Hart reversible pitch propeller was ordered for the VE-7.

**22 June** The Bureau of Navigation announced plans to select four officers for a two-year postgraduate course in aeronautical engineering at the Naval Academy and M.I.T., and asked for volunteers for the fall semester. Part of the requirement was that appointees take flight instruction and qualify as Naval Aviators after completing their studies.

**28 June** Six F-5Ls of the Atlantic Fleet Airboat Squadron, commanded by Lieutenant Commander Bruce G. Leighton, returned to Philadelphia, Pa., completing a seven-month cruise through the West Indies on which the squadron logged 12,731 nautical miles, including 4,000 flown on maneuvers with the fleet.

**6 July** In a test of the radio compass as an aid to navigation, an F-5L left Hampton Roads, Va., and flew directly to *Ohio* (BB 12), 94 miles at sea in a position unknown to the pilot. Without landing, the plane made the return trip to Hampton Roads, Va., this time navigating by signals from Norfolk, Va.

**12 July** A general order provided for the organization of the naval forces afloat into the Atlantic, Pacific and Asiatic Fleets; and for the formation of type forces within each designated Battleship, Cruiser, Destroyer, Submarine, Mine, Air and Train. Under this order, the Air Detachments in each fleet became Air Forces.

**17 July** The Secretary prescribed standard nomenclature for types and classes of naval vessels, including

aircraft, in which lighter-than-air craft were identified by the type "Z" and heavier-than-air craft by "V". Class letters assigned within the Z type were R, N and K for rigid dirigibles, non-rigid dirigibles and kite balloons respectively, while F, O, S, P, T and G were established for fighter, observation, scouting, patrol, torpedo and bombing and Fleet planes as classes within the V type.

**17 September** The site of the naval aviation activities on Ford Island was officially designated NAS Pearl Harbor, T.H.

**4 November** The third of a series of tests to determine the effectiveness of aerial bombs against ships was completed, using the old battleship *Indiana* (Battleship No. 1) as a target. The tests which began on 14 October were conducted at Tangier Sound in the Chesapeake Bay under carefully controlled conditions to determine both the accuracy with which bombs could be dropped on stationary targets and the damage caused by near-misses and direct hits.

## 1921

**20 January** The Secretary of the Navy approved a recommendation that development of radio-controlled aircraft be undertaken by the Bureau of Ordnance and the Bureau of Engineering.

**20 January** A Naval Aircraft Factory design of a turntable catapult, powered by compressed air, was approved by the Bureau of Construction and Repair for fabrication at the Philadelphia Navy Yard, Pa.



Aircraft were launched from capital ships by turntable catapult, shown on a pier at NAF with an N-9 428435

1921—Continued

**7 March** Captain William A. Moffett relieved Captain Thomas T. Craven as Director of Naval Aviation.

**15 March** The Metallurgical Laboratory at the Naval Aircraft Factory, Philadelphia, Pa., reported that a high-strength, chromium-vanadium steel alloy had proven satisfactory both in extensive laboratory tests and in the actual manufacture of aircraft fittings. These findings marked an important advance in the development of metal as a high-strength aircraft structural material.

**16 June** Two CR-1 Curtiss racers were ordered, the first of the series with which Navy and Army fliers captured many world speed records.

**1 July** The following basic ratings were established in the Aviation Branch: Aviation Machinist's Mate, Aviation Metalsmith, Aviation Carpenter's Mate, Aviation Rigger and Photographer. Although prior to this time certain general service ratings had been identified parenthetically as pertaining to aviation, qualifications for them required meeting the standards of the general rating in addition to those required for the aviation specialty. The ratings established on this date were the first concerned specifically with aviation and based solely on aviation requirements.

**12 July** An Act of Congress created a Bureau of Aeronautics, charged with matters pertaining to naval aeronautics as prescribed by the Secretary of the Navy.



W. A. Moffett the first Chief of the Bureau of Aeronautics 466366

**21 July** The bombing tests—The German battleship *Ostfriesland* was sunk by heavy bombs dropped by Army bombers in the last of a series of tests to determine the effectiveness of air weapons against combatant ships, and the means by which ship design and construction might counter their destructive capability. The tests, in which the Army participated at the invitation of the Navy, were carried out off the Virginia Capes beginning 21 June. On that day, the German submarine U-117 was sunk by 12 bombs dropped from Navy F-5Ls at 1,100 feet. On the 29th, Navy aircraft located the radio-controlled U.S. battleship ex-*Iowa* (Battleship No. 4) in 1 hour and 57 minutes after being alerted of her approach somewhere within a 25,000 square mile area and attacked with dummy bombs. On 13 July, Army bombers sank the German destroyer G-102, and on the 18th the German light



The *Ostfriesland* under attack in 1921 Army-Navy bombing test. Mining effects of hits like this sank her 161903

cruiser *Frankfurt* went down under the combined effect of 74 bombs delivered by Army and Navy aircraft. Tests against the *Ostfriesland* began on 20 July when Army, Navy and Marine Corps planes dropped 52 bombs, and they ended the next day when the Army delivered eleven 1,000- and 2,000-pounders. The Navy had originally planned the tests to provide detailed technical and tactical data on the effectiveness of aerial bombing against ships and the value of compartmentation in enabling ships to survive bomb damage; the Army participated for the purpose of portraying the superiority of air power over sea power. The divergence in purposes and resulting differences in operational plans were not reconciled and, in consequence, the Navy's purposes were not realized. The significance of the tests was hotly debated, and became a bone of contention between a generation of Army and Navy air officers. The one firm conclusion that could be drawn was that aircraft, in unopposed attack, could sink capital ships.

1921—Continued

**1 August** A World War I high-altitude bombsight, mounted on a gyroscopically stabilized base, was tested by the Torpedo Squadron, Atlantic Fleet at Yorktown, Va., marking the successful completion of the first phase of Carl L. Norden's development of an effective high-altitude bombsight for the Bureau of Ordnance.

**9 August** Rear Admiral Bradley A. Fiske, USN (Ret.), proposed as a landing surface for aircraft carriers, "a nice soft cushion" so mounted "that it would take up the forward motion of the airplane and not check its forward velocity at once."

**10 August** A General Order established the Bureau of Aeronautics, and defined its duties under the Secretary of the Navy as comprising "all that relates to designing, building, fitting out, and repairing Naval and Marine Corps aircraft;" gave it authority to recommend to the Bureau of Navigation and the Commandant of the Marine Corps on all matters pertaining to aeronautic training and the assignment of officer and enlisted personnel to aviation; described the scope of its relationships with other bureaus having cognizance of aeronautical materials and equipment; and also directed that special provision be made in its organization to furnish information "covering all aeronautic planning, operations and administration that may be called for by the Chief of Naval Operations."

**11 August** Practical development of carrier arresting gear was initiated at Hampton Roads as Lieutenant Alfred M. Pride taxied an Aeromarine onto the dummy deck, and engaged arresting wires. These tests resulted in the development of arresting gear for *Langley*, consisting essentially of both athwartship wires attached to weights, and fore and aft wires.

**24 August** During its fourth trial flight, the R-38 (ZR-2) rigid airship purchased by the Navy from the Royal Air Force, broke into two parts and fell into the Humber River at Hull, England. It carried to their deaths 28 British nationals and 16 Americans, including Air Commodore E. M. Maitland and Commander Louis H. Maxfield, the latter the prospective American commanding officer.

**1 September** The Bureau of Aeronautics began functioning as an organizational unit of the Navy Department, under its Chief, Rear Admiral William A. Moffett.

**26 October** A compressed air, turntable catapult, in its first successful test, launched an N-9 seaplane piloted by Commander Holden C. Richardson from a pier at the Philadelphia Navy Yard, Pa.

**3 November** A Curtiss-Navy racer, powered by a 400-hp Curtiss engine, on loan to the builder and piloted by Bert Acosta, won the Pulitzer Race at Omaha with a world record speed of 176.7 mph.

**1 December** The first flight of an airship inflated with helium gas was made at Norfolk, Va. The airship, the C-7, was piloted by Lieutenant Commander Ralph F. Wood.

**16 December** *Wright*, a seaplane tender and balloon carrier, was commissioned the AZ 1 at New York, N.Y., with Captain Alfred W. Johnson in command.

**20 December** To meet requirements expressed by several Pacific Fleet commands, the commanding officer of NAS San Diego, Calif., was authorized to establish a school for training Naval Aviators in the use of landplanes.



*Wright, AV1 with seaplane on board; the first U.S. Naval vessel especially fitted as an aircraft tender 1053778*

## 1922

**16 January** Parachutes issued for heavier-than-air use—The Bureau of Aeronautics directed that Army-type seat pack parachutes be shipped to Marine Corps aviation units in Haiti, the Dominican Republic, Guam and Quantico, Va.

**6 February** The Washington Treaty, limiting naval armament, was signed in Washington, D.C., by representatives of the British Empire, France, Italy, Japan and the United States. The treaty established a tonnage ratio of 5-5-3 for capital ships of Great Britain, the United States and Japan respectively, and a lesser figure for France and Italy. The same ratio for aircraft carrier tonnage set overall limits at 135,000-135,000-81,000 tons. The treaty also limited any new carrier to 27,000 tons with a provision that, if total carrier tonnage were not exceeded thereby, nations could build two carriers of not more than 33,000 tons each or obtain them by converting existing or partially constructed ships which would otherwise be scrapped by this treaty.

**7 February** The completion of a 50-hour test run of the Lawrance J-1, 200-hp, radial aircooled engine by the Aeronautical Engine Laboratory, Washington Navy Yard, D.C., foreshadowed the successful use of radial engines in naval aircraft.

**2 March** Experimental investigation and development of catapults using gunpowder was initiated, eventually producing a new type catapult for use in launching aircraft from capital ships.

**20 March** *Langley*, converted from the collier *Jupiter* (AC 3) as the first carrier of the U.S. Navy, was commissioned at Norfolk, Va., under command of her Executive Officer, Commander Kenneth Whiting.

**25 March** Research Laboratory as had been provided for in a public law passed in August 1916. Following the construction of necessary buildings at Bellevue, D.C., the Aircraft Radio Laboratory from NAS Anacostia, D.C., the Naval Radio Research Laboratory from the Bureau of Standards and the Sound Research Section of the Engineering Experiment Station were consolidated at the new organization prior to its establishment in July 1923. In view of the research orientation of this facility, it was generally called the Naval Research Laboratory, and its name was officially changed to that by the Naval Appropriations Act of 1926.

**27 March** To comply with a provision of the law establishing the Bureau of Aeronautics that its chief and at least 70 percent of its officers be either pilots or observers, the Bureau of Aeronautics defined the functions and qualifications of Naval Aviation Observers, and recommended a course of study for their training. Upon its approval by the Bureau of Navigation, Rear Admiral William A. Moffett reported for training, and on 17 June 1922 qualified as the first Naval Aviation Observer.

**29 March** A change in the aircraft designation system was promulgated which added the identity of the manufacturer to the model designation. Symbols consisted of a combination of letters and numbers in which the first letter identified the manufacturer and the second, the class (or mission) of the aircraft. Thus MO was a Martin observation plane. Numbers appearing between letters indicated the series of designs within the class built by the same manufacturer (the 1 being omitted) and numbers following a dash after the class letter indicated modifications of the basic model. Thus, the second modification of the MO became MO-2, while the second-design observation plane built by Martin became M2O.

*The first carrier, Langley, converted from the collier, Jupiter, with fighters and torpedo planes aboard 185915*



1922—Continued

**1 April** Descriptive specifications of arresting gear of the type later installed in *Lexington* and *Saratoga* were sent to various design engineers, including Carl L. Norden and Warren Noble. "The arresting gear will consist of two or more transverse wires stretched across the fore and aft wires . . . [and which] lead around sheaves placed outboard to hydraulic brakes. The plane after engaging the transverse wire is guided down the deck by the fore and aft wires and is brought to rest by the action of the transverse wire working with the hydraulic brakes."

**22 April** The Secretary of the Navy approved a recommendation of the general board that one spotting plane be assigned to each fleet battleship and cruiser, and that the feasibility of operating more aircraft from these ships be tested.

**24 April** In efforts to increase the service life of aircraft engines beyond the 50 hours then required, the Bureau of Aeronautics issued a contract to the Packard Motor Car Company for the 300-hour test of a Packard 1A-1551 dirigible engine. Such endurance testing, whereby the weaker components of an engine were identified in runs to destruction, and then redesigned for longer life, came to be an important step both in increasing the operating life of engines and in the development of new high performance engines.

**25 April** The first all-metal airplane designed for the Navy made its first flight. The ST-1 twin-engine torpedo plane, built by Stout Engineering Laboratory, was test-flown by Eddie Stinson. Although this aircraft possessed inadequate longitudinal stability, its completion marked a step forward in the development of all-metal aircraft.

**24 May** Routine operation of catapults aboard ship commenced with the successful launching of a VE-7 piloted by Lieutenant Andrew C. McFall, with Lieutenant DeWitt C. Ramsey as passenger, from *Maryland* (BB 46) off Yorktown, Va. A compressed air catapult was used. As catapults were installed on other battleships and then on cruisers, the Navy acquired the capability of operating aircraft from existing capital ships. Techniques were thus developed for supporting conventional surface forces, particularly in spotting for ships guns, and experimentation was conducted with aerial tactics that would later be further developed by carrier aviation. Perhaps more important, the capabilities and limitations of aircraft were demonstrated to officers and men throughout the Navy.

**31 May** In the National Elimination Balloon Race at Milwaukee, Wisc., the Navy was represented by two balloons: one manned by Lieutenant Commander Joseph P. Norfleet and Chief Rigger James F. Shade, and the other by Lieutenant William F. Reed and Chief Rigger K. Mullenix. Norfleet's balloon was filled with helium, the first use of the gas in a free balloon. Reed finished third in the race with a distance of 441 miles and was the only Navy qualifier for the International Balloon Race to be held at Geneva, Switzerland, later in the year.

**17 June** The practice of numbering aircraft squadrons to conform to the number of the ship squadron they served, was changed to a system of numbering all squadrons serially by class in the order in which they were initially authorized. The use of letter abbreviations to indicate mission was also adopted.

**17 June** In anticipation of a reorganization that would merge the Atlantic and Pacific Fleets into a U.S. Fleet, the fleet aviation commands, whose titles had previously been changed from Air Forces to Air Squadrons, were retitled Aircraft Squadrons of the Scouting and Battle Fleets. These commands would replace the Atlantic and Pacific Fleets, respectively.

**26 June** The rigid airship *Los Angeles* (ZR-3) was ordered from the Zeppelin Airship Company, Friedrichshafen, Germany. This zeppelin, part of World War I reparations, was obtained as a non-military aircraft under the terms approved by the Conference of Ambassadors on 16 December 1921.

**1 July** Eight medical officers, the first to report for flight training, began their instruction at NAS Pensacola, Fla. Four had previously completed the flight surgeon's course at the Army Technical School of Aviation Medicine.

**1 July** Congress authorized conversion of the unfinished battle cruisers *Lexington* and *Saratoga* to aircraft carriers, as permitted under the terms of the Washington Treaty.

**1 July** Navy men began training in the care and packing of parachutes when 10 Chief Petty Officers reported for two months instruction at the Army School at Chanute Field, Rantoul, Ill.

**3 July** Class XVI, the first class of student Naval Aviators to be trained in landplanes, began training at Pensacola, Fla.

1922—Continued

**17 July** The Chief of Naval Operations forwarded a list of Bureau and Division representatives to the Bureau of Navigation with the request that they be ordered to meet as a board for the purpose of drawing up tactical doctrine governing the employment of spotting aircraft in fleet fire control.

**27 September** The first mass torpedo practice against a live target was conducted off the Virginia Capes by 18 PT aircraft of Torpedo and Bombing Plane Squadron One. The squadron attacked the designated target, *Arkansas* (BB 33), which was one of a formation of three battleships that were maneuvering while running at full speed. The attack lasted over a 25 minute period during which the aircraft approached the ships from port and starboard and released 17 Mk VII Model 1 "A" torpedoes at distances of 500 to 1,000 yards and obtained eight hits on the designated target. Subsequent analysis emphasized artificialities which prevented the practice from demonstrating combat capability of either the surface or air units but the outstanding fact demonstrated was that torpedoes could be successfully launched from aircraft, and be made to run straight.

**27 September** Commanding officer, NAS Anacostia, D.C., proposed that radio could be used to detect the passage of a ship at night or during heavy fog. The means proposed, the "Beat method of detection," resulted from the unexpected nature of a radio signal observed by Commander A. Hoyt Taylor and Mr. L. C. Young of the Aircraft Radio Laboratory, NAS Anacostia, when a passing river steamer interrupted experimental high frequency radio transmissions between Anacostia and a receiver across the river at Hains Point, D.C. The observation and analysis of the phenomenon was a basic step in the chain of events that led to the U.S. Navy's invention of radar.

**8 October** The Curtiss Marine Trophy Race for seaplanes, held at Detroit, Mich., as an event of the National Air Races, was won by Lieutenant Aldophus W. Gorton, flying a TR-1 powered by a Lawrence, J-1 engine. He averaged 112.6 mph over the 160 mile course. Second place went to Lieutenant Harold A. Elliott in a Vought VE-7H.

**14 October** Lieutenants Harold J. Brow and Alford J. Williams, flying CR-2 and CR-1 Curtiss Racers with Curtiss D-12 engines, finished third and fourth in the Pulitzer Trophy Race at Detroit, Mich., making speeds of 193 and 187 mph, respectively.



*H. J. Brow with 1922 Curtiss CR  
Pulitzer Racer 1053781*

1922—Continued

**17 October** The first carrier takeoff in the U.S. Navy was made by Lieutenant Virgil C. Griffin in a Vought VE-7SF from *Langley*, at anchor in the York River.



*VE-7, type to make the first Langley take-off 651598*

**26 October** Lieutenant Commander Godfrey deC. Chevalier, flying an Aeromarine, made the first landing aboard the carrier *Langley* while underway off Cape Henry.

**14 November** Lieutenant Commander Godfrey deC. Chevalier, Naval Aviator No. 7, died in the Naval Hospital, Portsmouth, of injuries received in a plane crash two days before at Lochaven, near Norfolk, Va.

**18 November** Commander Kenneth Whiting, piloting a PT seaplane, made the first catapult launching from the carrier *Langley*, while she was at anchor in the York River.

**29 November** Lieutenants Ben H. Wyatt and George T. Owen, piloting DH-4Bs, arrived at San Diego, Calif., and completed a round trip transcontinental flight that began from the same place on 14 October. The planes made the trip in short hops, flying a southern route through Tucson, Ariz., New Orleans, La., and Pensacola, Fla., on the outward leg; and from Washington, D.C., through Dayton, Ohio, Omaha, Nebr., Salt Lake City, Utah, and San Francisco, Calif., on the homeward leg; completing the 7,000-mile trip in about 90 hours of flight. Layovers caused by mechanical difficulties, bad gasoline, weather and lack of navigating equipment accounted for most of the elapsed time.



*An aeromarine practices landings aboard Langley; LCDR G. deC. Chevalier made first landing on October 26, 1922 215821*





An aerial camera on the gun mount of a DH-4 1053779

## 1923

**6 February** Transfer of the Aeronautical Engine Laboratory from the Washington Navy Yard, D.C., to the Naval Aircraft Factory was authorized by the Secretary of the Navy, thereby clearly establishing the Naval Aircraft Factory as the center of the Navy's aeronautical development and experimental work.

**12 February** The Bureau of Navigation informed the Commandant at Pensacola, Fla., that two year's service in an operating unit subsequent to graduation from flight training was no longer a requirement for designation as a Naval Aviator.

**18–22 February** Aviation was employed in a U.S. Fleet Problem for the first time as Problem I was worked out to test the defenses of the Panama Canal against air attack. Blue Fleet and Army coastal and air units defending the Canal, were assisted by the operations of 18 patrol planes of Scouting Plane Squadron 1 based on the tenders *Wright* (AZ 1), *Sandpiper* (AM 51) and *Teal* (AM 23). The lack of carriers and planes for the attacking Black Fleet was made up by designating two battleships as simulated carriers. On the approach one of these, *Oklahoma* (BB 37), launched a seaplane by catapult to scout ahead of the force (21 Feb.), and early the next morning a single plane representing an air group took off from Naranyas Cays, flew in undetected and, without either air opposition or antiaircraft fire, theoretically destroyed Gatun Spillway with 10 miniature bombs.

**21 February** Tests of aircraft handling were made aboard *Langley* with Aeromarine operating in groups of three. Results showed that it required two minutes to prepare the deck after each landing; and in the best time for the day three planes were landed in seven minutes.

**21 February** In recognition of the fact that the newer aircraft engines offered advantages of longer life and lower cost, the Bureau of Aeronautics issued guidelines that severely restricted the repair and reuse of engines over two years old. Through this means, the Navy was able to expend promptly its residual stocks of World War I engines and equip most new aircraft with newer engines. More importantly, freed of the millstone of stocks of obsolescent engines, the Navy could aggressively sponsor the development of improved aircraft engines to meet its various requirements.

**7 March** Navy participation in aviation fuel research and development was indicated in the Aeronautical Engine Laboratory report on systematic tests, conducted by the Bureau of Standards, on mixtures of alcohol-gasoline and benzol-gasoline. Industrial and governmental research with fuels, of which this was a part, eventually resulted in the development of tetraethyl-lead as an additive for aviation fuels and of iso-octane as a standard for antiknock characteristics.

**10 March** The aircraft model designation system was modified by reversing the order of letters in the

1923—Continued

combination, placing the class letter first and manufacturer's letter last. Thus, the designation FB indicated a fighter built by Boeing. Although this modification applied only to new aircraft and did not change designations already assigned, the system so established remained in use until 1962.

**15 March** The training of nucleus crews for the rigid airships *Shenandoah* (ZR-1) and *Los Angeles* (ZR-3), which had been underway since 1 July 1922 at NAS Hampton Roads, Va., opened at a new location when ground school work started at NAS Lakehurst, N.J., under Captain Anton Heinan, lighter-than-air expert, formerly of the German Navy.

**15 April** The Naval Research Laboratory reported that equipment for radio control of aircraft had been demonstrated in an F-5L, and was found satisfactory up to a range of 10 miles. It also stated that radio control of an airplane during landing and takeoff was feasible.

**17 April** Lieutenant Rutledge Irvine, flying a Douglas DT equipped with a Liberty engine, established a world altitude record for Class C airplanes with a useful load of 1,000 kilograms, reaching 11,609 feet over McCook Field, Dayton, Ohio.

**26 May** The Chief of the Bureau of Aeronautics agreed with the Chief of the Air Service that it would be advantageous to both the aviation industry and the military services to work under identical aeronautic specifications whenever possible and further stated that he considered it desirable for the Army and Navy to work together toward that end immediately. When Lieutenant Ralph S. Barnaby was ordered to McCook Field as the bureau's representative at an interservice conference on standardization in December, a series of annual meetings was initiated that continued until 1937, when the Aeronautical Board assigned a full-time staff to carry on the work.

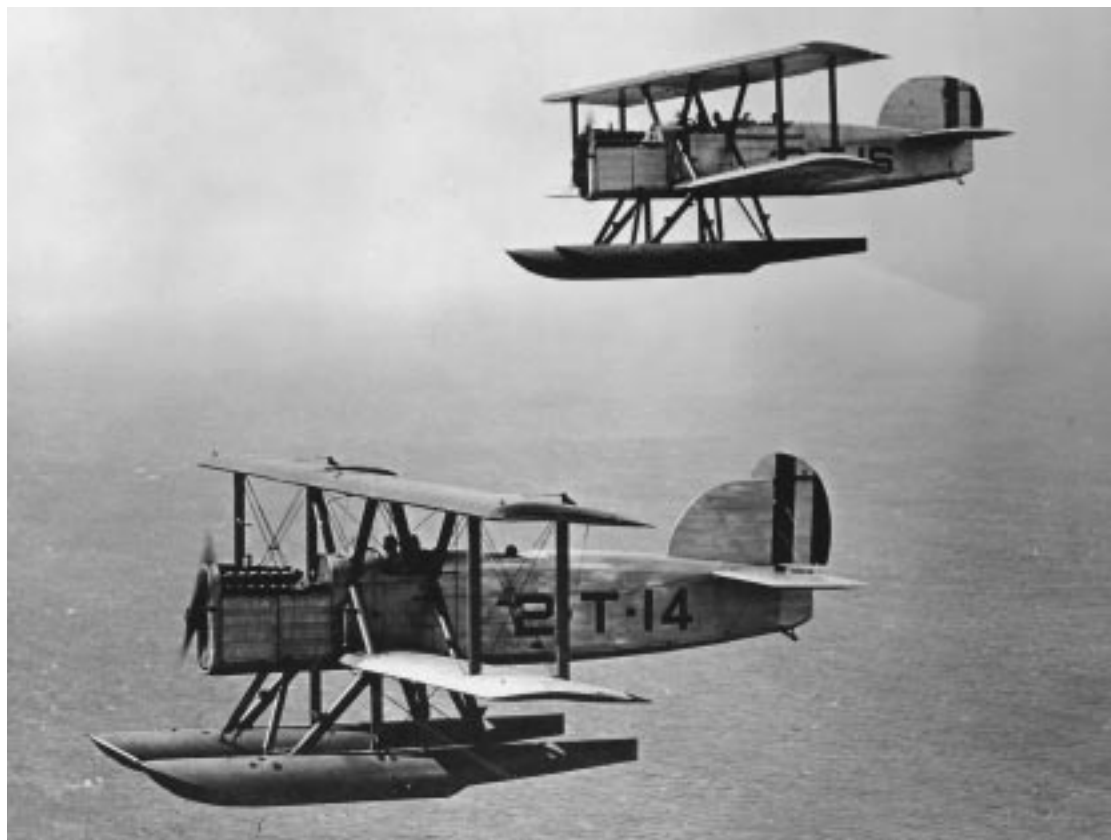
**6 June** Planes and pilots of Aircraft Squadrons, Battle Fleet, established seven world records for Class C seaplanes at San Diego, Calif., as follows:

Lieutenant (jg) Mainrad A. Schur, in a DT-2 torpedo plane, set the speed record for 500 kilometers at 72 mph.

Lieutenant Henry T. Stanley, in an F-5L patrol plane, set distance and duration records with a payload of 250 kilograms at 574.75 miles and 10 hours, 23 minutes, 58 seconds.

Lieutenant Herman E. Halland, in an F-5L patrol plane, set distance and duration records with a 500-kilogram payload at 466 miles and 7 hours, 35 minutes, 54 seconds.

*Two versions of the Douglas DT torpedo plane 426931*



1923—Continued

Lieutenant Robert L. Fuller, in a DT-2 torpedo plane, set distance and duration marks with a 1,000-kilogram payload at 205.2 miles and 2 hours, 45 minutes, 9 seconds.

**7 June** Pilots at San Diego, Calif., continued their assault on the record books with eight new world marks for Class C seaplanes as follows:

Lieutenant Earl B. Brix, in a DT-2, set an altitude record of 10,850 feet for planes carrying a 250-kilogram useful load.

Lieutenant Robert L. Fuller, in an F-5L, set an altitude record of 8,438 feet for planes carrying a 500-kilogram load.

Ensign Edward E. Dolecek, in an F-5L, set an altitude record of 7,979 feet for planes with a 1,000-kilogram load.

Lieutenant Cecil F. Harper, in a DT-2, set the altitude record of 13,898 feet for planes with no useful load.

Lieutenant Henry T. Stanley, in an F-5L, with a 1,500-kilogram load, set the duration mark at 2 hours, 18 minutes, and an altitude record of 5,682 feet.

Lieutenant Herman E. Halland, in an F-5L with a 2,000-kilogram load, set a duration record of 51 minutes and an altitude record of 4,885 feet.

**12 June** Lieutenant (jg) Mainrad A. Schur, flying a DT-2 Douglas torpedo plane powered with a Liberty engine, set three world records at San Diego, Calif., for Class C seaplanes with a duration mark of 11 hours, 16 minutes, 59 seconds, a distance mark of 792.25 miles, and a speed of 70.49 mph for 1,000 kilometers.

**13 June** At San Diego, Calif., Lieutenant Ralph A. Ofstie, in a TS seaplane equipped with a Lawrence J-1 engine, set world speed records for Class C seaplanes for 100 and 200 kilometers with speeds of 121.95 and 121.14 mph, respectively.

**21 July** The Bureau of Aeronautics established a policy of assigning experimental airplanes to fleet squadrons for operational evaluation before adopting them as service types.

**13 August** Constructive action towards building an effective aviation branch of the Naval Reserve Force was marked by the establishment of Naval Aviation Reserve Units at Fort Hamilton, N.Y., and Squantum, Mass.

**4 September** *Shenandoah* (ZR-1) made its first flight at NAS Lakehurst, N.J., Captain Frank R. McCrary commanding.

**28 September** U.S. Navy aircraft won first and second place in the international seaplane race for the Schneider Cup at Cowes, England, and in winning established a new world record for seaplanes with a speed of 169.89 miles per hour for 200 kilometers. Lieutenant David Rittenhouse, the new record holder, marked up 177.38 miles per hour for the race and Lieutenant Rutledge Irvine placed second with 173.46 mph. Both were flying CR-3s equipped with Curtiss D-12 engines.



*CR-3, winner of 1923 Schneider Trophy Race 175426*

**6 October** Navy planes swept the Pulitzer Trophy Race at St. Louis, Mo., taking the first four places all at faster speeds than the winning time of the previous year. Both first and second place bettered the world's speed mark, with the winner Lieutenant Alford J. Williams in an R2C, setting the new records for 100 and 200 kilometers at 243.812 and 243.673 mph, respectively.

**2 November** Lieutenant Harold J. Brow, flying an R2C-1 equipped with a Curtiss D-12 engine, established a world speed record at Mitchel Field, Long Island, N.Y., averaging 259.47 mph in four flights over the 3-kilometer course.



*Al Williams' R2C won the 1923 Pulitzer Race 458279*

1923—Continued

**4 November** Lieutenant Alford J. Williams, flying an R2C-1 equipped with a Curtiss D-12 engine, raised the world speed record to 266.59 mph at Mitchel Field, Long Island, N.Y., bettering the record set by Lieutenant Harold J. Brow only two days before.

**5 November** A series of tests, designed to show the feasibility of stowing a seaplane aboard the submarine S-1 and launching it, were completed at the Hampton Roads Naval Base, Va. A crew from *Langley*, supervised by Lieutenant Commander Virgil C. Griffin, had cooperated with the S-1's Commanding Officer, Lieutenant Powel M. Rhea, in carrying out the tests which involved removing a disassembled Martin MS-1 from a tank on the submarine, assembling it, and launching it by submerging the submarine.

**6 November** Lieutenant Alford J. Williams, in an R2C-1, climbed to 5,000 feet in 1 minute, bettering the best previously reported climb of 2,000 feet in the same time.

**16 November** The Bureau of Aeronautics directed that all aircraft attached to vessels of the fleet be overhauled once every six months.

**3 December** The establishment of a special service squadron, for the purpose of developing long-distance scouting planes, was approved by the Chief of Naval Operations. The squadron, designated VS Squadron 3, was initially based at NAS Anacostia, D.C., and commanded by Lieutenant Commander Charles P. Mason.

**7 December** The Bureau of Aeronautics established a new designation system for catapults whereby a type letter, "A" for compressed air, "P" for powder, and "F" for flywheel, indicated the energy source while major design modifications were indicated by Mark numbers. Under this system, the compressed air, turntable catapult demonstrated at the Naval Aircraft Factory and installed aboard *Maryland* (BB 46) was designated type "A" Mark I, and *Langley's* catapult was designated type "A", Mark III. This designation system was subsequently extended, with some modification, to include other energy sources, notably the type letter "H" for hydraulic catapults.

## 1924

**3 January** VT Squadron 20, commanded by Lieutenant Commander George D. Murray, sailed from San Diego, Calif., on board *Vega* (AK 17) for transfer to the Philippine Islands to operate from *Ajax* (AG 15) as the first air unit of the Asiatic Fleet.

**4 February** The Bureau of Aeronautics directed that the practice of striping or camouflaging aircraft be discontinued and that by 1 July all aircraft should be painted in accordance with the prescribed naval gray except stretched fabric on wing and tail and some fuselage surfaces which were to be aluminum. The one exception permitted was that all squadrons of a station, force, or fleet could uniformly paint the upper wing chrome yellow or other color to increase visibility in case of forced landing.

**26 February** VS Squadron 3 was authorized to fly one division of CS seaplanes from Anacostia, D.C., to



*Al Williams, speed record holder with R3C-1 459589*

1924—Continued

Miami, Fla, and Key West, Fla., and return, for the purpose of conducting service tests under actual operating conditions.

**8 March** The race for the Curtiss Marine Trophy at Miami was won by Lieutenant L. V. Grant in a Vought VE-7, at an average speed of 116.1 mph.

**21 March** The Bureau of Aeronautics directed that service parachutes be used by all personnel on all flights.

**21 April** The Bureau of Aeronautics requested the Bureau of Steam Engineering to investigate development of a single-wave radio sending and receiving set, suitable for installation in fighting planes, with a 20-mile sending radius, and powered by a small battery or engine driven generator.

**2 May** A DT plane, carrying a dummy torpedo, was launched by catapult from *Langley*, at anchor in Pensacola Bay, Fla. The plane was piloted by Lieutenant W. M. Dillion and also carried Lieutenant Stanton H. Wooster as gunnery officer.

**19 June** The Bureau of Ordnance issued a contract to the Ford Instrument Company for development of an antiaircraft director for shipboard fire control.

**22–23 June** Lieutenants Frank W. Wead and John D. Price, in a Curtiss CS-2 equipped with one Wright T-3 Tornado engine, set five world records for Class C sea-

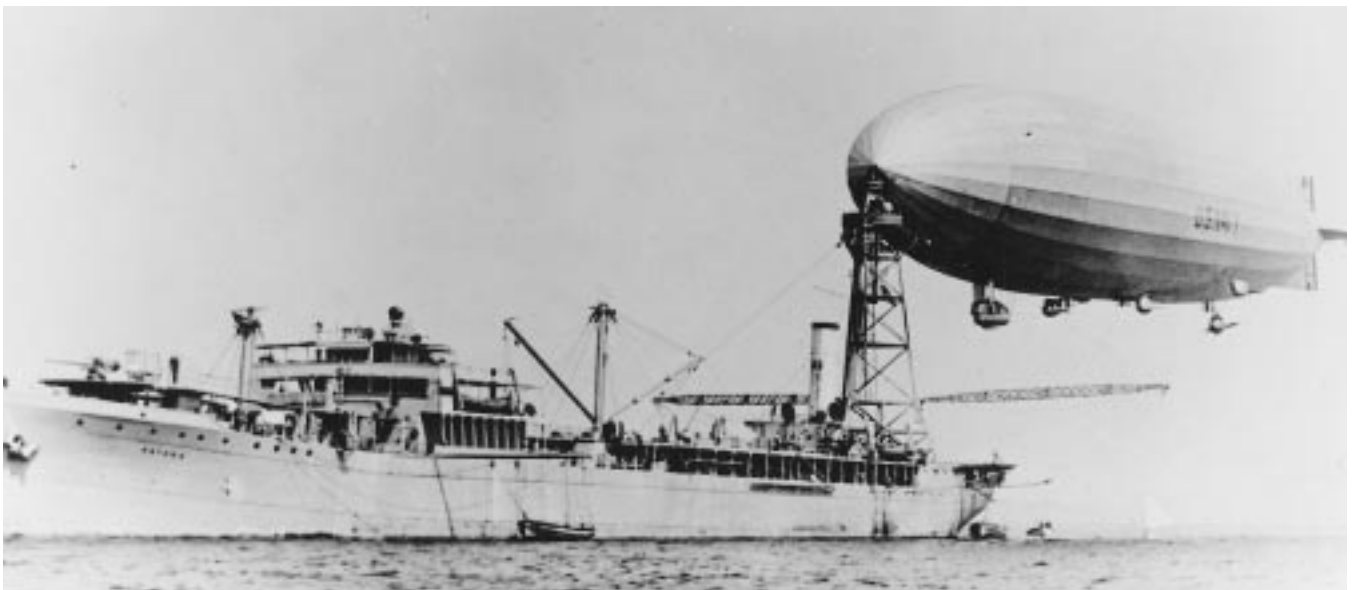
planes at Anacostia, D.C.; one for distance with 963.123 miles; one for duration for 13 hours, 23 minutes, 15 seconds; and three for speeds of 73.41 mph for 500 kilometers, 74.27 mph for 1,000 kilometers, and 74.17 mph for 1,500 kilometers.

**24 June** A technical order was issued which prescribed the external color of naval aircraft. Overall color was to be aluminum enamel with clear varnish on wooden spars and struts. Naval yellow enamel was to be used on the top surfaces of upper wings of training planes and yellow or other high visibility color could similarly be applied to all aircraft of any station, force or fleet.

**11–12 July** Lieutenants Frank W. Wead and John D. Price, flying a CS-2 equipped with a Wright Tornado engine, broke world records for Class C sea-planes at Anacostia, D.C., with new marks for distance of 994.19 miles and for duration of 14 hours, 53 minutes, 44 seconds.

**23 July** The Bureau of Aeronautics announced that it was assuming cognizance of pigeon boxes for use in aircraft.

**8 August** *Shenandoah* (ZR-1) secured to the mooring mast on *Patoka* (AO 9) while underway in Narragansett Bay, remained moored to the ship during her passage to anchor off Jamestown, R.I., and cast off next day, almost 24 hours later. This was the first use of the mooring mast erected aboard ship to facilitate airship operations with the fleet.



*In first use of mooring mast aboard ship, the airship, Shenandoah, moored to Patoka, August 8, 1924 19-N-9670*

1924—Continued

**11 August** Observation planes from the light cruiser *Raleigh* (CL 7) took off from the water near the Arctic Circle on the first of several reconnaissance flights over the Greenland coast from Angmagsalik to Cape Farewell to locate suitable emergency landing areas for the Army flyers, then crossing the Atlantic, via Iceland, on the last leg of their round-the-world flight.

**15 August** In the first use of rigid airships with the fleet, *Shenandoah* (ZR-1) departed Lakehurst, N.J., to take part in a Scouting Fleet problem 300 miles at sea. She discovered the “enemy” fleet but heavy rains forced her early retirement to base where she arrived 17 August after 40 hours in the air.

**1 September** A parachute school opened at NAS Lakehurst, N.J., to train enlisted men in the care, operation, maintenance and testing of parachutes—the first school of its kind in the Navy.

**15 September** An N-9 seaplane, equipped with radio control and without a human pilot aboard, was flown on a 40-minute flight at the Naval Proving Grounds, Dahlgren, Va. Although the aircraft sank from damage sustained while landing, this test demonstrated the practicability of radio control of aircraft.

**18 September** The repair ship *Medusa* (AR 1) was commissioned and a section of VO-2, consisting of two officers and 20 men, was organized and assigned as a ship-plane repair detail to support the operations of VO-1.

**10 October** A CS-2 seaplane, piloted by Lieutenants Andrew Crinkley and Rossmore D. Lyon, landed at Quantico, Va., after a continuous flight from NAS Anacostia, D.C., of 20 hours, 28 minutes, and 1,460 miles logged. Although the flight exceeded world records for endurance and distance, it was not officially timed and therefore not an official record.

**15 October** The rigid airship ZR-3 was delivered at NAS Lakehurst, N.J., completing a 5,000-mile flight from Friedrichshafen, Germany, in 81 hours under the command of Dr. Hugo Eckener, and with prospective commanding officer, Captain George W. Steele aboard.

**16 October** Emergency use of parachute—Following a mid-air collision over Coronado, Calif., Gunner William M. Coles, USN, of VF Squadron 1, made a successful emergency parachute jump from his JN.

**25 October** When all foreign entrants withdrew from the Schneider Cup Race to be held at Bayshore

Park, Md., the United States agreed to cancel the race rather than win by a flyaway. Instead, the Navy staged a series of record attempts in which the scheduled contestants and other naval aircraft put 17 world records in the book for Class C seaplanes as follows: Lieutenant George T. Cuddihy, in a CR-3 powered with a Curtiss D-12 engine, broke a maximum world speed record of almost two years standing with 188.078 mph.

Lieutenant Ralph A. Ofstie, in a CR-3 with a Curtiss D-12 engine, broke world speed records for 100, 200 and 500 kilometers with marks of 178.25 mph for the 100 and 200 and 161.14 for the 500.

Lieutenant George R. Henderson, in a PN-7 flying boat equipped with two Wright T-2 engines, set four records for speed over 100 and 200 kilometers with loads of 250 and 500 kilograms, all at 78.507 mph; and four records with a useful load of 1,000 kilograms with a speed of 78.507 mph for 100 and 200 kilometers, a distance record of 248.55 miles and a duration record of 5 hours, 28 minutes, 43 seconds.

Lieutenant Osborne B. Hardison, also in a PN-7, set world records for speed over 100 kilometers, and for distance with a useful load of 1,500 kilograms at 68.4 mph and 62.137 miles, and three more with a useful load of 2,000 kilograms in speed for 100 kilometers at 68.4 mph, distance 62.137 miles, and duration 1 hour, 49 minutes, 11.9 seconds.

**25 October** The rigid airship *Shenandoah* (ZR-1), commanded by Lieutenant Commander Zachary Lansdowne, landed at NAS Lakehurst, N.J., completing a round-trip transcontinental cruise that began on 7 October and covered 9,317 miles in 258 hours of flight. The trip included stops at Fort Worth, Tex., San Diego, Calif., and a stay of 11 days on the west coast, including a flight to Camp Lewis at Tacoma, Wash.

**11 November** Lieutenant Dixie Kiefer piloted a plane in a successful night catapult launch from *California* (BB 44) at anchor in San Diego, Calif., harbor. The launch at 9:46 p.m. was aided only by searchlights trained about 1,000 yards ahead.

**14 November** Qualifications for Flight Surgeons were agreed upon by the Chiefs of the Bureau of Aeronautics and the Bureau of Medicine and Surgery, which required medical officers to complete the three-month course at the U.S. Army School of Aviation Medicine and three months of satisfactory service with a Naval Aviation unit before designation. The requirement that a medical officer so qualified also make flights in aircraft was limited to emergencies and the desire of the officer.

1924—Continued

**17 November** *Langley* reported for duty with the Battle Fleet, thereby ending over two years in experimental status and becoming the first operational aircraft carrier in the U.S. Navy. On 1 December she also became the flagship of Aircraft Squadrons, Battle Fleet.

**25 November** Mrs. Calvin Coolidge christened the ZR-3 as *Los Angeles* (ZR-3) at NAS Anacostia, D.C. As a part of the ceremony it was commissioned a ship of the Fleet, with Captain George W. Steele commanding.

**13 December** The NM-1, an all-metal airplane, was flown at the Naval Aircraft Factory. This aircraft was designed and built for the purpose of developing metal construction for naval airplanes and was intended for Marine Corps expeditionary use.

**14 December** A powder catapult was successfully demonstrated in the launching of a Martin MO-1 observation plane from the forward turret of the battleship *Mississippi* (BB 41) at Bremerton, Wash. The aircraft was piloted by Lieutenant L. C. Hayden with Lieutenant William M. Fellers as passenger. Following this demonstration, the powder catapult was widely used on battleships and cruisers.

## 1925

**17 January** A special board, headed by the Chief of Naval Operations, Admiral Edward W. Eberle, submitted its report to the Secretary of the Navy. Appointed on 23 September 1924 to consider recent developments in aviation and to recommend a policy for the development of the Navy in its various branches, the board devoted most of its discussion to the importance of the battleship, but in its recommendations gave prominence to aviation. For this branch, it recommended that carriers be built up to treaty limits, that *Lexington* and *Saratoga* be completed expeditiously, that a new 23,000-ton carrier be laid down, and that a progressive aircraft building program be established to insure a complete complement of modern planes for the fleet. In regard to personnel, the board recommended expansion of aviation offerings at the Naval Academy, assignment of all qualified academy graduates to aviator or observer training after two years of sea duty, and the establishment of a definite policy governing assignment of officers to aviation.

**22 January** VF Squadron 2, the first trained to operate as a squadron from a carrier, began landing prac-

tice on *Langley* off San Diego, Calif. This was also the beginning of the *Langley* operations as a unit of Aircraft Squadrons, Battle Fleet.

**4 February** Commanding officers were made responsible for determining when aircraft attached to vessels of the fleet required overhaul, and an earlier order of 1923 was canceled which had required complete overhaul of such aircraft every six months.

**2-11 March** Fleet Problem V, the first to incorporate aircraft carrier operations, was conducted off the coast of Lower California. Although the air activity of *Langley* was limited to scouting in advance of the Black Fleet movement to Guadalupe Island, the performance was convincing enough for the Commander in Chief, Admiral Robert E. Coontz, to recommend that completion of *Lexington* and *Saratoga* be speeded up as much as possible. The Admiral also recommended that steps be taken to insure development of planes of greater durability, dependability and radius, and that catapult and recovery gear be further improved. He also reported that experience now permitted catapulting of planes from battleships and cruisers as routine.

**11 March** Routine aerological sounding flights—NAS Anacostia, D.C., reported arrangements were being made for daily weather flights to an altitude of 10,000 feet to obtain weather data and to test upper-air sounding equipment. These flights commenced in mid-April, and the following February the schedule was extended to include Saturday, Sunday and holiday flights, with the altitude being increased to 15,000 feet.

**13 March** Rear Admiral William A. Moffett was appointed for a second tour of duty as Chief of the Bureau of Aeronautics.

**2 April** The feasibility of using flush-deck catapults to launch landplanes was demonstrated by catapulting a DT-2 landplane, piloted by Lieutenant Commander Charles P. Mason, with Lieutenant Braxton Rhodes as passenger, from the *Langley*, moored to its dock in San Diego, Calif.

**8 April** Lieutenant John D. Price, piloting a VF-1 plane, made a night landing on *Langley*, at sea off San Diego, Calif., and was followed on board by Lieutenants Delbert L. Conley, Aldolphus W. Gorton and Rossmore D. Lyon. Except for an accidental landing on the night of 5 February when Lieutenant Harold J. Brow stalled while practicing night approaches, these were the first night landings made on board a U.S. carrier.

1925—Continued

**8 April** Almost two years after the special aviation uniform had been abolished, new uniforms of forestry green for winter and khaki for summer were authorized for Naval Aviators, Observers, and other officers on duty involving flying. Although there were minor modifications to the original design in later years, this uniform, in khaki, was adopted for the entire Navy in 1941.

**1-2 May** Lieutenants Clarence H. Schildhauer and James R. Kyle, on a test flight over Philadelphia, Pa., of the PN-9 manufactured at the Naval Aircraft Factory, broke the world endurance record for Class C seaplanes, remaining in the air for 28 hours, 35 minutes, 27 seconds. The plane, a metalhulled flying boat equipped with two Packard engines, was used by Commander John Rodgers later in the year on his record flight toward Hawaii.



*Rodger's PN-9 on mainland to Hawaii flight, forced down after record distance, sailed 450 miles to Kauai 426936*

**5 May** The Secretary of the Navy approved reorganization of certain departments at the Naval Academy as required to make aviation an integral part of the curriculum; the establishment of a program, beginning with the Class of 1926, to give three months of special ground and flight instruction to all midshipmen; and additional instruction as necessary to qualify each graduate as an aviator or observer during the first two years after graduation.

**29 May** The standard color of naval aircraft was modified: hulls and floats of seaplanes were to be painted navy gray; wings, fuselages, landing gear, etc., aluminum color; and the top surface of upper wings, stabilizers and elevators, orange-yellow.

**17 June** The Naval Air Detail, under Lieutenant Commander Richard E. Byrd of the MacMillan Expedition, sailed from Boston with three Loening amphibians aboard *Peary* (DD 340). *Bowdoin* (a civilian research ship) joined *Peary* (DD 340) off Wiscasset, Maine, and after a 3,000-mile voyage, the expedition reached Etah in North Greenland on 1 August to begin an aerial exploration of the area that covered 30,000 square miles before the end of the month.

**1 July** When a law, enacted 28 February, became effective, the Naval Aviation Reserve began to organize into 10 squadrons of four divisions each. Authorized squadron complements for each of three scouting and three bombing squadrons were established at 40 officers and 130 men, and for each of four fighting squadrons at 18 officers and 20 men.

**1 September** Commander John Rodgers, Lieutenant Byron J. Connell and a crew of three in a PN-9,



*A traditional Hawaiian greeting to Rodgers and crew at Kauai 184669*



1925—Continued

attempting a flight from San Francisco, Calif., to Honolulu, T.H. (Territory of Hawaii) were forced down by lack of fuel shortly after 4:00 in the afternoon. Lost at sea for 10 days in spite of extensive air and sea search, Commander Rodgers and his crew rigged sail from the wing fabric and set course for Kauai Island. After covering about 450 miles by sail, they were sighted on 10 September by the submarine R-4, 10 miles from their goal. The 1,841.12 statute miles, flown from 31 August to their forced landing was accepted by the F.A.I. as a new world airline distance record for Class C seaplanes that remained unbeaten for almost five years.

**3 September** The rigid dirigible *Shenandoah* (ZR-1) was torn apart in a severe line squall before daylight over Byesville, Ohio. The control car and after section of the hull fell directly to the ground, while the forward section with seven men aboard free-ballooned for an hour before they landed safely 12 miles from the scene of the crash. In all there were 29 survivors, but 14 were killed including Lieutenant Commander Zachary Lansdowne, the commanding officer.

**29 September** The Chief of Naval Operations directed that all heavier-than-air Naval Aviators, not already qualified to pilot landplanes, be given training in landplane operation.

**3 October** In view of the need for an accumulation of upper air data for improved weather forecasting, the Bureau of Aeronautics requested that aircraft squadron flagships take upper air soundings twice a day when at sea.

**5 October** VJ-1B, first of the Utility Squadrons, was formed at San Diego, Calif., from personnel of VS-2B and assigned to Aircraft Squadrons, Battle Fleet. Lieutenant John F. Moloney was the first commanding officer.

**26 October** The two Navy entries in the Schneider Cup Race at Bay Shore Park, Md., flown by Lieutenants George Cuddihy and Ralph A. Ofstie, were forced out of the race on the last lap with engine trouble.

**27 October** Oleo shock-absorbing landing gear for aircraft was reported in use on NB-1, FB-1, UO-1, SC-2 and new bombing planes being constructed by the Naval Aircraft Factory, Douglas and Boeing.

**30 November** The President's Aircraft Board, better known as the Morrow Board, after its senior member, submitted its report to President Calvin Coolidge. On

the basis of views expressed in extended hearings by prominent civilian and military leaders, the board made recommendations in regard to the aviation industry and military aviation that were of far reaching importance and influenced a number of legislative actions taken in the following months. Its recommendations against a separate air force and in favor of representation for aviation on operational commands and high level administrative offices, and its recognition of the need for a policy of long-range procurement and standard replacement schedules were among those of special interest to the Navy.

**14 December** The Lampert Committee, set up on 24 March 1924 by the House of Representatives as the Select Committee of Inquiry into the Operations of the United States Air Services, filed its report. It favored establishment of a Department of National Defense and an adequate representation of aviation in the high military councils. It showed particular concern over the state of the aircraft industry and recommended that the government cease competing with the industry in the production of aircraft, engines and accessories; that the requirement of competitive bidding be abolished in favor of other restrictions promoting the best interests of the Government; that the War and Navy Departments each spend \$10 million annually for new flying equipment; and that a five-year construction and procurement program be carried out.

**18 December** Competitive trials of Consolidated, Curtiss and Huff Daland aircraft, designed as land, sea gunnery and training planes were completed at NAS Anacostia, D.C. These trials led to the procurement of the Consolidated NY series of training planes which continued in use into the 1930s.

## 1926

**21 April** The Secretary of the Navy directed that beginning with the Class of 1926, all graduates of the Naval Academy be given a course of 25 hours of flight instruction during their first year of sea duty and that, for the purpose of providing this instruction, flight schools be established at the naval air stations at Hampton Roads, Va., and San Diego, Calif.

**9 May** Lieutenant Commander Richard E. Byrd and Aviation Pilot Floyd Bennett, flying a trimotor Fokker named the *Josephine Ford*, made the first flight over the North Pole, reaching it at 9:03 GCT. After circling the Pole, they returned to base at Kings Bay, Spitzbergen, Norway completing the round trip in 15 and one half hours.

1926—Continued



*F6C-1 Curtiss fighter  
powered by D-12  
engine 460634*

**14 May** The Curtiss Marine Trophy Race, held off Hains Point, D.C., over the Potomac, was won by Lieutenant Thomas P. Jeter in a Curtiss F6C-1 Hawk with a speed of 130.94 mph.

**6 June** The last elements of the Alaskan Aerial Survey Expedition departed Seattle, Wash., for Alaska. The expedition, under command of Lieutenant Ben H. Wyatt, was composed of the tender *Gannet* (AM 41), the barge YF 88 housing a photo lab, and three Loening amphibians. The work of the expedition, which extended through the summer and into September, was performed in cooperation with the Department of the Interior for early aerial mapping of Alaska.

**16 June** The Bureau of Aeronautics reported that the emergency barricade on *Langley* had successfully prevented landing aircraft from crashing into planes parked on the flight deck.

**24 June** An Act of Congress, implementing the recommendations of the Morrow Board pertaining to the Navy, provided that command of aviation stations, schools and tactical flight units be assigned to Naval Aviators; that command of aircraft carriers and tenders be assigned to either Naval Aviators or Naval Aviation Observers; that the office of an Assistant Secretary of the Navy be created to foster naval aeronautics; and that a five year aircraft program be set up under which

the number on hand would be increased to reach 1,000 useful planes.

**1 July** Provisions of a law enacted 24 June became effective, establishing a requirement that the number of enlisted pilots be not less than 30 percent of the total number of pilots on active duty in the Navy.

**2 July** The Distinguished Flying Cross was authorized by Congress as an award for acts of heroism or extraordinary achievement in aerial flight by any member of the armed services including the National Guard and the Reserves. The award was retroactive to 6 April 1917.

**10 July** Edward P. Warner took the oath of office as the first Assistant Secretary of the Navy for Aeronautics.



*First Assistant  
Secretary of the  
Navy for Air  
E. P. Warner*

1926—Continued

**28 July** The submarine S-1, commanded by Lieutenant C. B. Momsen, surfaced and launched a Cox-Klemin XS-2 seaplane, flown by Lieutenant D. C. Allen. It also recovered the aircraft and submerged completing the first cycle of operations in a series of tests investigating the feasibility of basing aircraft on submarines.



*S-1 demonstrates the feasibility of operating aircraft from submarines in tests with XS-2 seaplane, 1926 1053777*

**9 August** In a day of tests to determine the speed with which aircraft could be operated at sea, pilots of VF Squadron 1 completed 127 landings aboard *Langley*. As a result of the experience gained, the same squadron later landed 12 planes in 21 minutes under the emergency conditions created when the ship ran into a heavy mist.

**18 August** A contract was let to the Aircraft Development Corporation, Detroit, Mich., for a metal-clad airship designated ZMC-2. The descriptive term "metal-clad" resulted from the fact that the ZMC-2's lightly framed hull was covered with gas-tight stressed-aluminum skin. It was also to be pressure-rigid in that the shape of the hull was to be maintained by positive internal gas pressure.

**27 August** Commander John Rodgers, Naval Aviator No. 2, on a flight from NAS Anacostia, D.C., crashed in the Delaware River near the Naval Aircraft Factory dock and received injuries from which he died on the same day.

**22 October** In a display of tactics developed by VF Squadron 2, Lieutenant Commander Frank D. Wagner led the F6C-2 Curtiss fighters in a simulated attack on the heavy ships of the Pacific Fleet as they sortied

from San Pedro. Coming down in almost vertical dives from 12,000 feet at the exact time of which the fleet had been forewarned, the squadron achieved complete surprise and so impressed fleet and ship commanders with the effectiveness of their spectacular approach that there was unanimous agreement that such an attack would succeed over any defense. This was the first fleet demonstration of dive-bombing and although the tactic had been worked out by the demonstrating squadron in an independently initiated project, the obvious nature of the solution to the problem of effective bomb delivery was evident in that the same tactic was similarly and simultaneously being developed by VF Squadron 5 on the east coast.

**13 November** Lieutenant Christian F. Schilt, USMC, flying an R3C-2, took second in the Schneider Cup Race at Hampton Roads, Va., with an average speed of 231.363 mph. This was the last Navy participation in international racing competition.

**19 November** *Maryland* (BB 46) conducted experimental firing with the Mark XIX anti-aircraft fire control system which had been developed by the Ford Instrument Company and which incorporated a stabilized line of sight to aid in tracking approaching aircraft.

**13 December** Rear Admiral Joseph M. Reeves, commanding Aircraft Squadrons, Battle Fleet, reported on the results of the first dive bombing exercise ("light bombing," as it was then called) to be conducted in the formal fleet gunnery competition. One Marine and two Navy fighter squadrons and three Navy observation squadrons participated. The Marine and Navy fighters made 45 degree dives from 2,500 feet and at



*FB-5 fitted for longitudinal arresting wires 458533*

1926—Continued

an altitude of 400 feet, dropped 25 pound fragmentation bombs; observation squadrons similarly attacked from 1,000 feet. Pilots of VF-2, commanded by Lieutenant Commander Frank D. Wagner and flying F6Cs and FB-5s, scored 19 hits with 45 bombs on a target 100 feet by 45 feet. The uses visualized for this tactic included disabling or demolishing flight decks, destroying enemy aircraft in flight, attacking exposed personnel on ship or shore and attacking light surface craft and submarines.

## 1927

**1 January** A flight test section was established as a separate department at NAS Anacostia, D.C., with Lieutenant George R. Henderson in charge.

**1 January** To test the feasibility of using enlisted pilots in fleet squadrons, VF Squadron 2, manned with four Naval Aviators and 10 Aviation Pilots, was established at San Diego, Calif., Lieutenant Commander James M. Shoemaker commanding.

**18 January** Lieutenant Commander John R. Poppen, MC, reported for duty in charge of the Aviation Section of the Naval Medical School, Washington, D.C., marking the beginning of a three month period during which the entire resources of the school were devoted to intensive instruction in aviation medicine. The institution of this program also marked the beginning of

Flight Surgeon training in the Navy and the discontinuance of an interservice agreement in effect since 1922, by which Navy Medical Officers were trained in this specialty at the Army School for Flight Surgeons.

**9 March** The first passenger transport, the JR-1 trimotor, was purchased from the Ford Motor Company following a demonstration at NAS Anacostia, D.C.

**14 April** Lieutenant George R. Henderson, flying a Vought O2U Corsair equipped with a Pratt & Whitney Wasp engine, broke the world altitude record for Class C seaplanes with a useful load of 500 kilograms, reaching 22,178 feet over Washington, D.C.

**23 April** Lieutenant Steven W. Callaway, flying a Vought O2U Corsair at Hampton Roads, Va., set a new 100-kilometer world speed record for Class C seaplanes with a 500 kilogram useful load, at 147.263 mph.

**30 April** Lieutenant James D. Barner, flying a Vought O2U Corsair at Hampton Roads, Va., broke the 500-kilometer world speed record for Class C seaplanes carrying a useful load of 500 kilograms with a speed of 136.023 mph.

**5 May** Lieutenant Carleton C. Champion took off from Hampton Roads, Va., in a Wright Apache, equipped with a Pratt & Whitney Wasp engine and NACA supercharger, and climbed to an altitude of 33,455 feet, breaking the existing world record for Class C seaplanes by better than 3,000 feet.



*Battleship-based  
O2Us (Vought  
Corsairs) of  
1920s 426930*

1927—Continued

**21 May** Lieutenant Rutledge Irvine, in a Vought O2U Corsair equipped with a Pratt & Whitney Wasp engine, established a world record for Class C Seaplanes for 1,000 kilometers at Hampton Roads, Va., with a speed of 130.932 mph.

**23 May** A major advance in the transition from wooden to metal aircraft structures resulted from the Naval Aircraft Factory's report that the corrosion of aluminum by salt water—hitherto a serious obstacle to the use of aluminum alloys on naval aircraft—could be decreased by the application of anodic coatings.

**27 May** Dive bombing came under official study as the Chief of Naval Operations ordered the Commander in Chief, Battle Fleet, to conduct tests to evaluate its effectiveness against moving targets. Carried out by VF Squadron 5S in late summer and early fall, the results of these tests generated wide discussion of the need for special aircraft and units, which led directly to the development of equipment and adoption of the tactic as a standard method of attack.

**1 July** A new system of squadron designation became effective providing, in addition to the standard class designation letters and identification number, a suffix letter to indicate the fleet, force, or unit to which the squadron was assigned. Under this system VF-1B was Fighting Squadron 1 of Battle Force.

**1 July** The practice of sending Naval Reserve aviation officers to one year of training duty with the fleet after graduation from Pensacola, Fla., began with the assignment of the first group of 50 newly commissioned ensigns.

**4 July** Lieutenant Carleton C. Champion, flying a Wright Apache powered with a Pratt & Whitney engine, reached 37,995 feet over Anacostia, D.C., thereby breaking his own world altitude record for Class C seaplanes, established 2 months earlier. This height exceeded any previously reached by heavier-than-air aircraft.

**8 July** Lieutenant Byron J. Connell and Naval Aviator Pilot S. R. Pope, flying a PN-10 equipped with two Packard engines, set new world duration and distance records for Class C seaplanes with a useful load of 2,000 kilograms, and a new world duration record with a 1,000 kilogram load, on the same flight out of San Diego, logging 11 hours 7 minutes 18 seconds in the air and a distance of 947.705 miles.

**17 July** Major Ross E. Rowell, USMC, led a flight of five DHs in a strafing and dive bombing attack against bandit forces surrounding a garrison of U.S. Marines at Ocotal, Nicaragua. Although instances of diving attacks had occurred during World War I and Marine Corps pilots had used the same technique in Haiti in 1919, this attack was made according to doctrine developed in training and is generally considered as the first organized dive bombing attack in combat.

**25 July** Three weeks after breaking the seaplane altitude record, Lieutenant Carleton C. Champion took off from Anacostia, D.C., in a Wright Apache rigged as a landplane and reached 38,419 feet, establishing a new world record that stood for 2 years.

**15–16 August** Lieutenants Byron J. Connell and Herbert C. Rodd, flying out of San Diego in a PN-10 patrol plane equipped with two Packard engines, broke three world records for Class C seaplanes; distance with a 500-kilogram load, and duration with a 500-kilogram load, with marks of 1,569.0 miles and 20 hours 45 minutes 40 seconds in the air.

**18 August** Lieutenants Byron J. Connell and Herbert C. Rodd took off from San Diego, Calif., in a PN-10 flying boat with a useful load of 7,726 pounds, and climbed to 2,000 meters to break the world record for the greatest payload carried to that altitude by a Class C seaplane.

**16 November** *Saratoga*, first carrier and fifth ship of the Navy to bear the name, was placed in commission at Camden, N.J., Captain Harry E. Yarnell commanding.

**14 December** *Lexington*, first carrier and fourth ship of the Navy to carry the name, was commissioned at Quincy, Mass., Captain Albert W. Marshall commanding.

## 1928

**5 January** The first takeoff and landing on *Lexington* was made by Lieutenant Alfred M. Pride in a UO-1 as the ship moved from the Fore River Plant to the Boston Navy Yard in Massachusetts.

**6 January** Lieutenant Christian F. Schilt, USMC, flying an O2U-1, made the first of 10 flights in which he landed in a street of the village of Quilahi, Nicaragua, and evacuated 18 wounded officers and men while under hostile fire. For this feat, which he accomplished in three successive days, Schilt was awarded the Medal of Honor.

1928—Continued



*Saratoga with a deck-load of aircraft USN 1027066*

1928—Continued



*Schilt gets medal of honor USMC 521201*

**11 January** The first takeoff and landing on *Saratoga* was made by her Air Officer, Commander Marc A. Mitscher in a UO-1.

**27 January** *Los Angeles* (ZR-3) made a successful landing on *Saratoga* at sea off Newport, R.I., and remained on board long enough to transfer passengers and take on fuel, water and supplies.



*UO-1 makes landing on Saratoga, CV 3 424479*

**1 February** Joint Army-Navy nomenclature for aircraft engines became effective whereby standard type names were assigned to engines based upon the cubic inches of piston displacement—to the nearest ten. Under this scheme, the Vee type Curtiss D-12 engine received the standard type name Curtiss V-1150 and the air-cooled radial J-5 Whirlwind became the first Wright R-790.

**27 February** Commander Theodore C. Ellyson, the first Naval Aviator, and Lieutenant Commander Hugo Schmidt and Lieutenant Rogers Ranshousen, crashed to their deaths in a Loening amphibian in Chesapeake Bay while on a night flight from Norfolk, Va., to Annapolis, Md.

**28 February** An order was issued limiting the application of standard type names for aircraft engines to air-cooled engines of recent design. For example, the standard type name, Curtiss V-1150, was abolished and this engine was reassigned its earlier D-12 designation. On the other hand, the designation Wright R-790 was retained with provisions for use of R-790-A to indicate a major modification while earlier models of this engine kept the old designations, J-2, J-3 and J-4.

**28 February** The contract for the XPY-1 flying boat was issued to the Consolidated Aircraft Corporation. This aircraft, which was designed for alternate installation of two or three engines, was the first large monoplane flying boat procured by the Navy, and was the initial configuration which evolved into the PBY Catalina.

1928—Continued

**3-5 May** Lieutenants Arthur Gavin and Zeus Soucek, in a PN-12 equipped with two Wright Cyclone engines, set the world duration record for Class C seaplanes in a flight of 36 hours 1 minute over Philadelphia, Pa.

**11 May** An Act of Congress provided that duty performed by officers assigned to airships which required them to make regular and frequent aerial flights, could be certified by the Secretary as service equivalent to sea duty.

**19 May** Major Charles A. Lutz, USMC, won the Curtiss Marine Trophy Race at Anacostia, D.C., in an F6C-3, making a speed of 157.6 mph over the 100-mile course.

**25-26 May** Lieutenants Zeus Soucek and Lisle Maxson, in a PN-12 powered by two Wright engines, set world marks for Class C seaplanes with a 1,000-kilogram useful load: speed over 2,000 kilometers at 80.288 mph; distance at 1,243.20 miles; and duration at 17 hours 55 minutes 13.6 seconds.

**12 June** *Lexington* anchored in Lahaina Roads, Hawaii, at the end of a speed run from San Pedro, Calif., to Honolulu, Hawaii, that broke all existing records for the distance with an elapsed time of 72 hours and 34 minutes.

**26 June** Lieutenant Arthur Gavin, piloting a PN-12 powered with two Pratt & Whitney Hornet engines, set a world altitude record of 15,426 feet at Philadelphia, Pa., for Class C seaplanes with a payload of 2,000 kilograms.



*Lexington* off Diamond Head. *Lexington* and *Saratoga* were constructed on battle cruiser hulls 416531

**27 June** Lieutenant Arthur Gavin, in a PN-12 equipped with two 525-hp Pratt & Whitney engines, made a world record altitude flight of 19,593 feet at Philadelphia for Class C seaplanes with a useful load of 1,000 kilograms.

**30 June** A contract was issued to the Martin Company for development of the XT5M-1 "diving bomber," which, in a later production version, became the BM-1. This aircraft and the Naval Aircraft Factory's similar XT2N-1 were the first dive bombers designed to deliver a 1,000-pound bomb.

**11-12 July** A PN-12, powered with two Pratt & Whitney engines and piloted by Lieutenant Aldolphus W. Gorton and Chief Boatswain Earl E. Reber, in a flight out of Philadelphia, Pa., set five world records for Class C seaplanes as follows: distance and speed for 2,000 kilometers with both 1,000- and 2,000-kilogram loads at 1,336 miles and 81.043 mph; and a duration mark of 16 hours, 39 minutes with a 2,000-kilogram load.



The XT2N-1 heavy dive bomber built by NAF 462160



Air races were featured in the 1920s. LT A. W. Gorton in TR-1 won the 1922 Curtiss Marine Trophy Race 65098



1928—Continued

**25 July** The removal of bow and stern catapults on *Langley* was authorized since neither had been operated in three years.

**6 October** Contracts for the 6,500,000 cubic foot rigid airships ZRS-4 and ZRS-5, subsequently christened *Akron* (ZRS-4) and *Macon* (ZRS-5), were let to the Goodyear Zeppelin Corporation, Akron, Ohio.

**14 December** Fourteen fighting-plane radio telephone sets, operating on a frequency of 3,000 to 4,000 kilocycles and featuring an engine-driven generator, were shipped to VB-2B Squadron aboard the *Saratoga* for service tests. This equipment had been designed at NAS Anacostia, D.C., and manufactured at the Washington Navy Yard, D.C., in order to provide early evaluation of radio equipment in single-seat aircraft.

## 1929

**16 January** Experience in night flying became a requirement for all heavier-than-air Naval Aviators and Naval Aviation Pilots of the Navy and Marine Corps. The Chief of Naval Operations ordered that prior to 1 July 1930, each qualified aviator pilot an aircraft on 10 hours of night flying involving at least 20 landings, and that student aviators meet the same requirement during the first year of their first duty assignment.

**21 January** The Naval Proving Ground recommended that three prototypes of the production version of the Mark XI Norden bombsight be accepted and reported that on the first trial two of the three sights had placed a bomb within 25 feet of the target.

**23-27 January** The carriers *Lexington* and *Saratoga* appeared in fleet exercises for the first time, attached to opposing forces in Fleet Problem IX. The most notable event of the Problem was the employment of *Saratoga* by the attacking Black Fleet to achieve its primary objective, the theoretical destruction of the Panama Canal. This carrier was detached from the main force and with an escorting cruiser, sent on a wide southward sweep before turning north to approach within striking distance of the canal. On the morning of the 26th, while it was still dark, she launched a strike group of 69 aircraft which arrived over the target undetected shortly after dawn and completed the theoretical destruction of the Miraflores and Pedro Miguel Locks without opposition. This demonstration made a profound impression on naval tacticians and in the 1930 maneuvers, a tactical unit, built around the aircraft carrier, appeared in force organization for the first time.

**1 March** The Secretary directed that 33 officers of the Construction Corps and one officer of the line designated for Engineering Duty Only (EDO), with such additional Naval Constructors and EDO officers as the exigencies of the Navy permitted and the needs of the Bureau of Aeronautics required, be assigned to duty in the Aeronautical Organization.

**1 March** In an effort to increase the proportion of officers completing the flight training course at Pensacola, Fla., and thereby reducing per capita training expense, the indoctrination courses at Hampton Roads, Va., and San Diego, Calif., were changed to elimination courses that would emphasize flight familiarization to determine aptitude and be open only to those meeting the physical requirements for aviators.

**13 March** Rear Admiral William A. Moffett was appointed for a third consecutive tour as Chief of the Bureau of Aeronautics.

**9 April** The feasibility of abandoning fore-and-aft wire arresting gear was confirmed in operations aboard *Langley*. These, and similar operations aboard *Saratoga* later that month, culminated a year of experimental development on the landing platform at Hampton Roads, Va., and led to the Secretary's authorizing, in September, the physical removal from the carriers of the fore-and-aft wires and associated equipment.

**4-6 May** In winning the National Elimination Balloon Race with a flight from Pitt Stadium, Pittsburgh, Pa., to Savage Harbor, Prince Edward Island, Canada, Lieutenant Thomas G. W. Settle and Ensign Wilfred Bushnell won the Litchfield Trophy, qualified for the International Race to be held later in the year, and established world distance records for balloons in three categories from 1,601 to 4,000 cubic meters capacity with a flight of 952 miles.

**8 May** The Bureau of Aeronautics announced the policy of providing all carrier airplanes with brakes and wheel type tail skids, following successful operations of a T4M so equipped in tests carried out aboard *Langley* in conjunction with the elimination of the fore-and-aft wire arresting gear.

**8 May** Lieutenant Apollo Soucek, flying a Wright Apache equipped with a 425-hp Pratt & Whitney Wasp engine, set a new world record for Class C landplanes, reaching 39,140 feet over NAS Anacostia, D.C.

**10 May** The Distinguished Flying Cross was awarded to Lieutenant Alford J. Williams by the Secretary of the

1929—Continued



*Soucek in his Apache during the altitude record flight #80-G-416204*

Navy for extraordinary achievement in aerial flight during March 1928 in which he studied the action of aircraft in violent maneuvers and inverted flight, and developed and applied principles of operation which contributed directly to safety in flight and the development of more accurate methods of testing the performance capabilities of aircraft.

**25 May** The race for the Curtiss Marine Trophy, held at NAS Anacostia, D.C., was won by Lieutenant William G. Tomlinson in an XF7C-1 with a speed of 162.52 mph.

**4 June** Lieutenant Apollo Soucek, in a Wright Apache equipped with a Pratt & Whitney Wasp engine, set the new world altitude mark for Class C seaplanes at 38,560 feet.

**11 June** General standards for shielding aircraft engine ignition, essential to long range radio reception, were established at a conference held at the Bureau of Standards. Navy representatives included Lieutenant Commander Allen I. Price from the Bureau of Aeronautics and C. B. Mirick and L. A. Hyland from the Naval Research Laboratory. Basic techniques for shielding airborne radio from ignition interference had been developed by a naval radio group at the Bureau of Standards at the close of World War I and had per-

mitted some rather remarkable radio reception. Although some use of ignition shielding had been made throughout the 1920s, the results generally indifferent in that adequate shielding had brought with it undue cost in terms of aircraft maintenance or degradation of aircraft performance. At the June 1929 conference, spokesmen for aircraft, engine and radio fields and for magneto, sparkplug and cable specialties considered each other's problems sympathetically in order to develop practical shielding standards. Within the next year or so ignition shielding was generally applied to naval aircraft and a requirement for ignition shielding was included in the 1932 edition of the "General Specification for the Design and Construction of Airplanes for the United States Navy."

**9 August** The ZMC-2, a metal clad 200,000-cubic foot airship built by Aircraft Development Corporation, made its first flight at Grosse Ile (Detroit) Airport, Mich. This airship, subsequently delivered to NAS Lakehurst, N.J., was utilized several years for training purposes.

**20 August** Lieutenant Aldolphus W. Gorton, flying a specially equipped UO-1, made several successful hook-ons to the trapeze of *Los Angeles* (ZR-3) over NAS Lakehurst, N.J. Earlier attempts by the same pilot on 3 July were foiled when the hook failed to operate after making contact with the trapeze.

1929—Continued

**29 November** The first flight over the South Pole was made in a Ford trimotor named the Floyd Bennett. The flight was commanded by Commander Richard E. Byrd who also did the navigating. Bernt Balchen was pilot, Harold June was co-pilot and radio operator and Captain Ashley McKinley, USA, photographer. Takeoff from Little America on McMurdo

Sound was at 10:29 p.m. on the 28th, New York time, and the Pole was reached at 8:55 a.m. on the 29th. The round trip, including a fuel stop on the return flight, required almost 19 hours.

**27 December** Based upon scores obtained with the new Norden gyrostabilized MARK XI bombsight during fleet exercises, the Bureau of Ordnance reported that the sight gave about 40 percent more hits than earlier bombsights.



*The ZMC-2 metal-clad airship completed in 1929 21724*



*Lieutenant A. W. Gorton flying a Vought UO-1 makes hook-on landing on Los Angeles, a German-build rigid airship. 461642*



*F4Bs of Fighter Squadron VF-1B in formation 426947*



*Martin bomber drops torpedo 184698*



*The SC-1 scout bomber and torpedo plane 1053780*

*Ford trimotor, early passenger transport, RR-5 5370*



*PD-1 patrol planes conducting high altitude horizontal bombing 184590*



*Airships J-4 and L-1 flying over Barnegat Bay 463784*



*Mine layer Aroostook, first ship assigned to aviation in the Pacific served as a seaplane tender 1919-1931 1053770*



*F-5L and DT aboard Teal, a Bird-class tender 1053769*



*T4M-1 is released from Langley arresting gear, fiddle bridges, in background, supported fore and aft wires 426932*