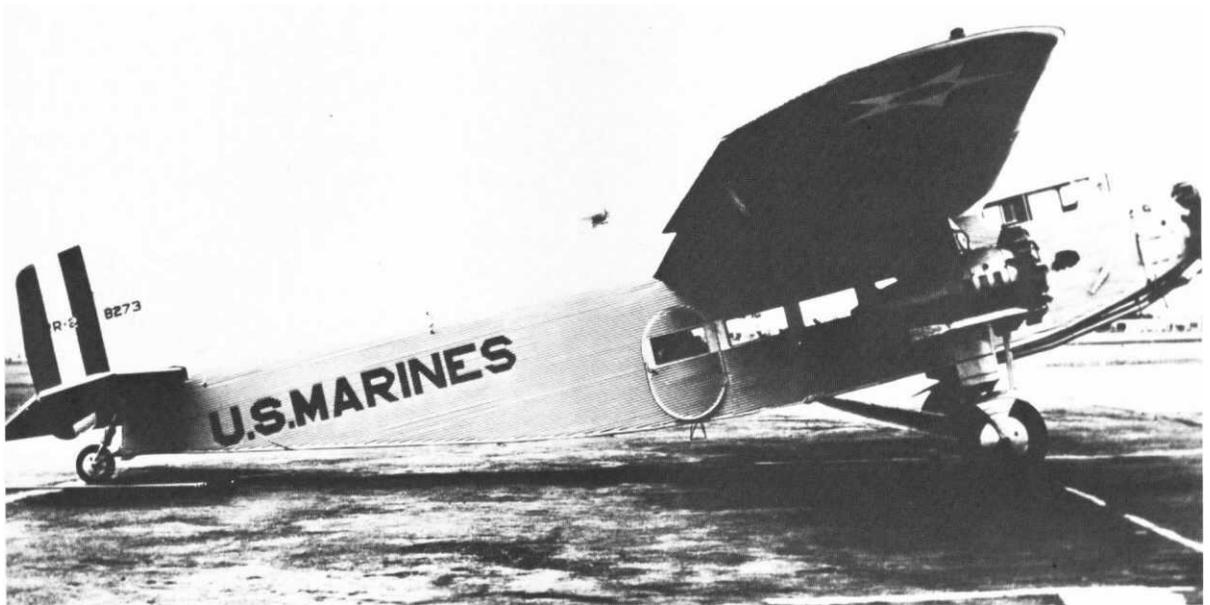
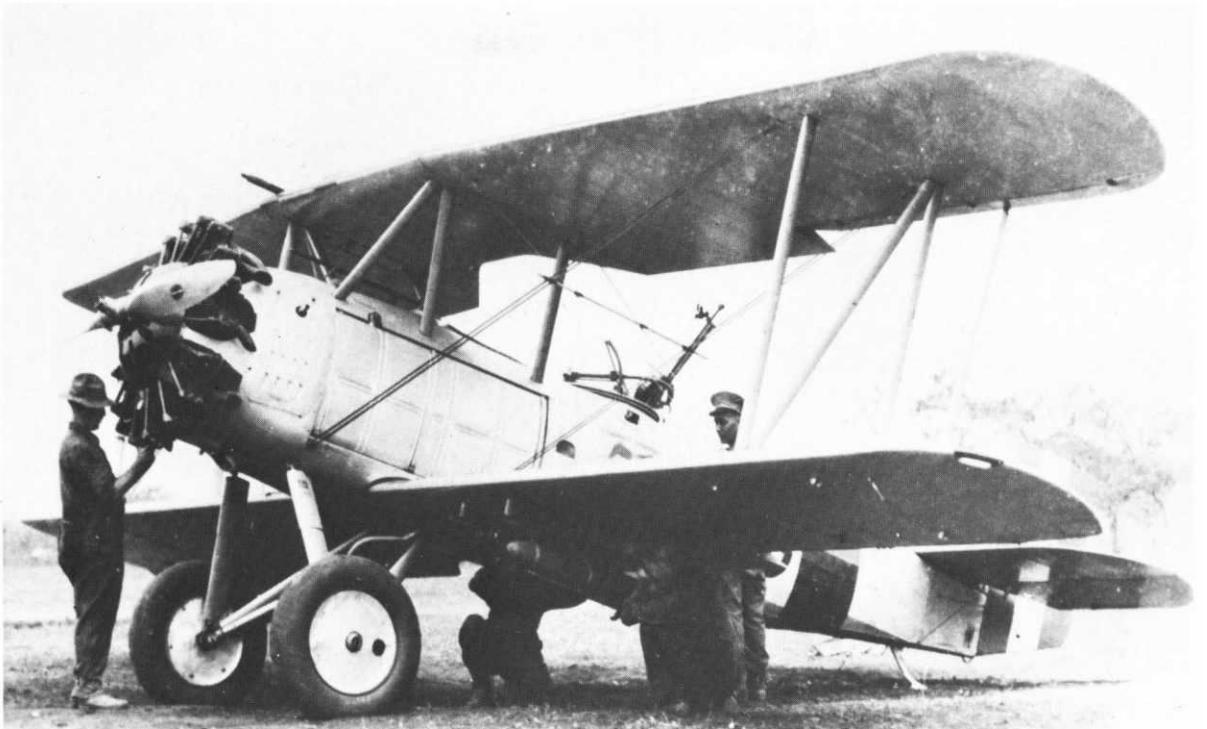




*An Atlantic-Fokker TA-2 at Managua, Nicaragua, in 1929. These tri-motor transports greatly increased the freight and passenger carrying capacity of Marine aviation. (Marine Corps Photo 528145).*



*The "Tin Goose" or Ford RR-2 trimotor transport, further enlarged Marine airlift capacity in Nicaragua in 1929. Its all-metal construction made it easier to maintain than the Fokker. (Marine Corps Photo A402978).*



*One of two O2U-1 "Corsairs" flown by Lieutenant Schilt at Quilali in 1929. The oversize DH-4B wheels dominate the undercarriage. (Marine Corps Photo 529590).*

in 1916. The six Jennies of 1st Air Squadron, commanded by Captain Walter E. McCaughtry, began operations at San Pedro de Macoris, Dominican Republic, in February 1919, while the six Jennies and six HS-2Ls of the 4th squadron\*

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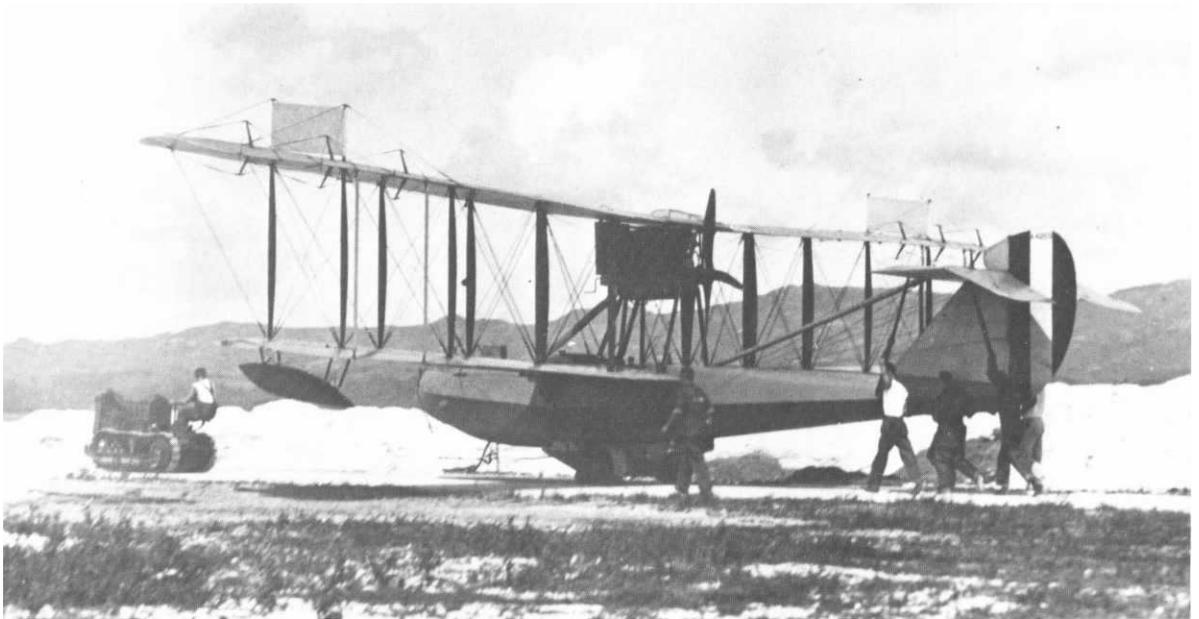
\* This force was designated 1st Division, Flight E, until the reorganization of 1920.

under Captain Harvey B. Mims took station at Port au Prince, Haiti, on 31 March.

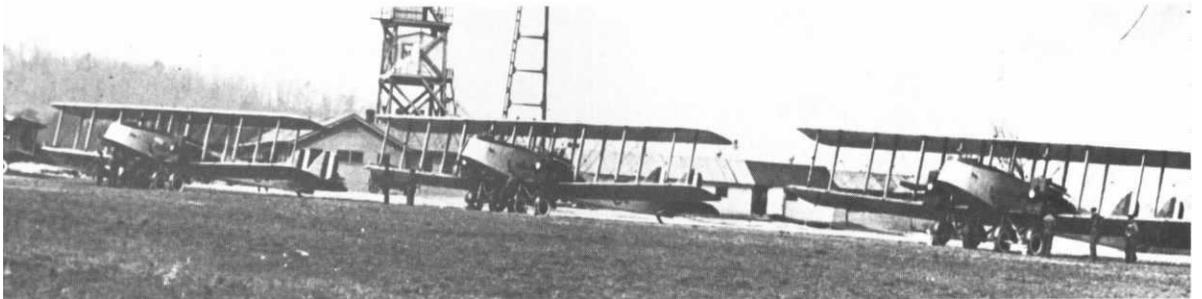
The 1st Squadron operated in the Dominican Republic until 1924, when it withdrew with the rest of the Marine contingent. The squadron in Haiti remained with the Marines in that country until final American evacuation in 1934. In both countries, Marine aviators assisted their com-



*A Fokker transport prepares to drop supplies to a patrol in Nicaragua in 1929. (Marine Corps Photo 514940).*



*A Curtiss HS-2L of Marine Scouting Squadron 1 (VS-1M) on Guam in May 1926. (Marine Corps Photo 530811).*



*Three of the giant Martin bombers lined up on the field at Quantico in 1925. (Nat Archives RG 127-G Photo 514939).*



*A Boeing FB-1 of Marine Fighting Squadron 6 (VF-6M) at San Diego. This was an early model of the new generation of aircraft the Marines began receiving in the late Twenties. (Nat Archives RG 127-G Photo 530238).*

rades on the ground in drawn-out, tedious guerrilla warfare against indigenous irregulars, called "Cacos" in Haiti and "Bandits" in Santo Domingo.

Aircraft on a number of occasions took part in active combat, bombing and strafing bandit groups or guiding ground patrols to contact. However, the limited armament and maneuverability of the planes and the lack of rapid, reliable air-ground communications rendered Marine aviation less than decisive as an anti-bandit weapon. In both Haiti and Santo Domingo, the air squadrons proved most useful in indirect support roles, carrying mail and passengers to remote posts, reconnoitering and mapping, and sometimes transporting supplies or evacuating wounded men. The ability of aviation to enhance the mobility of forces operating in largely roadless terrain began to become apparent to Marines in these campaigns.<sup>35</sup>

During the operations in Haiti, Marines began practicing a tactic fundamental to the carrying out of their close support mission. That tactic was dive bombing. During the summer of 1919, Lieutenant Lawson H. M. Sanderson of 4th Squadron, then stationed in Haiti, decided that he and his fellow pilots needed a more accurate method of delivering bombs against the enemy "Cacos." In experimental exercises, Sanderson abandoned the hitherto standard procedure of allowing his observer to release the bomb from horizontal flight while aiming with a crude sight protruding from the rear cockpit. Instead, he entered what was then considered a steep dive of 45 degrees, pointed the nose of his aircraft at the target, and released the bomb from the pilot's position at an altitude of about 250 feet.\* He found that this method made his bombing much more accurate, and other members of his squadron soon adopted it. By late 1920, Marines at Quantico were using it also.<sup>36</sup>

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\* By modern standards, what Sanderson was doing would be called "glide bombing," as a true, steep, powered dive was impossible in the planes of that day. At the time, however, they called it dive bombing and with sturdier machines like the Curtiss F6C series began to approximate the modern tactic. Lieutenant Sanderson never claimed to be the inventor of dive bombing, although probably he was the first Marine to use the tactic. Apparently, dive (or glide) bombing evolved in a number of air services during World War I. Both Allied and German pilots are reported to have used it in combat, and U.S. Army fliers at Ellington Field, Texas, practiced it during 1917-1918, dropping their bombs from wing racks controlled by wires leading to the pilot's cockpit.

While Sanderson introduced dive bombing to Marine aviators on the Atlantic Coast around 1920, it reached West Coast Marines from the Army. In May 1923, while taking an advanced course of instruction at Kelly Field, Texas, Major Ross Rowell, USMC, observed and participated in dive bombing exercises directed by Major Lewis H. Brereton, USA. Rowell, who claimed that this was the first time he had seen dive bombing, was impressed with its accuracy and "I immediately visualized the certain naval employment of such tactics where accuracy against small moving targets is paramount. Also it seemed to me that it would be an excellent form of tactics for use in guerrilla warfare."

When he took command of Observation Squadron 1 (VO-1M) at San Diego in 1924, Rowell trained his pilots in dive bombing and obtained Army-type, wing-mounted bomb racks for their DH-4Bs.\*\* His squadron put on dive bombing demonstrations at airport openings and air shows all up and down the West Coast. Eventually in Nicaragua they would have the chance to use their skill in combat.<sup>37</sup>

While Sanderson, Rowell, and others experimented with new tactics, Marine aviation in 1921 began its historic role in the Pacific when Flight L, organized at Parris Island, went by ship to Sunay, Guam. Since no air facility then existed on Guam, the unit's first mission was to build an airfield and seaplane base as part of a Navy plan (aborted by the Naval Disarmament Conference of 1921-1922) to build up the island's defenses. To this end, the flight embarked with every spare piece of air station equipment the Navy and Marine Corps could gather from the East Coast. For aircraft, the flight received N-9s and HS-2Ls, along with the giant F-5L. Later the unit acquired VE-7s and Loening amphibians. After completing its base on Guam, the unit settled down to routine training and the collection of meteorological data, continuing both activities until it was withdrawn from Guam in 1931. The weather information gathered by these Marine aviators, along with the presence of the

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\*\* Marine aviators during the 1920s used any scout or observation plane for dive bombing, including Jennies and DH-4Bs and later Curtiss Hawks and Helldivers. Biplanes could dive bomb without wing flaps or diving brakes because their "built-in headwind" of struts, wires, fixed landing gear, etc. kept their speed under 400 miles per hour even in a wide-open vertical dive.

air facilities that they built, contributed much to the development of trans-Pacific aviation.<sup>38\*</sup>

### China and Nicaragua

New overseas commitments developed in 1927, when the outbreak of civil wars in China and Nicaragua threatened American lives and interests in those countries and resulted in the dispatch of Marines. As in Haiti and Santo Domingo, Marine aviation accompanied the expeditions. To support Brigadier General Smedley D. Butler and his 3d Brigade in China, Fighting Squadron 3 (VF-3M) sailed from San Diego for Shanghai on 17 April 1927 with 9 officers, 48 enlisted men, and 8 FB-1s. It was reinforced by a new observation squadron (VO-5M) which was organized in China with aircraft (six O2B-1s) sent from San Diego and four officers and 94 men from the unit on Guam. These deployments made the Marine brigade, when it moved up to Tientsin, the center of trouble, the only foreign contingent in the area with its own aviation.

\* Cmdr G. C. Westervelt (C.C.) U.S. Navy and H. B. Sanford, Aeronautical Engineer, "Possibilities of a Trans-Pacific Flight," *United States Naval Institute Proceedings*, v. XLVI, No. 5 (May 1920), pp. 675-712. This article proved academically the possibility of making a trans-Pacific flight in a Navy NC-type flying boat, a type which recently had flown the Atlantic. The article presented in detail flight plans for several routes depending on the wind conditions of the season. Guam played a vital role in all the plans.

Commanded initially by Major Francis T. ("Cocky") Evans and then by Lieutenant Colonel Turner, the Marine squadrons stayed in China for a year and a half. They operated from a pasture levelled into a flying field by coolie labor about 35 miles from Tientsin. Isolated from the rest of the Marine brigade and with columns of troops from the rival Chinese armies frequently marching past them, the Marines formed their own base guard detachment and mounted machine guns on their hangars and barracks. No combat occurred for these Marines, however, either in the air or on the ground. The squadrons flew 3,818 sorties in support of the Marine brigade's peace-keeping mission. They spent most of their time in observation and photographic reconnaissance, tracking for General Butler the movements of the Chinese forces. They also carried mail and passengers.<sup>39</sup> The airmen's professional competence received high praise from Butler, who said in a message to Turner:

Our aircraft squadrons . . . have not been surpassed in their efficiency. Not only did they never fail immediately and successfully to respond to all calls, but they maintained themselves in the open for nearly eighteen months and at all times in readiness. . . . Their performance at all times was brilliant. . . . There has not been one fatality or serious injury.<sup>40</sup>

In 1929, as conditions quieted down in China, these units returned to their former stations at San Diego and Guam.



*A lineup of Boeing FB-1s of Marine Fighting Squadron 2 at Quantico in 1926. (Marine Corps Photo 515863).*



*The Marine Corps received five Curtiss F7C-1s in January 1929. This was the personal plane of Captain James T. Moore, CO Air Service, East Coast Expeditionary Force, Quantico. (Marine Corps Photo 517619).*

In Nicaragua, Marine aviation became involved in a small-scale, but drawn-out and difficult guerrilla war during which for the first time Marine fliers regularly gave something resembling close air support to troops engaged in ground combat. In 1927, the outbreak of civil war in Nicaragua\* led to Marine intervention. Under the "Stimson Agreement," named after American negotiator Henry L. Stimson, leaders to both warring Nicaraguan factions agreed to disarmament of their troops and to an American-supervised national election. Stability collapsed again when Augusto C. Sandino, a general of the Liberal faction, denounced the Stimson Agreement and declared war on both the Marines and the Nicaraguan government. There followed years of sporadic bush fighting which continued until the early 1930s.

\* Nicaragua had strategic importance for the United States because it contained within its borders an important alternate inter-oceanic canal route.

Two Marine air squadrons entered Nicaragua with the initial intervention force. On 18 February 1927, Observation Squadron 1 (VO-1M), with 8 officers, 81 enlisted men, and 6 DH-4Bs, embarked at San Diego for the Nicaraguan port of Corinto. Unloading from their transports there, they travelled by train to Managua with their aircraft, with the wings removed, carried on flatcars. At Managua, the squadron established itself in the ball park on the edge of the city, where the Marines remained for four months and from which they operated in cooperation with the Nicaraguan air force.\* VO-4M from Quantico, with seven officers and 78 men equipped with six O2B-1s sailed on 21 May to reinforce VO-1M. Upon its arrival in Nicaragua, the two units were designated Aircraft

\* The Nicaraguan air force consisted of two barnstorming pilots flying Laird Swallow aircraft which, according to Major Rowell, were "discards from the Checkered Cab Co., at San Francisco."

Squadrons, 2d Brigade, and placed under the command of Major Ross E. Rowell.

From February until May of 1927, aircraft of these two squadrons flew patrols over the neutral zone established and occupied by the Marines, and they conducted visual and photographic reconnaissance flights over the lines of the hostile Nicaraguan armies. During this period, under directions from Washington, the Marine airmen engaged in no combat beyond a couple of machine gun attacks on rebels who penetrated the neutral zone. In June, with order seemingly restored by the Stimson Agreement, most of VO-1M returned to San Diego. A few men and two of the Squadron's DH-4Bs remained with VO-4M, which was redesignated VO-7M on 1 July 1927. Major Rowell stayed in Nicaragua to command the reorganized squadron.<sup>41</sup>

On 16 July 1927, Sandino explosively demonstrated that hopes for stability were premature. At 0115 on that day, with an estimated force of 500 men, he attacked the town of Ocotal.<sup>42</sup> The garrison of 38 Marines and 49 Nicaraguan National Guardsmen rallied quickly and repulsed the first attack. Further unsuccessful rebel assaults followed until 0810, when Sandino made a truce offer that was refused by the defenders. The attack then resumed. The position of the Marines and guardsmen was precarious. Ocotal lay some 125 miles away from Managua, where most American forces were concentrated, and by ground transportation it would take a relief force 10 days to two weeks to cover that distance. The garrison had only limited stocks of water, food, and ammunition.

In this, the first major action of Sandino's war, Marine aviation intervened with dramatic and decisive effect. Around 1030 on the morning of 16 July, the routine daily reconnaissance patrol of two aircraft, piloted by Lieutenant Hayne D. Boyden, and Gunner Michael Wodarczyk, arrived over Ocotal. Observing the situation from the air, the two aviators moved to aid the garrison. Boyden, who lacked radio contact with the ground, landed to obtain information from a villager. Wodarczyk began strafing the bandits to protect Boyden. Boyden then took off for Managua to make his report while Wodarczyk continued his strafing attacks around Ocotal for another 20 minutes.

As soon as he received Boyden's report, Major Rowell ordered his five available DH-4Bs and O2B-1s armed and fueled. He forwarded the report to the brigade commander, Brigadier

General Logan Feland, and received in reply orders "to take such immediate steps as I deemed to be most effective in succoring the besieged Marines and Guardia." At 1230, Rowell and his flight took off from Managua. Each aircraft carried a full combat allowance of 600 rounds of ammunition for each of its machine guns but only a partial load of bombs due to the fact that the planes had to carry a heavy fuel load for the long flight.

The trip to Ocotal took about two hours because Rowell's formation had to fly around a line of thunder storms. Around 1435, they arrived over Ocotal. Rowell had trained all of his pilots in dive bombing and planned to use that mode of attack. Putting the flight into column formation, he led one circle of the town to locate enemy and friendly positions, then launched his assault. As Rowell later described the 45-minute action:

I led off the attack and dived out of column from 1,500 feet, pulling out at about 600. Later we ended up by diving in from 1,000 and pulling out at 300. Since the enemy had not been subjected to any form of bombing attack, other than the dynamite charges thrown from the Laird-Swallows by the Nicaraguan Air Force, they had no fear of us. They exposed themselves in such a manner that we were able to inflict damage which was out of proportion to what they would have suffered had they taken cover.<sup>43</sup>

In their diving attacks, Rowell and his pilots fired their front machine guns on the way down and dropped fragmentation bombs when targets presented themselves. As they pulled out of their dives their observers strafed the Sandinistas with their rear cockpit guns. After the second pass by the planes, bandits began fleeing out of the town, along with stampeding horses. Reports on the number of casualties inflicted on Sandino's men are conflicting, but, as the commander of the ground defenders of Ocotal stated in his report, "The air attack was the deciding factor in our favor, for almost immediately the firing slackened and troops began to withdraw."<sup>44</sup> Thus ended what probably deserves to be called the first Marine air-ground combined action.

After Ocotal, Sandino usually did not mass his forces where aircraft could reach them. He maintained his hit-and-run war year after year while the Marines and the National Guard launched operation after operation against him. VO-7M, reinforced after February 1928 by the 2 officers, 59 enlisted men, and 6 O2B-1s of VO-6M from Quantico,<sup>45</sup> provided combat, reconnaissance, and logistical support for these efforts. The

arrival late in 1927 of the first new Vought O2U "Corsairs" improved the squadrons' capabilities.

Flying one of the newly arrived Corsairs, Lieutenant Christian F. Schilt gave a courageous demonstration of the airmen's ability to aid hard-pressed infantry. On 30 December 1927, a patrol encountered a large Sandinista force near the village of Quilali. After a firefight in which the Marines took heavy casualties but drove off the bandits, the patrol took up defensive positions in the village. Reinforcements were sent from the nearby town of Telpaneca, but the relief column came under fire about five miles from Quilali. It took several air attacks and a patrol from Quilali to disperse the bandits and permit the two patrols to consolidate their defenses in the village. By this time, most of the commissioned and noncommissioned officers of both patrols had been killed or seriously wounded. In fact, a total of 18 wounded men needed immediate evacuation if they were to survive and if the patrols were to recover mobility. The acting commander of the beleaguered force, in a message relayed to headquarters in Managua, asked for air attacks to break up the bandit concentration surrounding him and recommended that "if humanly possible" a Corsair land at Quilali to take out the wounded.

In response to this message, Marine pilots dropped tools, supplies, and equipment to the defenders of Quilali, who cleared away the jungle and part of the village to create a rough, hole-pocked strip about 500 feet long. Lieutenant Schilt, in a Corsair fitted with over-sized wheels to negotiate the treacherous runway, made ten trips into the hastily prepared landing field on 6, 7, and 8 January 1928. On one of his first flights he brought in a new commanding officer along with badly needed medical supplies. In all, he flew in about 1,400 pounds of stores and evacuated the 18 seriously wounded. For this aeronautical accomplishment and display of pure courage, Lieutenant Schilt received the Medal of Honor.<sup>46</sup>

After Quilali, Marine aviation took part in many operations against Sandino. In January 1928, aerial reconnaissance and a preliminary bombing and strafing attack prepared the way for a major Marine-National Guard assault on Sandino's supposed mountain-top stronghold of El Chipote. The attack inflicted bandit casualties, but once again the elusive Sandino and most of his men escaped the net. Later in the same year, Marine air strikes severely punished a large enemy force at Murra, near Ocotal. Over the next four years, dive bombing and strafing

attacks in support of ground troops, sometimes directed from the ground by colored panels or other signalling devices, became a routine feature of operations. Neither side could claim decisive victories in this bush war, but the continuous pressure and aggressive tactics of the Marines began to show substantial results as early as the summer of 1928. From May to July of that year, more than 1,000 guerrillas surrendered to the Nicaraguan government under the promise of amnesty. Sandino and his hard core followers remained in the field, however, until 1931.<sup>47</sup>

Besides assisting Marines in combat, the air arm in Nicaragua enlarged its air transport role, using the newly acquired Atlantic-Fokker tri-motors. The first of these machines landed at Managua on 4 December 1927, ferried down from the United States by Major Brainard. During its first six weeks of operation, this transport carried 27,000 pounds of freight and 204 passengers, most of them on the long flight between Managua and Ocotal. The tri-motor could make this trip, which took ox-carts or mule trains 10 days to three weeks, in one hour and 40 minutes. Under Nicaraguan conditions, it could carry 2,000 pounds of cargo or eight fully equipped Marines per flight. So useful did this plane prove that two additional ones soon were put into service in Nicaragua. They were supplemented later by all-metal Ford tri-motors, which required less maintenance in the tropical climate than did the Fokkers with their canvas and wood wings. Able to fly six tons of supplies per day from Managua to Ocotal, Major Rowell set up an advanced air base at the latter city, which was closer to the bandit regions than was Managua.<sup>48</sup>

As fighting slackened off in Nicaragua after 1928, the Marine squadrons concentrated on observation, medical evacuation, and logistical support missions. They established a scheduled mail and passenger service to assist both the American forces and the Nicaraguan government. They also did extensive aerial mapping and photography.

### A Decade of Achievement

Marine aviation in 1929 could look back upon a decade of significant progress and achievement. Although hampered by low budgets and often forced to operate with outmoded or cast-off equipment, Marine aviators during these years perfected a stable organization. They formulated a mission and began to train themselves to



*A squadron leader's FB-1 of VF-1M in flight over Quantico in 1928. (Marine Corps Photo 530238).*

perform it. In Santo Domingo, Haiti, China, and Nicaragua, they adopted and refined new tactics, such as dive bombing, for carrying out their mission, and they showed the rest of the Marine Corps that on the battlefield aviation could make a difference—sometimes *the* difference between victory and disaster.

All the elements for an air arm that was an

integral part of the Marine Corps with a vital role in carrying out the Marines' mission were developed during the 1920s. It remained for Marine aviators in the next decade, under the shadows of depression and an impending Second World War, to bring their service to maturity and point it toward the great struggles and triumphs of the 1940s.



*Marine Fokkers on the landing strip at Ocotol, about 1929. (Marine Corps Photo 515413).*



## CHAPTER IV

### MARINE AVIATION COMES OF AGE, 1930-1940

#### Impact of the Great Depression

For Marine aviation, as for every element of the United States armed forces, depression-induced budget reduction was the dominant fact of the early 1930s. Marine aviation since its beginnings had operated under austere circumstances; its leaders now learned the truth of that old adage, "things could be worse." For 10 years after 1929, and especially in 1930, 1931, and 1932, appropriations for the military sank to survival level, and Marine aviation stood low on the priority list for distributing what funds Congress did allocate.

Marine aviation began a series of cost-cutting reductions, redeployments, and reorganizations. Abandoning the lighter-than-air field, the Marines abolished their balloon squadron (ZKO-1M) at Quantico on 31 December 1929 and distributed its personnel among their other aviation units on the east coast. The following August, they disbanded their lighter-than-air detachment at Great Lakes Naval Training Station. During April 1931, they broke up one observation squadron (VO-10M) at San Diego and transferred its aircraft and personnel to the remaining one (VO-8M) at that station. At Quantico, they merged the aircraft and personnel of two fighting squadrons into one (VF-9M). These changes reduced the administrative cost of operating the aircraft of these units without reducing the total number of aircraft in operation.<sup>1</sup>

In response to both budgetary pressures and to a new mood of isolationism in Congress, Marine aviation liquidated most of its overseas commitments during the early 1930s. On 26 February 1931, the squadron stationed at Suiyay, Guam, was withdrawn to the United States. A month later, it was dissolved, its personnel going to other aviation units and its materiel and equipment reverting to the Navy's Bureau of Aeronautics.

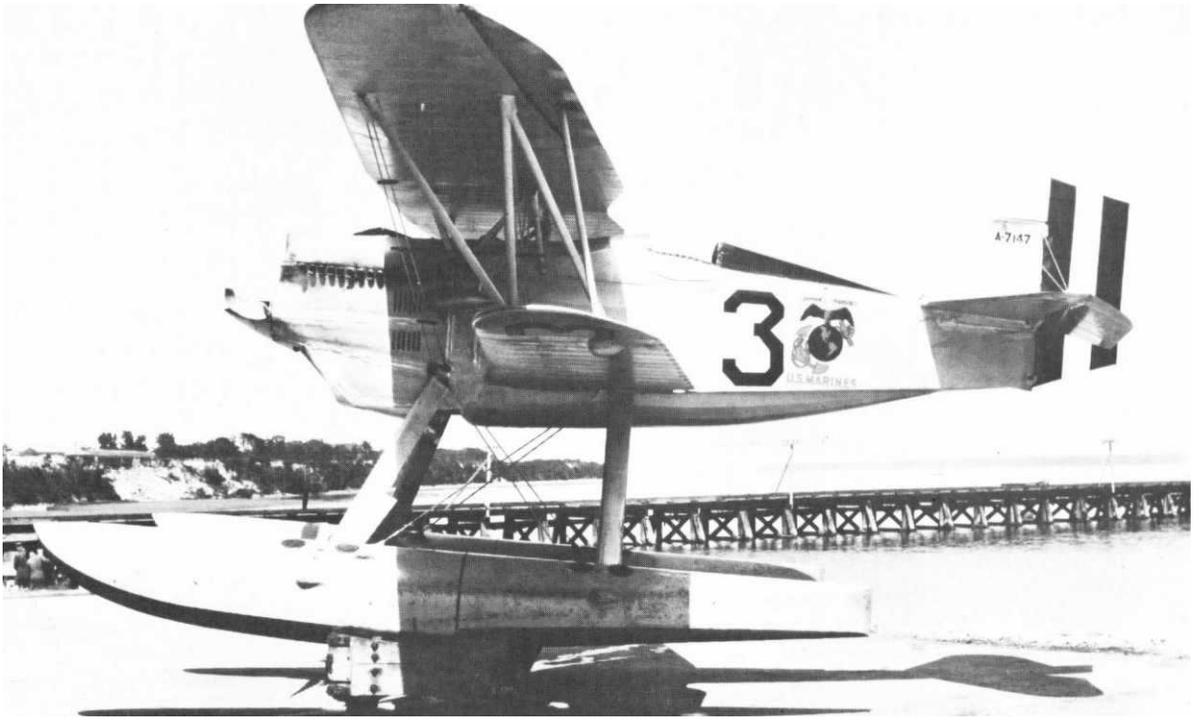
Late in 1932, in response to the re-establish-

ment of public order in Nicaragua and to a Congressional ban on the expenditure of any additional military appropriations to support forces in that country, the Marine air units left Nicaragua along with the rest of the Marine brigade. At the end of 1932, Marine aviation had only one remaining overseas commitment—Haiti, where one squadron (now designated VO-9M) continued to provide logistic support for ground forces while conducting routine training. This last commitment came to an end in August 1934 when VO-9M left the island and joined the air group at Quantico.<sup>2</sup>

#### Aviation and the Fleet Marine Force

While the Depression years brought budget cuts and economy drives to Marine aviation, they also brought a final reorganization and definition of mission. The Marine Corps, with its overseas commitments reduced to a minimum during the early 1930s, undertook a major review of its place in United States strategy. In the course of that review, a debate between two schools of thought within the Corps reached its climax. One faction argued that the Marine Corps should remain a small "Army" capable of performing any mission that the Army could, but on a limited scale. Opposed to adherents of this "jack of all trades" concept were those who believed that the Marine Corps should concentrate on one specialized function—amphibious warfare in co-operation with naval forces with its major objective the seizure of advanced bases for the fleet.

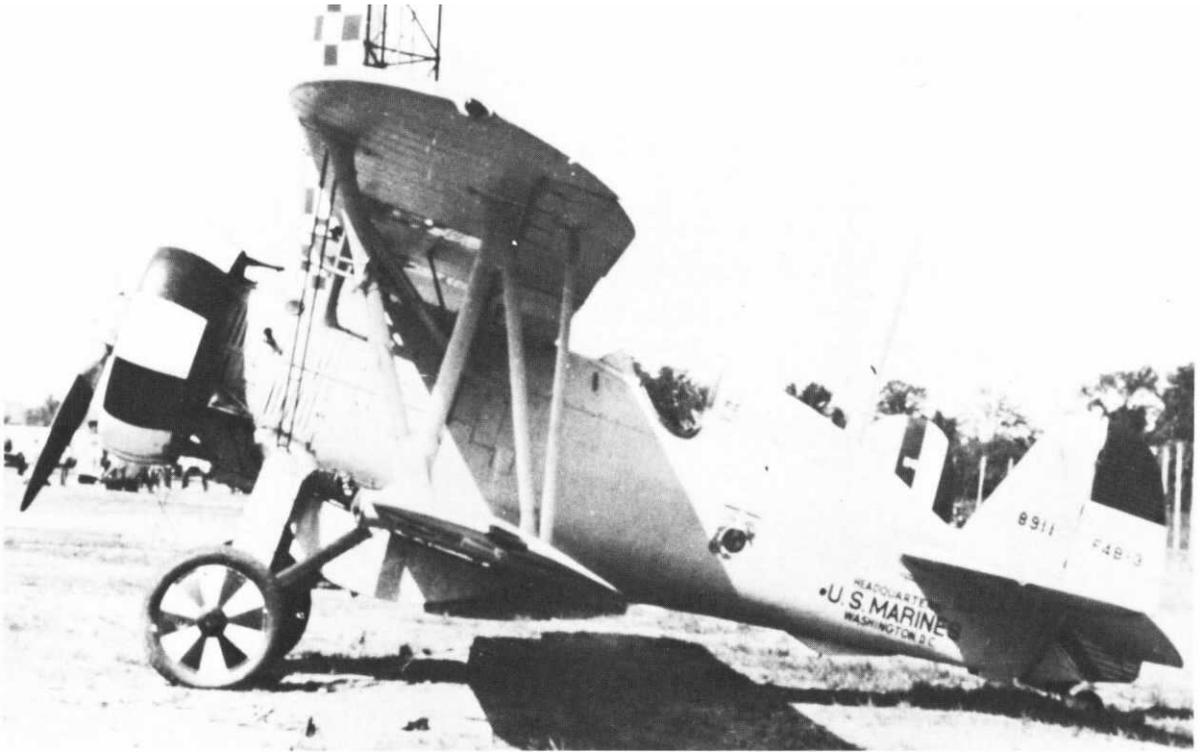
On 8 December 1933, the formation of the Fleet Marine Force (FMF) signalled the triumph of the amphibious warfare advocates. The FMF, drawn from the "force of Marines maintained by the Major General Commandant in a state of readiness for operations with the Fleet," would replace the old East and West Coast Expeditionary Forces. It would be an integral part of the



*A Curtiss Hawk flown by Captain Arthur H. Page won the Curtiss Marine Trophy Race at NAS Anacostia on 31 May 1930. This aircraft was modified for racing purposes. (Photo courtesy Major John M. Elliott, USMC, Ret.).*



*This F6C-4 of Fighting Squadron 10, about 1930, at San Diego has a cowling fitted over the exposed cylinders of its radial engine. (Marine Corps Photo 530812).*



*Advent of the Boeing F4Bs. A F4B-3 used as the Headquarters Marine Corps command plane in 1933. (Marine Corps Photo 529745).*



*Last and best of the Boeing biplanes, an F4B-4 of VF-9M in 1935. (Marine Corps Photo 515228).*



*F4B-3 of Bombing Squadron 4 (VB-4M) in flight in 1935. Equipped for dive-bombing, this aircraft had a bomb rack under the fuselage. (Marine Corps Photo 529974).*



*F4B-4s of VF-9M line up at Brown Field, Quantico in 1935. (Marine Corps Photo 528314).*

fleet, under the operational control of the fleet commander. The Commandant of the Marine Corps retained operational control of units and personnel not attached to the FMF, and he had administrative authority over all Marine personnel and was responsible for the conduct of training. The Commandant also had charge of research and development of doctrine, techniques, and equipment for amphibious warfare.<sup>3</sup>

As initially organized during 1933-1934, the FMF consisted of a regiment of infantry, two batteries of 75mm pack howitzers, one battery of 155mm guns, and one battery of .50 caliber anti-aircraft machine guns. The air squadrons of the former East and West Coast Expeditionary Forces were incorporated into the FMF as Aircraft One, located at Quantico, and Aircraft Two, at San Diego. These squadrons, in the words of the Major General Commandant, "form an integral part of the Fleet Marine Force and are organized for the support of that force in its operations with the fleet." Only three squadrons were not attached to the FMF—two which were deployed on board carriers and the one remaining in Haiti. The latter unit joined Aircraft One upon its transfer to Quantico.<sup>4</sup>

Besides organizing the FMF, the Marine Corps began to distill the lessons of long study and years of practical experience into a unified doctrine for the conduct of amphibious operations. During late 1933 and early 1934, the instructors and students at the Marine Corps Schools, in consultation with officers from Headquarters Marine Corps and the FMF, drew up the *Tentative Landing Operations Manual*. This document, published by the Navy Department in 1935, laid out in detail the principal steps for conducting an amphibious assault. The concepts of command relationships, organization, fire support, assault tactics, ship-to-shore movement, and logistics outlined in the manual and refined in edition after edition were tested and improved in fleet exercises during the 1930s. In World War II, they guided Marines to their hard-won Pacific victories.

The aviation section of this famous manual was written by a group of Marine fliers headed by Captain Harold D. Campbell.\* It discussed the role of Marine aviation in terms that echoed Cunningham's writings of the early 1920s. It recognized Navy and Marine aircraft, along with naval gunfire, as the sources of fire support for an

opposed beach landing, and it declared that an air superiority of at least three to one in the landing areas was a fundamental prerequisite for success.

The *Tentative Manual* listed the functions of aviation at every stage of an amphibious landing—long-range reconnaissance, providing fighter cover over transports and landing craft, knocking out enemy airfields and artillery positions, neutralizing beach strongpoints, artillery spotting, and close support of advancing troops after the beachhead was secured. As had Cunningham, the manual emphasized the importance of communication between aircraft, ships, and ground units and urged that all airplanes be equipped with two-way radios.

While the manual assumed that both Navy and Marine aircraft would be involved in any amphibious assault, it urged that Marine air units take a large part and advocated the assignment of a carrier for their exclusive use. In the *Tentative Landing Operations Manual*, Marine aviation achieved recognition as an integral and vital element in the execution of the Marine Corps' primary mission, and its functions were defined with sufficient precision to guide organizational and training efforts.<sup>5</sup>

In line with the manual's conclusions, the General Board of the Navy in 1939 summed up the mission for which Marine aviation was to prepare and in fact long had been preparing:

Marine aviation is to be equipped, organized and trained primarily for the support of the Fleet Marine Force in landing operations in support of troop activities in the field; and secondarily, as replacements for carrier-based naval aircraft.<sup>6</sup>

Colonel Turner did not live to see the air arm he headed for so many years achieve this recognition. In 1931, he made an inspection flight to Haiti in a new Sikorsky amphibian. After a normal landing at Gonaives, Haiti, the aircraft rolled into some soft sand into which the left landing gear sank two feet. Turner jumped from the plane to survey the damage. As he went under the propeller, which was still turning, he forgot to allow for the lift of the airplane, and the propeller struck him in the side of the head and killed him. Only 49 years old when he died, Turner had been the first Marine aviator in line for promotion to brigadier general.<sup>7</sup>

Major Roy S. Geiger succeeded Turner as head of the Aviation Section. At this time, the senior Marine airman by rank was Major Ross Rowell, who had led the dive bombing attack at Ocotol, but Geiger had joined aviation five years

\* The other Marine drafters of the section were First Lieutenants Vernon E. Megee, William O. Brice, Pierson E. Conradt, and Frank D. Wier. (Megee comments).



*Colonel Thomas C. Turner was killed on 28 October 1931 at Gonaïves, Haiti, when he stepped into the propeller of a Sikorsky RS-1 similar to this one. (U.S. Naval Air Station, Quantico, Photo 299).*

before Rowell and had been senior squadron commander with the 1st Aviation Force while Rowell had not received his wings until November 1922. By experience, then, Geiger could claim seniority, and the Major General Commandant put experience ahead of rank in choosing a new chief of aviation. Geiger served until 30 May 1935, participating in some of the conferences at which the *Tentative Manual* was drafted. He then went on to other assignments.

In World War II, Geiger would command the 1st Marine Aircraft Wing during the battles of Guadalcanal and become successively the first Marine aviator to command an amphibious corps and the first Marine to command an army (the Tenth on Okinawa). In 1945, with the rank of lieutenant general, he would command Fleet Marine Force, Pacific.

Geiger's successor as head of aviation, Major Rowell, served until 10 March 1939. During Rowell's tenure, the position of Marine aviation at headquarters underwent a change long sought by its directors. In 1935, the same year that Rowell succeeded Geiger, the Aviation Section was separated from the Division of Operations and Training and placed directly under the Major General Commandant. Then on 1 April 1936, the section achieved full-fledged division status with Rowell, now a colonel, as its first director. As Director of the Division of Aviation,

Colonel Rowell advised the Major General Commandant on all aviation matters and served as liaison officer between Marine headquarters and the Navy's Bureau of Aeronautics (BuAir), upon which Marine aviation still depended for aircraft, equipment, and supplies.<sup>8</sup>

The new status of the Director of Marine Aviation increased the effectiveness with which Colonel Rowell and his successors could plan the development of the Marine air arm and defend its interests in service councils. Through access to the Commandant, the Directors of Aviation could determine what the Marine Corps expected from its aviation component. Through liaison with BuAir, they could ascertain what the Navy required of the Marine air arm and what assets they could obtain to meet the demands. As fleet exercises under the new amphibious doctrines raised problems of aviation command and responsibility, independent Directors of Marine Aviation, dealing directly with the Commandant and the Chief of Naval Operations, could resolve most of the controversies by establishing more precise definitions of responsibility.

Within the framework of Aircraft One and Aircraft Two, FMF, Marine squadrons underwent various redesignations and reorganizations. Always, the direction of these changes was toward more complete commitment to the FMF and to the Marines' missions in support of it. In



*Marine aviation joins the carriers. A Vought O2U-2 of VS-14M on the deck of the USS Saratoga in November 1931. The arresting hook can be seen underneath the fuselage. (Marine Corps Photo 529593).*



*A line of Vought SU-4s of VO-8M. In the 1930, observation planes also began to be called "scout" planes. (Marine Corps Photo 517614).*



*Vought SU-2 of VS-15M in 1936. Aircraft of this and similar types flew observation missions for the Marines during the Thirties. (Photo from Museums Branch Activities, Quantico).*

1934, the two squadrons (VS-14M and VS-15M) which had been stationed on board aircraft carriers since 1931 were disbanded. Reorganized as VO-8M, their aircraft and personnel joined Aircraft Two at San Diego. Meanwhile, VO-9M from Haiti joined Aircraft One at Quantico. These reorganizations left Marine aviation totally committed to the FMF.

In January 1935, Aircraft One consisted of one headquarters squadron (HS-1M), one, service squadron (SS-1M), two observation squadrons (VO-7M and VO-9M), one fighting squadron (VF-9M), and one utility squadron (VJ-6M). Aircraft Two at the same time contained a headquarters squadron (HS-2M), a service squadron (SS-2M), an observation squadron (VO-8M), a bombing squadron (VB-4M), and a utility squadron (VJ-7M).<sup>9</sup> Further reinforcing its integration with the fleet, Aircraft Two early in 1935 was placed under the direct authority of the Commander-in-Chief, U.S. Fleet, and further assigned to Aircraft, Battle Force, U.S. Fleet. Under this command arrangement, which prevailed during most of the decade, Aircraft Two spent much time operating from carriers.

In 1936, the neat organizational structure of Aircraft One was disrupted when VO-9M deployed to St. Thomas in the Virgin Islands,

where it operated as an independent unit of the FMF, separate from Aircraft One. The following year, Aircraft Two received a new fighting squadron, VF-4M, and the Marines renumbered all of their squadrons to conform to a new Navy numbering system.\* Late in the same year, to simplify accounting and administrative procedures and bring them into line with those of the Navy, the Marines redesignated their non-flying squadrons to differentiate them from the mobile organizations. In Aircraft One and Two, headquarters squadrons were redesignated base air

\*The new system was as follows:

		Old	New
Aircraft One:	HQ	HS-1M	Same
	Service	SS-1M	Same
	Observation	VO-7M	VMS-1
	Fighting	VF-9M	VMF-1
	Bomber	VB-6M	VMB-1
	Utility	VJ-6M	VMJ-1
Aircraft Two:	HQ	HS-2M	Same
	Service	SS-2M	Same
	Observation	VO-8M	VMS-2
	Fighting	VF-4M	VMF-2
	Bomber	VB-4M	VMB-2
	Utility	VJ-7M	VMJ-2
St. Thomas, V.I.	Observation	VO-9M	VMS-3 <sup>10</sup>



*The utility squadron (VJ-7M) of Aircraft Two lined up for inspection at San Diego in 1933. The aircraft in the foreground are N2C-2s, with a Fokker tri-motor at the far end of the line. (Marine Corps Photo 528144).*



*A Vought SU-2 of VO-9M at Bourne Field, St. Thomas, Virgin Islands. The squadron was stationed here beginning in 1936. (Marine Corps Photo 529595).*



*An F3F-1 of VF-4M. This was the first Marine fighter with retractable landing gear. (Photo from Museums Branch Activities, Quantico).*



*The Marines' first all-metal monoplane fighter, the Brewster F2A-3 "Buffalo." (Marine Corps Photo 304388).*



*Last of the Grumman biplanes, an F3F-2 with closed cockpit and three-blade propeller in 1938. (Marine Corps Photo 525776).*



*An F2A "Buffalo" taxiing. This aircraft, the most advanced in Marine hands, quickly became obsolete in World War II. (Photo from Museums Branch Activities, Quantico).*

detachments while service squadrons became headquarters and service squadrons. Each of these units was attached to a naval air station and controlled by its commanding officer. Additional base air detachments were formed at St. Thomas and Parris Island.

In May 1939, the East and West Coast air groups underwent a final redesignation. At that time, Aircraft One became 1st Marine Aircraft Group (1st MAG) and Aircraft Two became 2d Marine Aircraft Group (2d MAG). While administratively part of the FMF, the 2d MAG continued to be attached to the U.S. Fleet's Aircraft, Battle Force for carrier operations and training.

As early as 1920, Marine aviation organization had provided for a wing\* headquarters under which the squadrons would operate. However, until 1938, no wing had been formed. With the attachment of most Marine squadrons to the FMF, interest in the creation of a wing revived. As proposed in October 1938, the wing headquarters would consist of a commander and staff at the brigade level who would be responsible directly to the FMF commander, or the Navy Battle Force commander when under Navy operational control, for the employment and training of the assigned Marine air units. This proposal received the endorsement of the Commander-in-Chief, U.S. Fleet (CinCUS), who envisioned the wing commander as a member of the staff of the Commander, Aircraft, Battle Force, directing Marine squadrons under that officer's control. The FMF commander also favored the proposal as providing a commander and staff with whom his headquarters could work on planning and training. Also, the wing headquarters could take operational control of the two aviation groups, if both ever were concentrated under one FMF commander.

With the plan for a wing headquarters apparently approved by both Navy and Marine authorities, arrangements were made to activate it on 1

July 1939. A conflict developed, however, between the FMF commander and the Aircraft, Battle Force commander over the precise degree of control each would exercise over the wing. After a year of correspondence, the Commandant and CinCUS finally resolved the difference in favor of the FMF commander, placing the wing firmly within the FMF. The headquarters finally was activated in July 1941, but controversy continued over the composition of the wing as a tactical operating force. This issue remained unsettled on 7 December 1941.

### Men and Machines, 1930-1940

In spite of the budget cuts of the 1930s, the manpower of Marine aviation slowly increased. In 1935, the Marine Corps had 147 officers on aviation duty, including 110 pilots, and 1,021 enlisted men. By 1939, the numbers had increased to 191 officers, 173 of them pilots, 19 warrant officers, of whom 7 were pilots, and 1,142 enlisted men. The same gradual upward trend continued into 1940.<sup>11</sup>

Marine air personnel in 1939 included besides the regulars, 56 aviation cadets. These cadets came from the Marine Aviation Reserve, which continued to grow and prosper throughout the 1930s.<sup>12</sup> During 1931 and 1932, defying the worst years of the Depression, the Marines commissioned 11 new reserve squadrons—three service, four observation, two fighting, one scout, and one utility. They added two more later in the decade. Often ill-paid or unpaid (the appropriation for reserve aviation fell as low as \$700,000 per year), some Marine air reservists paid their own expenses at drills and encampments rather than forego their training.

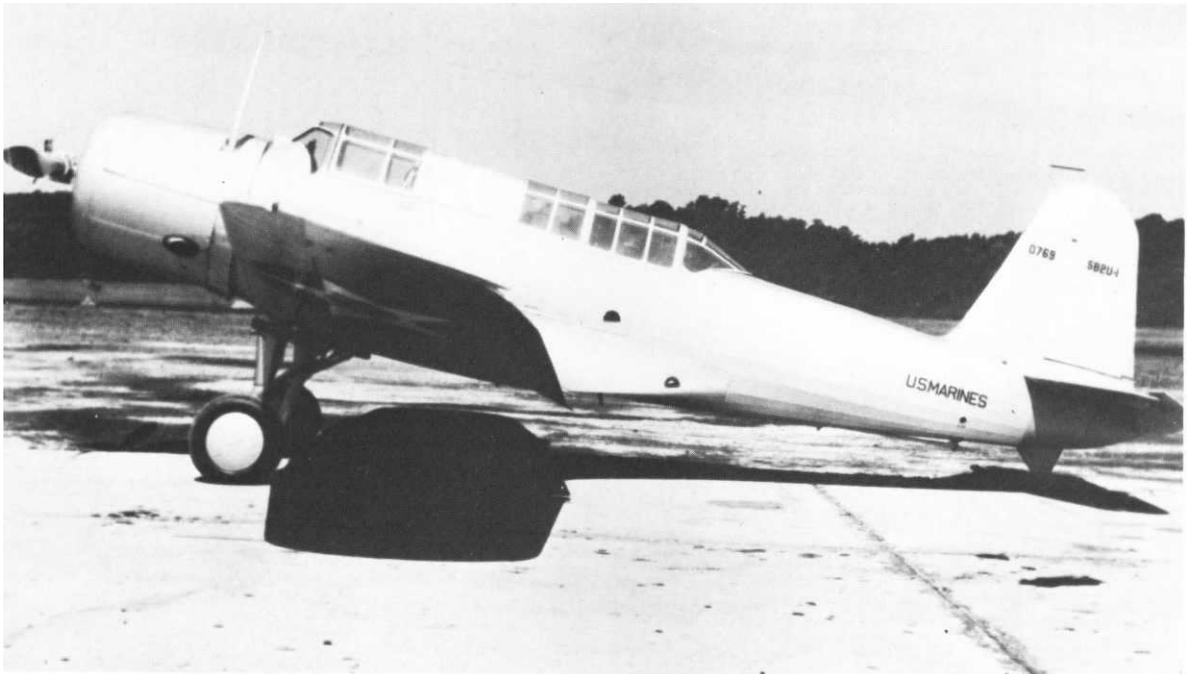
In 1935, new legislation strengthened the reserve. Public law Number 37, approved on 15 April 1935, created the grade of aviation cadet in the Marine Corps Reserve and provided for the appointment, instruction, and pay of the cadets and for their commissioning as second lieutenants, USMCR, upon satisfactory completion of training.<sup>13</sup> The first list of candidates for cadet appointments included such great World War II names as Gregory ("Pappy") Boyington (who initially failed to qualify) and Robert E. Galer, a 13-plane ace and Medal of Honor winner.

The Naval Reserve Act of 1938, which also applied to the Marine air reserve, provided for increased pay, disability benefits, paid retirement, and other advantages for reservists and, in the words of Marine aviation historian Captain

\* Definition of the term "wing" in Marine aviation organization has undergone confusing changes since World War I, as have the definitions of and relations between the wing's subordinate groups and squadrons. By 1938, the terminology had evolved close to the modern usage. That is, the Marine aircraft wing was supposed to command an as yet undetermined number of groups which in turn were composed of varying numbers of squadrons. The exact composition of the wing was then and remains today both variable and controversial. Unlike the Air Force wing, which normally consists of groups and squadrons of a single aircraft type, a Marine aircraft wing always has been composed of groups of fixed-wing aircraft of all types and beginning with Korea also included helicopters.



*Curtiss SOC-3s of Observation Squadron Two (VMS-2), part of Aircraft Two, Fleet Marine Force in 1933. (Marine Corps Photo 517613).*



*In 1938, Vought SB2U-1 "Vindicators," all-metal monoplane scout bombers, brought the observation elements of Marine aviation into the same performance range that the F2A did the fighter elements. (Marine Corps Photo 529317).*

Edna Loftus Smith, "really set the mood for the Reserve as it exists today." Further legislation in 1939 permitted the promotion to first lieutenant of reserve second lieutenants who had served as such for three years and passed an examination.

At the end of fiscal year 1938, the Marine Aviation Reserve consisted of 15 student aviators training at Pensacola, 10 inspector-instructors and 34 enlisted men on active duty at reserve aviation bases, and 109 officers and 575 enlisted men on inactive duty, plus 63 cadets on active service at Quantico, San Diego, and Pensacola. Many of the reserve units by this time contained manpower of high quality. Major Karl S. Day,\* for example, commander of the reserve squadron at Floyd Bennett Field, authored the first standard textbook on instrument flying and radio navigation. Most of Day's pilots, like Day himself, who worked for American Airlines, held jobs in the airline industry and were "keenly interested in what they were doing." Candidates for enlisted billets had to go through a probation period:

You come out there and work Saturdays and Sundays and do the dirty work, sweeping hangars and stuff like that, and then if you are pretty good at it, maybe six months later you get a chance to enlist as a buck private. That was the kind of outfits these were. If you have material like that to work with, you can do a lot of things.<sup>14</sup>

After 1935, aviation reserve units routinely took their two weeks of active duty every year for training. Frequently during these periods, they conducted joint exercises with ground Marine reserve units, thereby improving their ability to work with regular Marine aviators if necessary in close support of troops.

For both regular and reserve Marine airmen and ground crewmen, the training cycle established in the 1920s continued into the early 1930s with few major changes. Beginning aviators continued to earn their Navy wings at Pensacola, qualifying first in seaplanes and then in landplanes. Then they went on to Navy, Army, and Marine Corps schools and bases for advanced flight and tactical training. Some Marine aviators also took academic work at the Chemical Warfare School, the Naval War Col-

\* Recalled to active duty in 1940, Day went on to a distinguished Marine aviation career in World War II and after the war remained active in reserve affairs. Before retiring with the rank of lieutenant general in the Marine Corps Reserve, he played a major part in legislative battles for the survival and growth of the reserve and served from 1953-1956 as President of the Marine Corps Reserve Officers' Association. He died on 19 January 1973.

lege, Harvard University, and the California Institution of Technology. Enlisted men received instruction at various service technical schools.<sup>15</sup>

Among the aviators at Quantico and San Diego, there continued to prevail the individualistic, often undisciplined atmosphere of the 1920s. A Marine squadron commander in the early 30s, a veteran recalled:

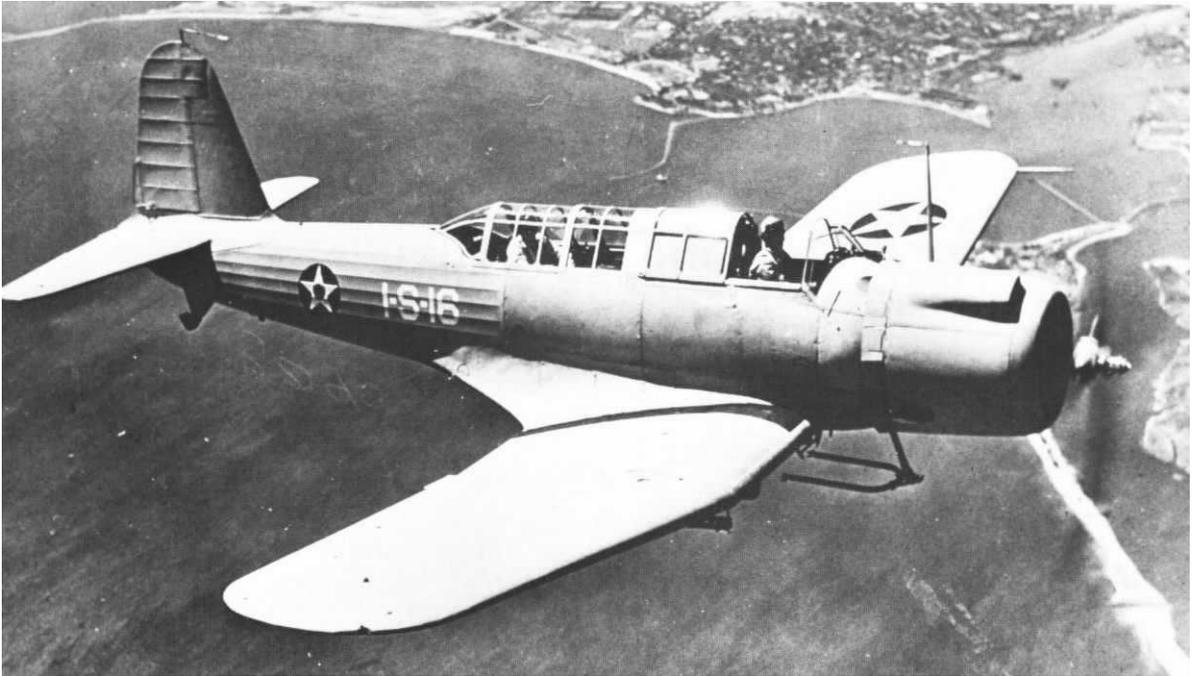
... was not a ... commander in the sense of Courts and Boards; he had a first sergeant who took care of the service record books, and then a collection of pilots who ran around doing what they pleased. At a place like Quantico there was only one commanding officer, and ... he had all power of—let's say final power over personnel matters, he had all authority there was over materiel matters, he controlled the station. And the squadron commanders were just people who flew airplanes, flew the number one airplanes, everybody else followed along. The squadron commanders exercised no command at all.<sup>6</sup>

Under this system, "The pilots, the squadrons, were loosely controlled mobs . . . but they were all good airmen, they could all fly like mad." At annual gunnery and bombing exercises, "The umpiring and observing was lax, loose. . . ." <sup>17</sup>

This atmosphere began to change with the start in 1931 of carrier training for Marine squadrons. In that year, VS-14M under Captain William J. Wallace began operations from USS *Saratoga* and VS-15M under First Lieutenant William O. Brice joined USS *Lexington*. Actually detachments rather than squadrons, each of these units consisted of eight aviators and 36 enlisted men and operated six planes. During the three years that these units flew from the carriers, which were based on the Pacific Coast, two-thirds of the Marines' total complement of aviators served with one or the other of them for training. In their shipboard tours, these Marine pilots practiced carrier takeoffs and landings, and they underwent intensive training in gunnery, formation flying, aerial tactics, and communications, training checked periodically by thorough tests and inspections.

This curriculum, standard for Navy fliers at the time, would appear loosely organized to a modern naval aviator, but it seemed highly formalized to the Marine pilots. In the words of one, Edward C. Dyer, it was:

... a rude awakening. . . . There was no monkey business whatsoever. In the first place we were handed a doctrine, a hook, a guide, that told us how the squadron should be organized. . . . We had a commanding officer, an executive officer, a flight officer, an engineering officer, a materiel officer, and so on, and the duties of each officer were all spelled out. . . . The organization and operation of the



*SB2U-3 in flight. This aircraft was classed as a scout bomber and could take off from carriers or be launched from a ship's catapult. (Marine Corps Photo 306304).*



*Marines received new transports during the 1930s, including this Curtiss-Wright R4C-1 "Condor" transport in 1937 which had a crew of two and could carry 10 passengers. (Marine Corps Photo 517615).*

squadron was definitely controlled. The aircraft were issued by the Air Battle Force material people. They would . . . give us the airplanes; we would then have to maintain them. But these fellows would arrive and inspect. They'd swoop down from the staff and take a look at your airplanes just to see if you were maintaining them in a satisfactory condition. . . . All of our material was requisitioned and accounted for. We were required to follow a training syllabus. We had so many hours of gunnery, so many hours of navigation, so many hours of radio practice, so many hours of formation flying, so many hours of night flying, and we jolly well had to do it. . . .<sup>18</sup>

Aviators returning from tours with the carriers introduced new standards of professional performance to the squadrons at Quantico and San Diego, and commanders like Colonel Rowell worked to improve training and tighten discipline. In 1938-1939, the FMF instituted a four-phase training plan intended to achieve "coordinated and progressive training of all units, in order to prepare the command for immediate operations with the United States Fleet."

Marine aviation had an assignment in each phase, beginning with individual gunnery practice and then progressing to squadron tactics and formation flying, navigation, night flying and instrument flying, and practice in supporting ground troops. In the final phases, all squadrons of the 1st and 2d MAGs joined the ground elements of the FMF in large-scale fleet landing exercises. As a result of these influences, Marine aviation by 1940 was becoming a fighting organization oriented toward its principal mission rather than a random collection of pilots and aircraft.<sup>19</sup>

Marine aviators in the 1930s trained and operated with aircraft of steadily improving performance, mission capability, and reliability. Around 1932, they began receiving fighters of the Boeing F4B series, the famous Boeing "Bipes." With all-metal fuselages in the later models and wood framed, fabric-skinned wings, these sturdy biplanes served both as fighters and dive bombers. The latest and best of the series, the F4B-4, was armed with one .30 and one .50 caliber machine gun and could carry two 116-pound bombs in wing racks. With its 550-horsepower Pratt and Whitney radial engine, it could reach a top speed of 184 miles per hour and a service ceiling of 26,900 feet. It had a cruising range of 350 miles which could be extended to 700 by fitting an external fuel tank under the belly. Pilots found the F4B-4 easy to fly; it maneuvered readily and responded quickly to the controls. A Marine aviator remembered the F4B-4 as "the *one* airplane which made the pilot feel that he himself was flying—not just riding in a machine."

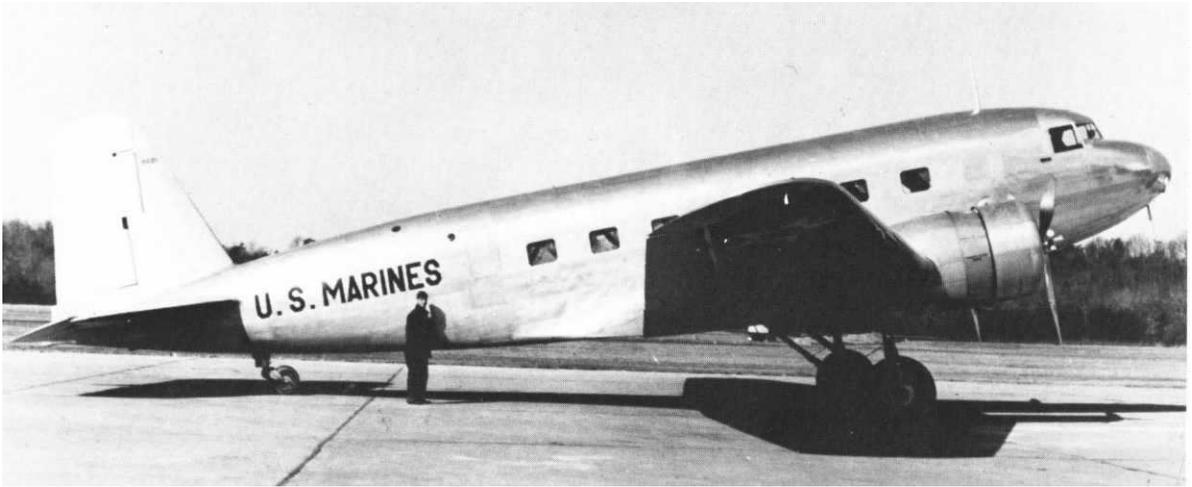
In the late 30s the Grumman F1F, F2F, and F3F series, perhaps the ultimate in biplane fighter design and performance, supplanted the F4Bs. All-metal in construction except for fabric-covered wings and control surfaces, these small (28-foot wingspread) airplanes boasted such features as enclosed cockpits and retractable landing gear.

The final plane of the series received in quantity by the Marines, the F3F-2, had an 850-horsepower Wright Cyclone radial engine and could reach a top speed of 260 miles per hour. Its service ceiling was about 32,000 feet, and it had a range of 975 miles at a cruising speed of 125 miles per hour. Pilots unfamiliar with its retractable landing gear, which had to be raised and lowered by a hand-cranked gear and chain, made numerous wheels-up landings in the F3F-2, but the sturdy machines usually escaped from these mishaps with little damage other than bent propellers, torn skins, and dented cowlings.

Finally, in 1939, the Marines received their first all-metal monoplane fighter, the Brewster Aeronautical Corporation's F2A "Buffalo." This craft, faster and more heavily armed than its predecessors, itself would become obsolete before it entered combat as the pressures of World War II accelerated airplane development.

Evolution of other aircraft types paralleled that of fighters. For observation planes, the Marines throughout most of the decade used the Vought SU-1 through 4 series and the Curtiss SOC-3. All of these were single-engine, two-seater biplanes with top speeds of around 160 miles per hour. In the late 30s, these gave way to the Vought SB2U-1 and SB2U-3 "Vindicator," a single-engine, two-seater, all-metal monoplane. For dive bombing, Marine aviators in the mid-30s began using the Great Lakes BG-1, a big, rugged biplane which would remain in service until replaced (in 1941) by the monoplane Douglas SBD series.

Transport aircraft also steadily improved. In the early part of the decade, the Marines continued to use the Ford and Fokker tri-motors that had proven their worth in Nicaragua. In 1935, they received two new models of the Ford tri-motor, RR-4s, each powered by three 450-horsepower Wasp radial engines. In June 1934 and November 1935, they supplemented their Fords and Fokkers with two Curtiss R4C-1 "Condors," twin-engined biplanes. The DC-2, designated the Douglas R2D-1, a low wing, twin engine, all-metal transport and the ancestor of



*In 1935 in the Douglas R2D-1 the Marines made the acquaintance of the ancestor of the World War II "Gooney Bird" and crossed the threshold of modern air transport capability. (Photo Courtesy of Marine Corps Museum, Quantico).*



*The 1934 flight line of VO-8M at NAS San Diego. The aircraft are Vought O3U-6 observation planes and Curtiss R4C-1 "Condors." (Marine Corps Photo 530257).*

the World War II "Gooney Bird," entered Marine aviation in 1935. With these few large transports and several smaller twin-engine utility machines, Marine aviators in the 1930s gained airlift experience which would prove invaluable during the early days of World War II in the Pacific.<sup>20</sup>

During 1932, their last year in Nicaragua, Marine aviators at Managua tested their first vertical takeoff and landing, rotary-winged aircraft—a Pitcairn autogyro,\* one of three experimental models which the Navy had purchased from the manufacturer. On test flights around Managua, the ungainly craft, with its overhead rotor and stubby wings, attracted great attention from the Nicaraguans who developed a proprietary fondness for it. The Marines liked it less well. While the machine could take off and land in a space smaller than that required by conventional aircraft of the day, it was difficult to fly and could carry a payload of no more than 50 pounds. In a report to Headquarters Marine Corps dated 22 November 1932, the aviators who had tested the autogyro concluded that it had no expeditionary use beyond limited reconnaissance and passenger-carrying functions. For the time being, and in fact until after World War II, Marine Corps aviation would continue to rely on fixed-wing aircraft.<sup>21</sup>

### Operations, 1930-1940

Marine air operations during the 1930s reflected the increasing capabilities and enhanced sense of mission and purpose of the aviation service. While the air races, exhibition flights, and formation flyovers of the 20s continued into the new decade, they took an inferior place on the list of priorities to fleet problems, landing exercises, and the annual qualification for record in aerial gunnery and bombing.

Air races continued to be popular during the 30s, and Marines continued to compete in them.

\* The autogyro, like the helicopter, derived its lift from an overhead rotor, but unlike the helicopter, it did not apply engine power to the rotor in flight. A single engine powered both the rotor and a front propeller. In taking off, the pilot first used a clutch to connect the engine to the overhead rotor. After bringing it up to takeoff speed, he switched power to the front propeller, leaving the rotor turning freely. The machine then was supposed to lift into the air after a short takeoff run and fly with the spinning rotor and stubby wings providing air lift. The autogyro could take off and land almost vertically, but it could not hover as can a helicopter.

On 31 May 1930, Captain Arthur H. Page won the Curtiss Marine Trophy Race held at Anacostia Naval Air Station. Flying an F6C-3 land-plane modified and equipped with pontoons for the event, he completed the five laps around the 20-mile course at an average speed of 164 miles per hour.

An enthusiastic competitor, Captain Page did not content himself with success in the Curtiss Trophy race. He also established a distance record for "blind"\*\*\* flying by making a 1,000-mile instrument flight in an O2U-1 Corsair from Omaha, Nebraska, to Washington, D.C. In September 1930, Captain Page was on his way to his third success of the year, leading all entries through 17 of the 20 laps of the Thompson Trophy Race in Chicago, when he was overcome by carbon monoxide leaking into his cockpit, crashed, and died in the wreck.

Captain Page's death did not end Marine fliers' efforts to publicize their service and educate the American people about the various functions of military aviation. Marine pilots participated in dive bombing exhibitions, parachute jumps, and formation flights. They competed in the National Air Races at Cleveland, Ohio, and the American Air Races at Miami. Carrying the banners of Marine aviation to Canada, they took part in the Toronto Flying Club Pageant. In a continuing effort to prove by performance the value of their service, Marine aviators for a while carried the air mail between Washington, D.C., and Camp Rapidan, Virginia, a frequently-used conference site for government leaders.<sup>22</sup>

These activities, however, declined in importance during the 1930s compared to the serious work of training Marine aviation to support the FMF. With no overseas commitments to divert their energies, the Marine squadrons' major operations of the decade all were related to preparation for amphibious warfare. The 1st MAG at Quantico, treated as part of the 1st Marine Brigade at that station, centered its operations on preparation to support either the FMF or fleet aviation. On the Pacific Coast, the Marines disbanded VS-14M and VS-15M in 1934 and transferred their personnel and equipment to Aircraft Two (2d MAG) at San Diego. Thereafter, all squadrons of 2d MAG usually were attached to Aircraft, Battle Force, and spent much of their time flying from carriers while participating in exercises

\*\*\* The term was used at that time to denote control of an aircraft by a pilot using aircraft instruments only without visual reference outside the aircraft.

with the Pacific Fleet. On both coasts, the primary objective of all FMF aviation remained, in the Commandant's words: "the close support of troops in a landing and during the operations subsequent thereto."<sup>23</sup>

In 1935 and every year thereafter until the United States entered World War II, the 1st and 2d MAGs took part in the fleet landing exercises in which the methods of amphibious warfare were tested and refined.<sup>24</sup> Early in 1935, 12 aircraft from 1st MAG joined the 1st Marine Brigade in Fleet Exercise Number One at Culebra, Puerto Rico. This squadron experimented with techniques for spotting the fall of naval gunfire in shore bombardments and practiced bombing and strafing beach targets representing defense installations. To their surprise, Marine pilots found low-altitude bombing more effective than dive bombing in these attacks.

From 4 January to 24 February 1936, the entire 1st MAG, over 50 planes, again supporting the 1st Marine Brigade, participated in Fleet Landing Exercise Number Two at Culebra. For a month, while the infantry made eight separate beach landings, the aircraft laid smoke screens, bombed and strafed beach targets, spotted for naval gunfire, and flew reconnaissance and photographic missions. Marine aviators learned this time that smoke screens laid from the air disrupted rather than protected formations of assault boats by reducing the boat crews' range of vision. This series of maneuvers, like others that followed, also convinced Marine aviators that they needed a specialized attack plane properly to conduct their mission of close support. The current practice of using fighter and observation machines for this purpose, in one Marine pilot's words, "interferes materially with the normal missions of these types, and is at best a makeshift expedient."

In 1937, for the first time, both Marine air groups, mustering between them 83 aircraft, operated together as a combined force. For this event, 1st MAG flew across the continent to join 2d MAG in Fleet Landing Exercise Number Four, held between 27 January and 10 March 1937 at San Clemente Island, California. This major exercise involved both the 1st and 2d Marine Brigades, as well as a provisional Army amphibious brigade. In this series of maneuvers, Navy carrier planes did all the gunfire spotting, and the Marines concentrated on general reconnaissance, observation, and attacks in support of ground troops. Once again, Marine aviators came away from the maneuvers convinced they

needed a specialized attack aircraft. Similar fleet exercises followed every year through 1941.

In all of these exercises in the 1930s, Marine aviators were supposed to be improving their ability to give close support to infantry in the ground battle. The decade ended, however, with major operational problems still unsolved and with the concept of close air support itself as yet ill-defined.

Marine fliers found their close support efforts hindered rather than helped by their new fast, higher-flying aircraft. Pilots in the open cockpits of slow-moving DH-4Bs and comparable machines usually could locate friendly and enemy positions relatively easily by sight and sound, but aviators of the 30s, often riding in closed cockpits, swept across the lines too quickly to orient themselves. Also, the Marine fliers of the 30s, who had specialized in aviation from the beginning of their military careers, lacked the familiarity with ground tactics possessed by aviators of the older generation, many of whom had transferred from the infantry.

By the end of the decade, both ground and air Marines realized that the solutions to these problems lay in improved radio communication, simplified and mutually understood systems for locating ground targets, and still more intensive joint training, but the implementation of these measures remained incomplete at the outbreak of the war with Japan.<sup>25</sup>

Partly as a result of these continuing practical difficulties, the Marine Corps Schools as late as 1940 defined the role of aviation in supporting infantry in cautious terms:

When aviation is acting in close support of the ground forces, its striking power should be used against [only] those targets which cannot be reached by the ground arms, or on targets for which ground weapons are not suitable or available. In almost all ground situations there are vital targets beyond the range of weapons of ground arms which can be powerfully dealt with by attack aviation. Therefore, the use of attack aviation to supplement the firepower of ground arms is generally discouraged as it may result in the neglect of more distant, and perhaps more vital objectives. As a general rule, attack aviation should be used in lieu of artillery only when the time limit precludes the assembly of sufficient artillery units to provide the necessary preparation, and when such absence of artillery may involve failure of the campaign as a whole.<sup>26</sup>

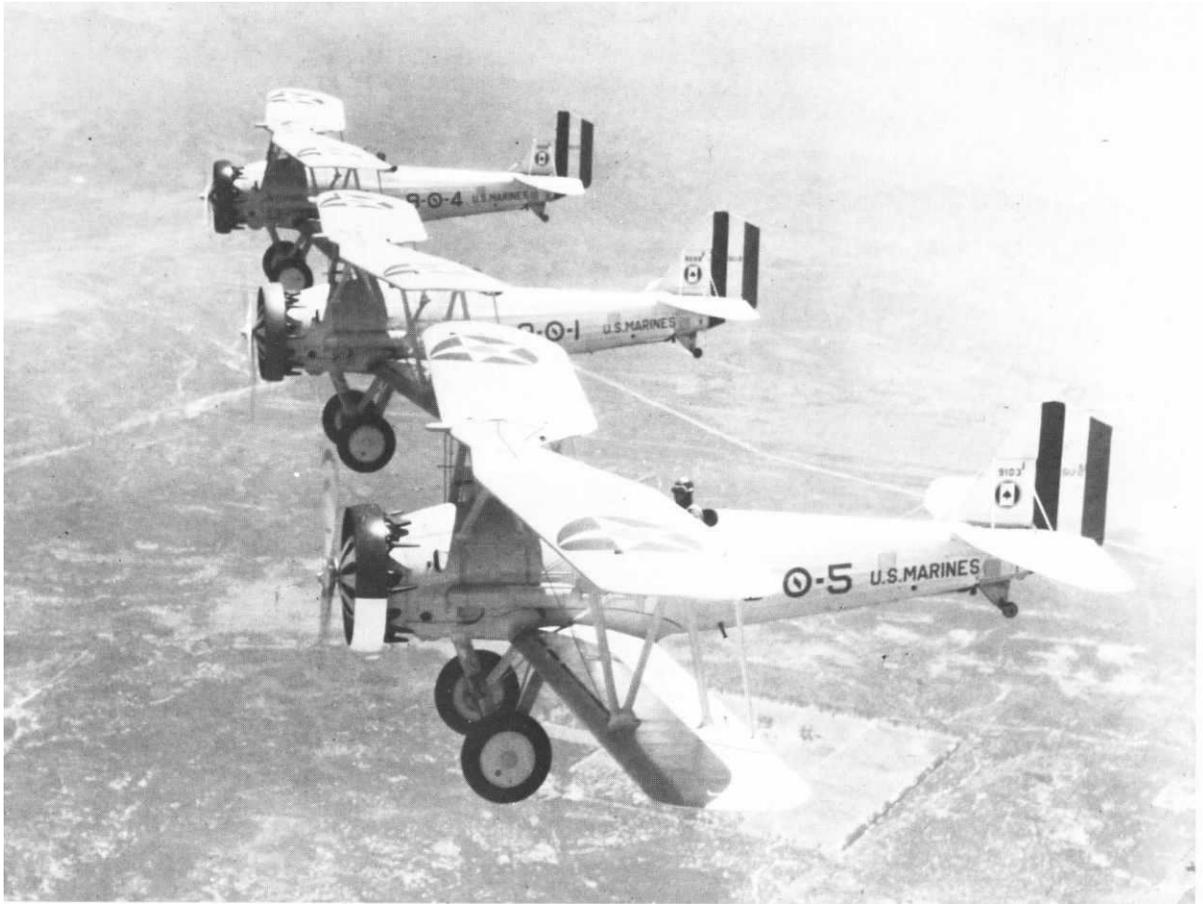
Nevertheless, while the question of close air support remained the subject of debate, by the end of the 1930s the Marine air-ground team had moved a long distance from concept toward reality. The conduct of amphibious warfare, including aviation's part in it, had been formu-



*F3F-2s of VMF-2 flying in formation in 1938. (Marine Corps Photo 515234).*



*A Pitcairn autogyro of the type Marines tested in Nicaragua in 1933. While a forerunner of rotary-wing and vertical takeoff and landing craft, the autogyro proved ineffective for Marine purposes. (Marine Corps Photo 514902).*



*SU-2s of VO-8M fly in formation over San Diego in 1933. (Marine Corps Photo 530122).*



*A Great Lakes BC-1 of Marine Bombing Squadron Two (VMB-2) in 1935. These large, sturdy biplanes were used as dive bombers by Marine aviators in the 1930s. (Marine Corps Photo 529314).*

lated into a doctrine which had been tested and validated insofar as could be done within the limitations of peacetime exercises. Marine aviation's command and staff organization had evolved from independent squadrons into a wing completely integrated into the FMF, and large-scale training of air units with ground forces had become routine. Marine air's relationship with the Navy had been clearly defined. In fleet problems and landing exercises, Marine aviation had demonstrated potential ability to perform both its primary mission of supporting the landing force and its secondary mission of reinforcing Navy units on carriers.

### Conclusion: Marine Corps Aviation, 1912-1940

Marine aviation began in the years 1912-1917 with a few men experimenting with rickety machines, their concept of an operation being to take off, fly a few miles, and land again with the aircraft still in one piece. As aircraft gradually improved in performance and reliability, and as the Marine Corps, like the other services, slowly committed more men and resources to aviation, a rudimentary organization began to take form, and Marine aviators began to see the outlines of a mission: support of Marine expeditionary forces in seizing and holding advance bases.

In World War I, the first war in which Airpower played a significant part, Marine aviation, like the Corps as a whole, was diverted from its amphibious expeditionary mission and sent into

large-scale land combat in France. Denied the opportunity which they eagerly sought to support the Marine brigade, Marine aviators managed to place organized squadrons at the front, and they fought where they were needed. They proved their ability to hold their own in combat against German veterans.

During the 1920s, Marine aviation, although hampered by limited budgets and often outmoded equipment and diverted by the showmanship and headline-hunting of the decade, still moved toward definition of its role in supporting Marine operations. In the air over Haiti, the Dominican Republic, China, and Nicaragua, Marine aviators actively assisted the ground forces, not only in combat but also in reconnaissance, transportation, and supply. By trial and error they worked out basic tactics for close air support. In Nicaragua, by the end of the decade, the Marine air-ground team had become a reality.

Then in the 1930s, as Marine Corps doctrine crystallized and it began to train for its amphibious warfare mission, Marine aviation achieved full acceptance as part of the Fleet Marine Force, as well as developing a secondary capacity to join naval aviation in carrier operations.

In all of these decades, Marine aviators developed versatility. They flew all kinds of missions with all kinds of airplanes. They learned early to make do and do well with what they had. They established a tradition of excellence and adaptability which would be seen again and again, from Henderson Field on Guadalcanal to the frozen hills around the Chosin Reservoir to the monsoon skies of Vietnam.

## NOTES

Unless otherwise noted, the material in this monograph is drawn from the following sources: LCdr Reginald Wright Arthur, USN (Ret.), *Contact!* (Washington, D.C.: Naval Register, 1967); Capt Charles W. Boggs, USMC, "Marine Aviation: Origin and Growth," *Marine Corps Gazette*, v. XXXIV, No. 11 (November 1950), pp. 68-75; Maj Edwin N. McClellan, USMC, "Marine Corps Aviation," *Marine Corps Gazette*, v. XVI, No. 1 (May 1931), pp. 11-13, 43-44 and No. 2 (August 1931), pp. 56-59; Martin Caidin, *Golden Wings* (New York: Random House, 1960); RAdm George van Deurs, USN (Ret.), *Wings for the Fleet* (Annapolis: U.S. Naval Institute, 1966); Robert Sherrod, *History of Marine Corps Aviation in World War II* (Washington, D.C.: Combat Forces Press, 1952), hereafter Sherrod, *Marine Air History*; Adrien O. Van Wyen and Lee M. Pearson, *United States Naval Aviation, 1910-1960* (Washington, D.C.: Government Printing Office, 1961), hereafter Van Wyen and Pearson, *Naval Aviation*; Capt Archibald D. Turnbull, USN and LtCdr Clifford L. Lord, USNR, *History of United States Naval Aviation* (New Haven, Conn.: Yale University Press, 1949). All references to the annual reports of the Commandant of the Marine Corps are taken from extracts in the file "Major General Commandant, Annual Reports on Aviation, 1912-1941." All cited material is available in or through the Historical Reference Section, History and Museums Division, Headquarters, U.S. Marine Corps (HRS, HMD, HQMC).

### CHAPTER I.

#### The Beginnings, 1912-1917

Unless otherwise indicated, all material in this chapter on the development of naval aviation is drawn from Turnbull and Lord, *History of US Naval Aviation, passim*, and Van Deurs, *Wings for the Fleet, passim*. This chapter also draws heavily upon material supplied by two commentators on the original draft of the manuscript: MSgt Walter F. Gemeinhardt, USMC (Ret), ltr to Director, History & Museums Div, dtd 14 May 1975, Comment File, Brief History of Marine Corps Aviation (hereafter cited as Gemeinhardt Comments); and Lee M. Pearson, Historian, NavAirSysCom, ltr to Director, History & Museums Div, dtd 26 March 1975, Comment File, Brief History of Marine Corps Aviation (hereafter cited as Pearson Comments).

- 1 LtCol Kenneth J. Clifford, USMCR, *Progress and Purpose: A Developmental History of the United States Marine Corps, 1900-1970* (Washington, D.C.: HMD, HQMC, 1973), pp. 1-16, hereafter Clifford, *Progress and Purpose*; MajGenCmdt, Annual Report, 1912.
- 2 Alfred A. Cunningham Biographical File (HRS, HMD, HQMC).
- 3 Lt A. A. Cunningham ltr to Capt. W. I. Chambers, dtd 25 July 1913, quoted in Caidin, *Golden Wings*, p. 8.
- 4 McClellan, "Marine Corps Aviation," *Marine Corps*

- Gazette* (hereafter cited as *MCG*), v. XVI, No. 1 (May 1931), p. 12.
- 5 Order from MajGenCmdt to 1stLt A. A. Cunningham, dtd 10 May 1912, Cunningham Bio File.
- 6 Van Deurs, *Wings for the Fleet*, p. 76.
- 7 Maj A. A. Cunningham, ltr to Mr. Miller, dtd 22 Jan 1931, Cunningham Papers; Maj A. A. Cunningham, ltr to Maj E. W. McClellan, dtd 11 Mar 31, McClellan Papers (Collections Unit, Marine Corps Museums).
- 8 Bernard L. Smith Biographical File (HRS, HMD, HQMC); Van Deurs, *Wings for the Fleet*, p. 76.
- 9 McClellan, "Marine Aviation," *MCG*, v. XVI, No. 1 (May 1913), pp. 13, 43.
- 10 Quoted in Caidin, *Golden Wings*, p. 9.
- 11 The details of these flights can be found in the typewritten Log Book in the Cunningham Papers.
- 12 Cunningham Bio File.
- 13 MajGenCmdt, Annual Report, 1913.
- 14 The Chambers Board's findings are summarized in Turnbull & Lord, *History of US Naval Aviation*, pp. 33-34.
- 15 Capt Edna Loftus Smith, MCWR, "Aviation Organization in the U.S. Marine Corps, 1912-1945" (Ms in HRS, HMD, HQMC), p. 2, hereafter cited as Smith, "Aviation Organization"; Clifford, *Progress & Purpose*, pp. 18-21; 1stLt B. L. Smith, ltr to CO, Flying School, dtd 10 Mar 1914, Subj: Report of Work Done by the Marine Section of the Naval Flying School. . . while Temporarily attached to the First Advance Base Brigade, USMC, Culebra, P.R., Brief History of Marine Aviation Comment File (We are indebted to Mr. Lee M. Pearson, NavAirSysCom for furnishing us with a copy of this document from Navy files).
- 16 Turnbull and Lord, *History of US Naval Aviation*, pp. 41-42.
- 17 Smith Bio File.
- 18 Maj A. A. Cunningham, ltr to Mr. Miller, dtd 22 Jan 1931, Cunningham Papers.
- 19 Cunningham Bio File.
- 20 Van Deurs, *Wings for the Fleet*, pp. 154-155, discusses Evans' feat and the arguments about looping and spinning in some detail.
- 21 MajGenCmdt, Annual Report, 1916.
- 22 *Ibid.*
- 23 MajGenCmdt, order to 1stLt A. A. Cunningham, dtd 26 Feb 1917, copy in Cunningham Bio File; Smith *Aviation Organization*, p. 2.

### CHAPTER II

#### Marine Aviation in World War I

Unless otherwise noted, material in this chapter is drawn from the sources listed at the beginning of the notes and in addition from MSgt Roger M. Emmons, USMC (Ret), *The First Marine Aviation Force, 1917-1918: Development and Deployment* (Ms File Copy, HRS, HMD, HQMC); this paper also can be found in *Cross and*

*Cockade: The Journal of the Society of World War I Aero Historians*, v. VI, No. 2 (Summer 1965), pp. 173-186, and No. 3 (Autumn 1965), pp. 272-292. All page references to this source in this monograph are to the Ms file copy. Material for this section is drawn also from Smith, "Aviation Organization."

- 1 MGen Ford O. Rogers, USMC (Ret), Interview by Oral History Unit, HMD, dtd 3 Dec 1970 (Oral History Coll, HMD), inscrtpt, p. 25, hereafter Rogers Interview.
- 2 MajGenComdt George Barnett, ltr to CNO, Subj: Organization of Land Aero Squadron, dtd 27 July 1917, MajGen Comt Barnett, ltr to BGen Squires, Ch Sig Off, US Army, Subj: US Marine Aviation Section for Service in France, dtd 17 Sept 1917; Col J. T. Nance, USA, ltr to MGC, Subj: Instruction of Commissioned and Enlisted Mar Corps Personnel in Ballooning, dtd 28 Sept 1917, all in Roger Emmons Papers (Collections Unit, Marine Corps Museums). The Emmons papers are a compilation of Marine aviation records made by MSgt Emmons, Historian, Marine Corps Aviation Association, who graciously turned over copies of them to the History and Museums Division.
- 3 LtGen Karl S. Day, USMCR (Ret), Interview by Oral History Unit, HMD, dtd 5 Aug 1968 (Oral History Coll, HMD) inscrtpt, pp. 5-6, 8, hereafter Day Interview.
- 4 MGen Lawson H. M. Sanderson, USMC (ret), Interview by Oral History Unit, HMD, dtd 14 July 1969 (Oral History Coll), HMD, inscrtpt, p. 3, hereafter Sanderson Interview.
- 5 Quoted in Div of Reserve, HQMC, *The Marine Corps Reserve: A Short History* (Washington, D.C.: US Govt. Printing Office, 1966), p. 12.
- 6 Fred T. Janc, *Jane's All the World's Aircraft 1919*, C. G. Grey, ed. (New York: Arco Publishing Co., 1969), p. 452a, hereafter Jane, *World Aircraft 1919*.
- 7 Gen Christian F. Schilt, USMC (Ret), Interview by Oral History Unit, HMD, dtd 17 and 21 Nov 1969 (Oral History Coll, HMD) inscrtpt, p. 15, hereafter Schilt Interview.
- 8 Capt A. A. Cunningham, ltr to MajGen Cndt, Subj: Intvw with Army Signal Corps Officers, dtd 10 Oct 1917, Emmons Papers.
- 9 Day Intvw, pp. 9-10.
- 10 CO, 1st Regt, Fixed Defense Force, ltr to MajGen Cndt, Subj: Organization of Advance Base Unit, dtd 21 Dec 1917, Emmons Papers.
- 11 The details of this trip, with interesting observations of France at war, can be found in a pocket diary kept by Cunningham and now part of the Cunningham Papers. The diary has been published by the History and Museums Division as *Marine Flyer in France: The Diary of Captain Alfred A. Cunningham, November 1917-January 1918* (Washington, D.C.: HQMC, 1974).
- 12 Maj A. A. Cunningham, "Value of Aviation to the Marine Corps," *MCG*, v. V, No. 3 (Sept 1920), p. 224.
- 13 MajGen Cndt, order to Capt A. A. Cunningham, dtd 11 March 1918, Cunningham Bio File.
- 14 The evolution of the Northern Bombing Group can be traced in "Summary of Events in the Development of the Northern Bombing Group," a typed compilation of letters, telegrams, and official reports in the Cunningham papers.
- 15 MajGen Cndt to CO, 1st Aviation Squadron, Subj: Change of Station, dtd 31 Dec 1917, in Emmons Papers; for the other side of the story, see Day Intvw, pp. 9-11, and MGen Fred S. Robillard, USMC (Ret), Colonel Robillard's Story on Marine Aviation, in MGen Fred S. Robillard File, Personal Papers (Collections Unit, Marine Corps Museums).
- 16 MajGenCndt, Orders to Capt R. S. Geiger, Subj: Change of Station, dtd 4 Feb 1918 and Capt. R. S. Geiger, ltr to MajGen Cndt, Subj: Transfer of Aeronautic Detachment, dtd 9 Feb 1918, both in Emmons Papers.
- 17 Rogers Intvw, pp. 26-27, 29.
- 18 Emmons, *First Aviation Force*, p. 14.
- 19 MSgt Roger M. Emmons, USMC (Ret), *Navy Fliers Transferred to Marine Aviation, Marine Day Wing in France, 1918* (Baltimore, Md.: 1st Marine Aviation Force Veterans' Association, 1971), pp. 1-10; Rogers Intvw, pp. 36-37.
- 20 Rogers Interview, p. 33. See also Day Interview, pp. 12-14.
- 21 Captain Mims's letters to Cunningham and Cunningham's letters to Mims are in the Cunningham Papers; these documents cover the entire period when Cunningham was overseas.
- 22 Maj Edna Loftus Smith, USMCWR, *Marine Corps Reserve Aviation, 1916-1957* (Washington, D.C., 1959), pp. 2, 5. Hereafter Smith, *Reserve Aviation*.
- 23 MajGen Cndt, Annual Report, 1918.
- 24 Maj Alfred A. Cunningham, ltr to Gen Charles G. Long, dtd 31 October 1918, and ltr to Mr. Miller, dtd 22 January 1931, both in Cunningham Papers.
- 25 Day Interview, p. 25.
- 26 Emmons, *First Aviation Force*, pp. 35-36; Maj Alfred A. Cunningham, ltr to Mr. Miller, dtd 22 January 1931, Cunningham Papers.
- 27 Day Interview, pp. 17, 26; Rogers Interview, pp. 35-36, 38, 41, 44. Both of these Marine aviators flew with the British squadrons.
- 28 Maj Alfred A. Cunningham, ltr to Gen Charles G. Long, dtd 9 November 1918, Cunningham Papers.
- 29 Maj Alfred A. Cunningham, ltr to Gen Charles G. Long, dtd 12 October 1918, Cunningham Papers.
- 30 For history and technical details of the DH-4, DH-9, and DH-9A, see W. M. Lambertson, compiler, and E. F. Cheesman, editor, *Reconnaissance and Bomber Aircraft of the 1914-1918 War* (Los Angeles, Calif.: Aero Publishers, Inc., 1962), pp. 13-14, 36-41, 214-215; also Emmons, *First Aviation Force*, p. 35.
- 31 For details of the raid on Thielt, see Emmons, *First Aviation Force*, pp. 48-53. The Ralph Talbot Papers provide biographical data on Talbot as well as a moving re-creation of the naive gallantry of these World War I aviators.
- 32 Emmons, *First Aviation Force*, p. 65.
- 33 Maj Alfred A. Cunningham, ltr to Gen Charles G. Long, dtd 9 November 1918, Cunningham Papers.

### CHAPTER III

#### Advance Toward Maturity, 1919-1929

- 1 U.S. Navy Dept., *Annual Reports of the Navy Department for the Fiscal Year 1919* (Washington: Government Printing Office, 1920), v. I, p. 41.
- 2 Smith, *Aviation Organization*, p. 5.
- 3 Maj Alfred A. Cunningham, "Value of Aviation to the Marine Corps," *MCG*, v. V, No. 3 (September 1920), p. 222, hereafter, Cunningham, "Value of Aviation."
- 4 Smith, "Aviation Organization," pp. 7-8, quotes Cunningham's testimony before the General Board. For Cunningham's views on the role of Marine aviation, see Cunningham, "Value of Aviation," pp. 221-233.

- 5 MajGen Cndt, Annual Report, 1919, 1920.
- 6 Unless otherwise noted, all material in this section is drawn from Smith, "Aviation Organization," pp. 5-10.
- 7 Quoted in Smith, "Aviation Organization," pp. 5-6.
- 8 For the rivalry between Cunningham and Turner, see Capt Harvey B. Mims, ltr to Maj Alfred A. Cunningham, dtd 7 October 1918, and Maj Alfred A. Cunningham, ltr to Capt Harvey B. Mims, dtd 30 October 1918 and ltr to Mr. Miller, dtd 22 January 1931, all in Cunningham Papers. Also Rogers Interview, pp. 50-51.
- 9 Maj Alfred A. Cunningham, ltr to MajGenCndt John A. Lejeune, dtd 23 February 1928, in Cunningham Biographical File.
- 10 MGen Louis E. Woods, USMC (Ret), Interview by Oral History Unit, dtd 3, 10, 17, 24 May, 27 June, 7 July 1968 (Oral History Coll, HMD), transcript, p. 63, hereafter Woods Interview; Rogers Interview, p. 15.
- 11 Woods Interview, p. 62.
- 12 Maj Edwin H. Brainard, USMC, "Marine Aviation—A Lecture," *MCG*, v. XI, No. 3 (September 1926), p. 192.
- 13 *Ibid.*, pp. 192-197.
- 14 Officer in Charge of Aviation, Memo. to: Director of Operations and Training, Subj: Aviation Data for Quarterly Preparedness Report, dtd 18 October 1921, in File MajGen Cndt, Annual Reports on Aviation, 1912-1940; Smith, *Reserve Aviation*, pp. 18-19.
- 15 Woods Interview, p. 63.
- 16 LtGen Francis P. Mulcahy, USMC (Ret), Interview by Oral History Unit, HMD, HQMC, dtd 11, 14, 15 February 1967 (Oral History Coll, HMD), transcript pp. 79-80, hereafter Mulcahy Interview.
- 17 Smith, *Reserve Aviation*, pp. 29-38.
- 18 For descriptions of Marine air training, see MajGenCndt, Annual Reports, 1921 through 1929.
- 19 Woods Interview, p. 28; see also pp. 29-30.
- 20 Rogers Interview, p. 50.
- 21 MajGenCndt, Annual Report, 1927.
- 22 MajGenCndt, Annual Report, 1920; William T. Larkins, *U.S. Marine Corps Aircraft, 1914-1959* (Concord, Calif.: Aviation History Publications, 1959), pp. 16, 18; Paul R. Matt, compiler, and Bruce Robertson, ed., *United States Navy and Marine Corps Fighters, 1918-1962* (Fallbrook, Calif.: Aero Publishers, 1962), pp. 22-24; Rogers Interview, pp. 56-57, describes the fate of the D-7s.
- 23 Schilt Interview, pp. 35-36; Larkins, *USMC Aircraft*, pp. 12-13.
- 24 Officer in Charge of Aviation, Aviation Data for Preparedness Report for Quarter Ending 30 June 1925, dtd 2 July 1925, in "MajGenCndt, Annual Reports on Aviation, 1912-1941."
- 25 For a summary of these developments, see Matt and Robertson, *Navy and Marine Fighters*, p. 31.
- 26 BGen Daniel W. Torrey, USMC (Ret), Interview by Oral History Unit, dtd 13 August 1968, (Oral History Coll, HMD) transcript, pp. 15-16, hereafter Torrey Interview; Matt and Robertson, *Navy and Marine Fighters*, pp. 32-36.
- 27 The comment on the Corsair is in Schilt Interview, pp. 57, 74; Matt and Robertson, *Navy and Marine Fighters*, pp. 37-46.
- 28 MajGenCndt, Annual Reports, 1922, 1923, 1924; Smith, *Reserve Aviation*, pp. 19-20.
- 29 Rogers Interview, pp. 53-54, 58-63.
- 30 Sherrod, *Marine Air History*, p. 22.
- 31 Woods Interview, pp. 31-36; 1st Sergeant Harry L. Blackwell, ltr to his mother, dtd 2 May 1923, in Harry L. Blackwell Papers, Collections Unit, Marine Corps Museums.
- 32 Capt Ralph J. Mitchell, USMC, "The Longest American Airplane Flight," *MCG*, v. IX, No. 1 (March 1924), pp. 57-64.
- 33 U.S. Navy Dept., *Annual Reports of the Navy Department for the Fiscal Year 1924* (Washington, D.C.: Government Printing Office, 1925), p. 617; "Professional Notes," *MCG*, v. XIII, No. 2 (June 1928), p. 156.
- 34 Rogers Interview, p. 58.
- 35 Sherrod, *Marine Air History*, pp. 22-23.
- 36 Col L. H. M. Sanderson, ltr to Capt Warren J. Goodman, USMCR, dtd 1 September 1944, and ltr to the Chief of Naval Operations, dtd 19 August 1946, both in "Aircraft—Bombers" Subject File, HRS, HMD.
- 37 Capt Garrett H. Graham, USMCR, ltr to BGen Louis E. Woods, USMC, Subj: Origin of Dive Bombing, dtd 22 February 1944; MGen Ross E. Rowell, USMC, Interview on the Origin and Early Use of Dive Bombing Tactics, held in the Aviation History Unit on 24 October 1946, hereafter Rowell Interview; these and other documents on dive bombing are in "Aircraft—Bombers" Subject File, HRS, HMD.
- 38 MGen Fred S. Robillard, USMC (Ret), *As Robie Remembers* (Bridgeport, Conn.: Wright Investors' Service, 1969), pp. 45-58.
- 39 MajGenCndt, Annual Reports, 1927 and 1929, LtGen William J. Wallace, USMC (Ret), Interview by Oral History Unit, dtd 2 and 13 February 1967 (Oral History Coll, HMD), transcript, pp. 35-40.
- 40 Quoted in Sherrod, *Marine Air History*, p. 28.
- 41 MajGenCndt, Annual Report, 1927. Rowell Interview.
- 42 The account of the battle of Ocotal is drawn from the following sources: Maj Ross E. Rowell, USMC, "Annual Report of Aircraft Squadrons, 2nd Brigade, 1 July 1927 to 20 June 1928," *MCG*, v. XIII, No. 4 (December 1928), hereafter Rowell, "Nicaragua Report, 1928"; Rowell Interview; Headquarters Marine Corps, Division of Operations and Training Report, "Combat Operations in Nicaragua," *MCG*, v. XIV, No. 1 (March 1929), hereafter Div Ops, "Nicaragua Report, 1927-1928."
- 43 Rowell Interview.
- 44 DivOps, "Nicaragua Report, 1927-1928," p. 20.
- 45 MajGenCndt, Annual Report, 1928.
- 46 Rowell, "Nicaragua Report, 1928," p. 254; Schilt's Flight Log, listing his trips into and out of Quilali is in the Christian F. Schilt Papers (Collections Unit, Marine Corps Museums).
- 47 "Combat Operations in Nicaragua," *MCG*, v. XIV, No. 3 (September 1929), pp. 177-179; Rowell Interview.
- 48 Schilt Interview, p. 72.

## CHAPTER IV

### Marine Aviation Comes of Age, 1930-1940

- 1 MajGenCndt, Annual Report, 1931.
- 2 MajGenCndt, Annual Report, 1931, 1932, 1933.
- 3 Clifford, *Progress and Purpose*, p. 45.
- 4 MajGenCndt, Annual Report, 1934.
- 5 Clifford, *Progress and Purpose*, pp. 46-48, 58-59; Peter A. Isely and Philip A. Crowl, *The U.S. Marines*

- and Amphibious War: Its Theory and Its Practice in the Pacific* (Princeton, N.J.: 1951), pp. 40-41; Gen Vernon E. Megee, USMC (Ret), ltr to Dir, History & Museums Div, dtd 24 Apr 1975, Comment File, Brief History of Marine Corps Aviation.
- 6 Quoted in Sherrod, *Marine Air History*, pp. 31-32.
  - 7 Robert Sherrod, "Marine Corps Aviation: The Early Days, Part I," *MCC*, v. XXXVI, No. 6 (May 1952), p. 59.
  - 8 Unless otherwise noted, the information in the rest of this section is drawn from Smith, *Aviation Organization*, pp. 12-16.
  - 9 MajGenCmdt, Annual Report, 1935.
  - 10 MajGenCmdt, Annual Report, 1937, 1938.
  - 11 MajGenCmdt, Annual Report, 1935, 1939, 1940.
  - 12 Except where otherwise noted, all material on the development of the reserve is taken from Smith, *Aviation Reserve*, pp. 42-48.
  - 13 MajGenCmdt, Annual Report, 1935, 1936, 1939.
  - 14 Day Interview, pp. 42-45. See also Torrey Interview, pp. 24-27.
  - 15 MajGenCmdt, Annual Report, 1934, 1935, 1936.
  - 16 BGen Edward C. Dyer, USMC (Ret), Interview by Marine Corps Oral History Unit dtd 7, 9, 19, and 20 August 1968 (Oral History Coll, HMD), transcript, pp. 35-37.
  - 17 *Ibid.*, pp. 31, 36-39, 50-51.
  - 18 *Ibid.*, pp. 35-36. See also pp. 39-44.
  - 19 *Ibid.*, pp. 49, 84-85; MajGenCmdt, Annual Report 1939.
  - 20 Matt and Robinson, *Navy and Marine Fighters*, pp. 47-53, 68-76; Larkins, *USMC Aircraft*, pp. 44, 64, 74, 83, 94, 96. The quotation on the F4B-4 is from Megee Comments.
  - 21 Lynn Montross, "The Marine Autogyro in Nicaragua," *MCC*, v. XXXVII, No. 2 (February 1953), pp. 56-61.
  - 22 MajGenCmdt Annual Report, 1930. For each year's racing and air show activity, See *Ibid.*, 1930-1939.
  - 23 MajGenCmdt, Annual Report 1938 and 1939.
  - 24 All data on amphibious exercises which follows is from Isely and Crowl, *Marines and Amphibious War*, pp. 45-56.
  - 25 Clifford, *Progress and Purpose*, p. 59.
  - 26 Quoted in Isely and Crowl, *Marines and Amphibious War*, pp. 58-59.

## APPENDIX A

### Directors of Marine Corps Aviation, through Pearl Harbor\*

Major Alfred A. Cunningham .....	17 Nov 1919–12 Dec 1920
Lieutenant Colonel Thomas C. Turner .....	13 Dec 1920– 2 Mar 1925
Major Edwin H. Brainard .....	3 Mar 1925– 9 May 1929
Colonel Thomas C. Turner .....	10 May 1929–28 Oct 1931
Major Roy S. Geiger .....	6 Nov 1931–29 May 1935
Colonel Ross E. Rowell .....	30 May 1935–10 Mar 1939
Brigadier General Ralph J. Mitchell .....	11 Mar 1939–29 Mar 1943

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\*On 1 April 1936 the title of Officer-In Charge, Aviation, was changed to Director of Aviation.



## APPENDIX B

### First 100 Marine Corps Aviators

<i>Number</i>	<i>Name</i>	<i>Date of Designation</i>	<i>Naval Aviator Number</i>
1	Alfred Austell Cunningham	17 Sep 1915	5
2	Bernard Lewis Smith	1 Jul 1914	6
3	William Maitland McIlvain	10 Mar 1915	12
4	Francis Thomas Evans	9 Mar 1916	26
5	Roy Stanley Geiger	9 Jun 1917	49
6	David Lukens Shoemaker Brewster	5 Jul 1917	55
7	Edmund Gillette Chamberlain	9 Oct 1917	96 1/2 & 768
8	Russell Alger Presley	9 Nov 1917	100 3/4 & 769
9	Doyle Bradford	5 Nov 1917	111 1/2
10	Clifford Lawrence Webster	5 Nov 1917	112 1/2
11	Arthur Houston Wright	6 Dec 1917	148 & 803
12	Herman Alexander Peterson	2 Nov 1917	163 1/2
13	George McCully Laughlin III	12 Dec 1917	165 & 790
14	Charles Burton Ames	21 Dec 1917	193
15	John Howard Weaver	21 Jan 1918	251 & 794
16	Alvin Lochinvar Prichard	21 Jan 1918	279
17	George Conan Willman	22 Jan 1918	299 & 795
18	Herbert Dalzell Elvidge	12 Mar 1918	424
19	Hazen Curtis Pratt	8 Mar 1918	426
20	Sidney "E" Clark	8 Mar 1918	442 & 800
21	Frederick Commodore Schley	8 Mar 1918	443 & 801
22	Charles Alfred Needham	14 Mar 1918	444
23	John Bartow Bates	25 Mar 1918	449
24	Ralph Talbot	10 Apr 1918	449
25	Thomas Carrington Comstock	26 Mar 1918	473 & 789
26	Francis Osborne Clarkson	28 Mar 1918	474 & 788
27	Guy Mowrey Williamson	25 Mar 1918	477
28	Grover Cleveland Alder	25 Mar 1918	479
29	Edward Kenealy	23 Mar 1918	480
30	Donald Newell Whiting	1 Apr 1918	503
31	Howard Albert Strong	2 Apr 1918	505
32	John Parke McMurrin	1 Apr 1918	508 & 791
33	James Kendrick Noble	1 Apr 1918	510 & 792
34	Vincent Case Young	1 Apr 1918	519
35	Province Law Pogue	19 Jun 1918	522 & 782
36	Duncan Hugh Cameron	26 Mar 1918	527 & 787
37	George Fred Donovan	26 Mar 1918	532 & 798
38	William Herbert Derbyshire	28 Feb 1918	533 & 770
39	Frederick Brock Davy	28 Feb 1918	534 & 771
40	Douglas Bennett Roben	14 Mar 1918	535 & 774
41	Arthur Hallett Page, Jr.	14 Mar 1918	536 & 775
42	Gove Compton	14 Mar 1918	537 & 773
43	Thomas James Butler	10 Apr 1918	541 & 786
44	Thomas Rodney Shearer	4 Apr 1918	559
45	Ford Ovid Rogers	14 Apr 1918	560
46	Homer Carter Bennett	11 Apr 1918	562 & 797
47	John Edmond Powell	4 Apr 1918	563
48	William Morrison Barr	8 Apr 1918	567 & 799
49	Harry Eldridge Stovall	11 Apr 1918	568
50	Harvey Byrd Mims	4 Dec 1917	576
51	Winfield Scott Shannon	17 Apr 1918	583
52	Everett Robert Brewer	17 Apr 1918	585

<i>Number</i>	<i>Name</i>	<i>Date of Designation</i>	<i>Naval Aviator Number</i>
53	John George Estill Kipp	17 Apr 1918	586
54	Frederick Louis Kolb	17 Apr 1918	587
55	George Franklin Kremm	17 Apr 1918	588
56	Jesse Arthur Nelson	17 Apr 1918	589
57	Herman Judson Jesse	17 Apr 1918	590
58	William Webster Head	17 Apr 1918	591
59	Gustav Henry Kaemmerling	17 Apr 1918	592
60	Jesse Floyd Dunlap	17 Apr 1918	593
61	Trevor George Williams	17 Apr 1918	594
62	Clyde Noble Bates	17 Apr 1918	595
63	Melville Edward Ingalls Sullivan	17 Apr 1918	596
64	Francis Patrick Mulcahy	17 Apr 1918	597
65	Benjamin Louis Harper	17 Apr 1918	598
66	Walter Harold Batts	17 Apr 1918	599
67	Henry Teasdale Young	17 Apr 1918	600
68	Karl Schmolsmire Day	17 Apr 1918	601
69	Fred Sevier Robillard	17 Apr 1918	602
70	Melchior Borner Trefall	17 Apr 1918	603
71	Harold Cornell Major	17 Apr 1918	604
72	Robert Sidney Lytle	17 Apr 1918	605
73	Thomas Caldwell Turner	14 Mar 1918	772
74	Kenneth Brown Collings	26 Mar 1918	776
75	Donald Buford Cowles	4 Apr 1918	777
76	Maco Stewart, Jr.	4 Apr 1918	778
77	Henry Sidney Ehret, Jr.	6 Apr 1918	779
78	Raymond Joseph Kirwan	8 Apr 1918	780
79	Frank Nelms, Jr.	19 Jun 1918	781
80	Harvey Chester Norman	23 May 1918	783
81	Delmar Leighton	23 May 1918	784
82	John Thomas Brecton	11 Apr 1918	785
83	William Wheelwright Torrey	22 Mar 1918	793
84	Joseph White Austin	23 Mar 1918	796
85	Bunn Gradon Barnwell	28 May 1918	804
86	Walter Josephs Willoughby	19 Jun 1918	805
87	Chester Julius Peters	19 Jun 1918	806
88	Roswell Emory Davis	19 Jun 1918	807
89	Horace Wilbur Leeper	25 Jun 1918	808
90	Byron Brazil Freeland	25 Jun 1918	809
91	Robert James Paisley	19 Jun 1918	810
92	Charles Thomas Holloway II	1 Jul 1918	811
93	Frank Henry Fleer	2 Jul 1918	812
94	Maurice Kingsley Heartfield	2 Jul 1918	813
95	Robert James Archibald	8 Jul 1918	814
96	Arthur Judson Sherman	8 Jul 1918	815
97	Philip William Blood	8 Jul 1918	816
98	Albert Aloysius Kuhlen	28 Jun 1918	817
99	Earl Francis War	30 Jun 1918	818
100	August Koerbling	1 Jul 1918	819

NOTE: Aviators with two designation numbers generally transferred from the Navy to the Marine Corps, receiving a second number from the Marines. The lower number is used to establish precedence. Numbers with fractions resulted from several aviators being given the same designation number. Also, dates of designation should not be confused with dates of precedence, which are reflected by naval aviator numbers and are often much earlier than designation dates.

## APPENDIX C

### Marine Corps Aircraft, 1913-1940

<i>Designation</i>	<i>Type</i>	<i>Year Assigned</i>	<i>Manufacturer and Name</i>	<i>Engine Type and Horsepower</i>	<i>Dimensions Length and Span</i>	
1. AX-1	Bat Boat, 1-engine 2-crew, biplane	1913	Curtiss	Curtiss 90 h.p.	27'2"	37'1"
2. JN-4B	Trainer, 1-engine, 2-crew, biplane	1917	Curtiss "Jenny"	Curtiss DXX 100 h.p.	27'4"	43'3"
3. H-12	Patrol, 2-engine, 2-crew, biplane, flying boat	1918	Curtiss	2 Liberty 42 cyl. 300 h.p.	46'1"	95'
4. H-16	Patrol, 2-engine, 2-crew, 4-place, biplane, flying boat	1918	Curtiss, Naval Air- craft Fac- tory; and others.	2 Liberty 12 cyl. 300 h.p.	46'1"	95'
5. HS-2	Patrol, 1-engine, 2-crew, biplane, flying boat	1918	Curtiss; Standard; Naval Air- craft Fac- tory; Lowe, Willard, and Fowler; and others.	Liberty 12 cyl. 330 h.p.	39'	74'
6. HS-2L	Patrol, 1-engine, 2-crew, biplane	1918	Curtiss; Lowe, Willard, and Fowler; and others.	Liberty 12 cyl. 360 h.p.	39'	74'
7. Kirkham Fighter	Experimental fighter, 1-engine, 2-place, triplane	1918	Curtiss	Kirkham 400 h.p.	23'	31'10"
8. N-9	Trainer, 1-engine, 2-place, 1 float, biplane, seaplane	1918	Curtiss; Burgess	Curtiss	30'10"	53'4"
9. R-6	Trainer, 1-engine, 2-place, biplane, seaplane.	1918	Curtiss	Curtiss V-2 200 h.p.	33'5"	57'1"
10. DH-4	Observation, 1-engine, 2-crew, biplane	1920	Dayton- Wright	Liberty 12 cyl. 360 h.p.	30'2"	42'6"
11. DH-9A	Observation bomber, 1-engine, 2-crew, biplane	1918	British Aircraft Manufacturing Co.	Liberty 12 cyl. 400 h.p.	30'3"	45'11"

This list is reproduced with amendments from Historical Branch, G-3 Division, HQMC, *Marine Corps Aircraft 1913-1965* (Washington, DC: HMD, 1967, rev. ed.). The amendments include the addition of specifications for the DH-9A taken from W. M. Lamberton, comp., and E. F. Cheeseman, ed., *Reconnaissance and Bomber Aircraft of the 1914-1918 War* (Los Angeles: Aero Publishers Inc., 1962).

<i>Designation</i>	<i>Type</i>	<i>Year Assigned</i>	<i>Manufacturer and Name</i>	<i>Engine Type and Horsepower</i>	<i>Dimensions Length and Span</i>	
12. DH-4B	Observation, 1-engine, 2-crew, biplane	1920	U.S. Army	Liberty 42 cyl. 400 h.p.	30'2"	42'6"
13. E-1 "M" Defense	Fighter, 1-engine, biplane	1920	Standard	LeRhone 80 h.p.	18'11"	24'
14. HS-1	Patrol, 1-engine, 2-crew, biplane	1920	Curtiss	Liberty 12 cyl. 360 h.p.	38'6"	62'1"
15. JN-4	Trainer, 1-engine, 2-crew, biplane	1920	Curtiss "Jenny"	Curtiss OXX 100 h.p.	27'1"	43'7"
16. JN-6-HG-1	Trainer, 1-engine, 2-crew, biplane	1920	Curtiss "Jenny"	Hispano 150 h.p.	27'	43'3"
17. VE-7	Trainer, 1-engine, 2-crew, biplane	1920	Lewis and Vought	Hispano E-2 180 h.p.	24'5"	34'1"
18. Fokker C-1	Fighter, 1-engine, 2-crew, biplane	1921	Netherlands Aircraft Company	B. M. W. 243 h.p.	23'8"	34'10"
19. Fokker D-7	Fighter, 1-engine, 1-crew, biplane	1921	Fokker	Packard 350 h.p.	23'	27'6"
20. VE-7G	Trainer, 1-engine, 2-crew, biplane, seaplane	1921	Naval Aircraft Factory	Hispano E-2 480 h.p.	24'5"	34'1"
21. VE-7SF	Fighter trainer, 1-engine, 1-crew, land, biplane	1921	Vought	Hispano E-2 480 h.p.	24'5"	34'1"
22. DH-4B-1	Observation, 1-engine, 2-crew, biplane	1922	U.S. Army	Liberty 12 cyl. 400 h.p.	30'2"	42'6"
23. F-5-L	Patrol bomber, scout, 2-engine, 2-crew, 5-place, biplane, flying boat	1922	Naval Aircraft Factory; Curtiss; and others	2 Liberty 12 cyl. 360 h.p.	49'4"	103'9"
24. MB-3	Fighter, 1-engine, 1-crew, biplane	1922	Thomas-Morse	Hispano 300 h.p.	20'	26'
25. MBT	Torpedo bomber, 2-engine, 3-crew, biplane	1922	Martin	2 Liberty 12 cyl. 400 h.p.	46'4"	71'5"
26. MT	Torpedo bomber, 2-engine, 3-crew, biplane	1922	Martin	2 Liberty 12 cyl. 400 h.p.	46'4"	71'5"
27. DT-2	Torpedo bomber, 1-engine, 2-crew, convertible (land or sea), biplane	1923	Douglas; Naval Aircraft Factory; Lowe, Willard, and Fowler	Liberty 12 cyl. 450 h.p.	37'8"	50'
28. JN-4H	Trainer, 1-engine, 2-crew, biplane	1923	Curtiss "Jenny"	Hispano Suiza 150 h.p.	27'	43'8"
29. T3M-1	Torpedo bomber, 1-engine, 3-crew, 2-float, convertible, lower wing had wider span	1923	Martin	Wright 575 h.p.	42'9"	56'7"
30. VE-9	Observation, 1-engine, 2-crew, biplane	1923	Vought	Wright E-3 180 h.p.	24'6"	34'1"

<i>Designation</i>	<i>Type</i>	<i>Year Assigned</i>	<i>Manufacturer and Name</i>	<i>Engine Type and Horsepower</i>	<i>Dimensions Length and Span</i>	
31. DH-4B-2	Observation, 1-engine, 2-crew, biplane	1925	Naval Aircraft Factory	Liberty 12 cyl. 400 h.p.	30'2"	42'5"
32. JN-6H	Trainer, 1-engine, 2-crew, biplane	1925	Curtiss "Jenny"	Hispano 180 h.p.	26'11"	43'7"
33. JN-6H-B	Same configuration as number 31.					
34. O2B-1	Observation, 1-engine, 2-crew, biplane	1925	Boeing	Liberty 400 h.p.	30'2"	42'6"
35. TW-3	Trainer, 1-engine, 2-crew, 1-float, biplane, convertible	1925	Dayton Wright "Chummy"	Wright 180 h.p.	25'11"	34'10"
36. VE-7H	Trainer, 1-engine, 2-crew, 1-float, biplane, seaplane	1925	Vought	Wright E-2 180 h.p.	24'5"	34'2"
37. F6C-3	Fighter, 1-engine, 1-crew, 2-float, biplane, convertible	1926	Curtiss "Hawk"	Curtiss D-12 400 h.p.	22'8"	31'6"
38. FB-1	Fighter, 1-engine, 1-crew, biplane	1926	Boeing	Curtiss D-12 400 h.p.	23'6"	32'
39. NB-1	Trainer, 1-engine, 2-crew, 1-float, biplane, convertible	1926	Boeing	Wright J-4 200 h.p.	28'9"	36'10"
40. NB-2	Trainer, 1-engine, 2-crew, 1-float, biplane, convertible	1926	Boeing	Wright E-4 180 h.p.	28'9"	36'10"
41. NY-1	Trainer, 1-engine, 2-crew, 1-float	1926	Consolidated	Wright J-5 200 h.p.	31'5"	34'6"
42. OD-1	Observation, 1-engine, 2-crew, biplane	1926	Douglas	Packard 4A-1500 500 h.p.	28'8"	39'8"
43. OL-2	Observation, 1-engine, 2-crew, biplane	1926	Loening	Liberty 400 h.p.	33'10"	45'
44. XS-1	Scout, 1-engine, 1-crew, 2-float, biplane, seaplane	1926	Cox-Klemin	Kinner, 5 RA 84 h.p.	18'2"	18'
45. F6C-1	Fighter, 1-engine, 2-crew, 2 float, biplane, convertible	1927	Curtiss "Hawk"	Curtiss D-12 400 h.p.	22'8"	31'6"
46. F6C-4	Fighter, 1-engine, 2-crew, 2-float, biplane, convertible	1927	Curtiss "Hawk"	Pratt & Whitney R-1340 410 h.p.	22'5"	31'6"
47. O2Y-1	Observation, 1-engine, 2-crew, 1-float, biplane, convertible	1927	Vought "Corsair"	Pratt & Whitney R-1300 425 h.p.	24'8"	34'6"
48. OL-4	Observation, 1-engine, 3-crew, biplane, amphibian	1927	Loening	Liberty 400 h.p.	35'1"	45'
49. OL-6	Observation, 1-engine, 3-crew, biplane, amphibian	1927	Loening	Packard 2A-1500 475 h.p.	35'4"	45'
50. TA-1	Transport, 3-engine, 2-crew, high wing monoplane	1927	Atlantic; Fokker	3 Wright J-5 220 h.p.	49'1"	63'4"

<i>Designation</i>	<i>Type</i>	<i>Year Assigned</i>	<i>Manufacturer and Name</i>	<i>Engine Type and Horsepower</i>	<i>Dimensions Length and Span</i>	
51. XF6C-5	Experimental fighter, 1-engine, 1-crew, 2-float, biplane, convertible	1927	Curtiss "Hawk"	Pratt & Whitney R-1700 525 h.p.	25'5"	31'6"
52. F7C-1	Fighter, 1-engine, 1-crew, 1-float, convertible	1928	Curtiss "Sea Hawk"	Pratt & Whitney, R-1340-B 450 h.p.	22'2"	32'8"
53. F8C-1	Fighter, 1-engine, 2-crew, biplane	1928	Curtiss "Helldiver"	Pratt & Whitney R-1340-B 450 h.p.	25'11"	32'
54. F8C-3	Same configuration as number 52.					
55. NY-1B	Trainer, 1-engine, 2-crew, 1-float, biplane, convertible	1928	Consolidated	Wright J-5 220 h.p.	31'4"	34'6"
56. O2B-2	Observation, 1-engine, 2-crew, biplane	1928	Naval Aircraft Factory	Liberty 400 h.p.	30'1"	42'5"
57. OC-1	Observation, 1-engine, 2-crew, biplane	1928	Curtiss "Falcon" (redesignated from F8C-1)	Pratt & Whitney R-1340 410 h.p.	28'	38'
58. OC-2	Same configuration as number 56.					
59. OL-8	Observation, 1-engine, 2-crew, biplane, amphibian	1928	Loening	Pratt & Whitney R-1300 425 h.p.	34'9"	45'
60. TA-2	Transport, 3-engine, 2-crew, monoplane	1928	Atlantic; Fokker	2 Wright R-790A 300 h.p. 1 Pratt & Whitney 450 h.p.	48'7"	72'10"
61. UO-1	Observation, 1-engine, 2-crew, 1-float, biplane convertible	1928	Vought "Corsair"	U-8-D 250 h.p.	29'3"	34'1"
62. UO-5	Observation, 1-engine, 2-crew, biplane, convertible	1928	Vought "Corsair"	Wright J-5 220 h.p.	28'4"	34'4"
63. XOL-8	Experimental observation, 1-engine, 3-crew, biplane, amphibian	1928	Loening	Pratt & Whitney R-1300 425 h.p.	34'9"	45'
64. FB-5	Fighter, 1-engine, 1-crew, biplane	1929	Boeing	Packard 12A-1500 475 h.p.	23'2"	32"
65. JR-2	Transport, 3-engine, 2-crew, 10-passenger, high wing monoplane	1929	Ford "Tin Goose"	3 Wright R-790A 300 h.p.	49'10"	74"
66. OL-3	Observation, 1-engine, 3-crew, biplane, amphibian	1929	Loening	Packard 2A-2500 475 h.p.	35'1"	45'
67. XHL-1	Experimental transport 1-engine, 2-crew, biplane, amphibian, cabin-ambulance	1929	Loening	Pratt & Whitney R-1690 525 h.p.	34'9"	46'10"

<i>Designation</i>	<i>Type</i>	<i>Year Assigned</i>	<i>Manufacturer and Name</i>	<i>Engine Type and Horsepower</i>	<i>Dimensions Length and Span</i>	
68. F8C-5	Fighter, 1-engine, 2-crew, biplane	1930	Curtiss "Helldiver"	Pratt & Whitney R-1340C 450 h.p.	25'11"	32'
69.	Same configuration as number 64.					
70. O2U-4	Observation, 1-engine, 2-crew, 1-float, biplane, convertible	1930	Vought "Corsair"	Pratt & Whitney R-1340C 450 h.p.	30'	36'
71. TA-3	Transport, 3-engine, 2-crew, high wing monoplane	1930	Atlantic; Naval Aircraft Factory	3 Wright R-975 300 h.p.	48'1"	63'4"
72. XN2B-1	Experimental trainer, 2-crew, biplane	1930	Boeing	Wright R-540 165 h.p.	25'8"	35'
73. XOC-3	Experimental observation, 1-engine, 2-crew, biplane	1930	Curtiss "Falcon"	Pratt & Whitney R-1340C 450 h.p.	28'	38'
74. NT-1	Trainer, 1-engine, 2-crew, biplane	1931	New Standard	Kinner K-5 415 h.p.	24'7"	30'
75. O2C-1	Same configuration as number 67.					
76. O3U-2	Observation, 1-engine, 2-crew	1931	Vought "Corsair"	Pratt & Whitney R-1690C 600 h.p.	26'	36'
77. OL-9	Observation, 1-engine, 2-crew, biplane, amphibian	1931	Loening	Pratt & Whitney R-1340C 450 h.p.	34'9"	45'
78. OP-1	Observation, 1-engine, 2-crew, autogiro	1931	Pitcairn	Wright R-975 300 h.p.	23'1"	Rotor 30'3"
79. RA-3	Same configuration as number 70.					
80. RC-1	Transport, 2-engine, 2-crew, ambulance, high-wing, boxtail, monoplane	1931	Curtiss-Wright "Kingbird"	2 Wright R-975 300 h.p.	34'10"	54'6"
81. RR-2	Same configuration as number 64.					
82. RR-3	Transport, 3-engine, 2-crew, 10-passenger, high-winged monoplane	1931	Ford "Tin Goose"	3 Pratt & Whitney R-1340-C 450 h.p.	50'3"	77'10"
83. RS-1	Transport, 2-engine, 2-crew, 7-passenger, high-wing, parasol wing, amphibian	1931	Sikorsky	2 Pratt & Whitney R-1860 575 h.p.	45'2"	79'9"
84. RS-3	Transport, 2-engine, 2-crew, 8-passenger, biplane, amphibian	1931	Sikorsky	2 Pratt & Whitney R-1340-C 575 h.p.	40'3"	71'8"

<i>Designation</i>	<i>Type</i>	<i>Year Assigned</i>	<i>Manufacturer and Name</i>	<i>Engine Type and Horsepower</i>	<i>Dimensions Length and Span</i>	
85. T4M-1	Torpedo bomber, 1-engine, 3-crew, biplane, convertible	1931	Martin	Pratt & Whitney R-1690 525 h.p.	37'8"	53'
86. F4B-4	Fighter, 1-engine, 1-crew, biplane, land-carrier	1932	Boeing	Pratt & Whitney R-1340-D 500 h.p.	20'4"	30'
87. RR-5	Same configuration as number 81.					
88. SU-2	Scout, 1-engine, 2-crew, biplane, land-carrier	1932	Vought "Corsair" (formerly O3U-4)	Pratt & Whitney R-1690-C 600 h.p.	26'	36'
89. F3B-1	Fighter, 1-engine, 1-crew, 1-float, biplane, convertible, land-battleship-carrier	1933	Boeing	Pratt & Whitney R-1340-B 450 h.p.	24'10"	33"
90. N2C-2	Trainer, 1-engine, 2-crew, biplane, convertible	1933	Curtiss "Fledgling"	Wright R-760A 240 h.p.	27'9"	39'1"
91. RE-3	Transport, 1-engine, 2-crew, 4-passenger, high-wing, monoplane	1933	Bellanca "Pacemaker"	Pratt & Whitney R-1340-CD 450 h.p.	27'10"	46'4"
92. SU-3	Scout, 1-engine, 2-crew, biplane, land-carrier	1933	Vought "Corsair"	Pratt & Whitney R-1690C, 600 h.p.	26'	36"
93. F4B-3	Fighter, 1-engine, 1-crew, biplane, land-carrier	1934	Boeing	Pratt & Whitney R-1340D 500 h.p.	20'	30'
94. JF-1	Utility, 1-engine, 2-crew, biplane, amphibian boat hull	1934	Grumman "Duck"	Pratt & Whitney R-1830-62	14'4"	39'
95. R2D-1	Transport, 2-engine, 2-crew, 14-passenger, low-wing, monoplane	1934	Douglas	2 Wright R-1820-12 725 h.p.	62'	85'
96. R4C-1	Transport, 2-engine, 2-crew, 14-passenger, biplane	1934	Curtiss-Wright "Condor"	2 Wright R-1820-12 725 h.p.	50'3"	82'
97. RR-4	Transport, 3-engine, 2-crew, 10-passenger, all metal cabin, high-wing monoplane.	1934	Ford "Tin Goose"	3 Pratt & Whitney R-1340-96	50'3"	77'10"
98. SU-1	Scout, 1-engine, 2-crew, biplane, land-carrier	1934	Vought "Corsair" (redesignated from O3U-2)	Pratt & Whitney R-1690-40 600 h.p.	26'3"	36'
99. BG-1	Bomber, 1-engine, 2-crew, biplane, staggered wing, land-carrier	1935	Great Lakes	Pratt & Whitney R-1535-66 700 h.p.	28'9"	36'
100. JF-2	Utility, 1-engine, 2-crew, biplane, amphibian, boat hull	1935	Grumman "Duck"	Pratt & Whitney R-1820-62 700 h.p.	14'4"	39'

<i>Designation</i>	<i>Type</i>	<i>Year Assigned</i>	<i>Manufacturer and Name</i>	<i>Engine Type and Horsepower</i>	<i>Dimensions Length and Span</i>	
101. O3U-6	Observation scout, 1-engine, 2-crew, biplane, convertible, land or sea	1935	Vought "Corsair"	Pratt & Whitney R-1340-12 550 h.p.	27'2"	36'
102. RD-3	Transport, 2-engine, 2-crew, 7-passenger, high-wing, monoplane, amphibian, boat hull	1935	Douglas	2 Pratt & Whitney R-1340-96 450 h.p.	45'2"	60'
103. SOC-1	Scout observation, 1-engine, 2-crew, biplane, convertible equipped for catapult	1935	Curtiss	Pratt & Whitney R-1340-18 550 h.p.	26'10"	36'
104. F2A-1	Fighter, 1-engine, 1-crew, mid-wing monoplane	1936	Brewster "Buffalo"	Pratt & Whitney 850 h.p.	26'	35'
105. F3F-1	Fighter, 1-engine, 1-crew, biplane, land-carrier	1936	Grumman	Pratt & Whitney R-1535-84 650 h.p.	23'5"	32'
106. O3U-1	Observation, 1-engine, 2-crew, biplane, convertible, battleship-carrier	1936	Vought "Corsair"	Pratt & Whitney R-1340-96 450 h.p.	29'11"	36'
107. RD-2	Transport, 2-engine, 2-crew, 7-passenger, high-wing monoplane, boat hull	1936	Douglas	2 Pratt & Whitney R-1340-96 450 h.p.	45'3"	60'
108. SU-4	Scout, 1-engine, 2-crew, biplane, land-carrier	1936	Vought "Corsair"	Pratt & Whitney R-1690-42 600 h.p.	28'	36'
109. XBG-1	Experimental bomber, 1-engine, 2-crew, biplane, carrier	1936	Great Lakes	Pratt & Whitney R-1535-66 700 h.p.	33'9"	36'
110. F2F-1	Fighter, 1-engine, 1-crew, biplane, land-carrier	1937	Grumman	Pratt & Whitney R-1535-72 750 h.p.	21'2"	28'6"
111. F3F-2	Fighter, 1-engine, 1-crew, biplane	1937	Grumman	Pratt & Whitney R-1535-84 650 h.p.	23'2"	32'
112. J2F-1	Utility, 1-engine, 2-crew, biplane, amphibian, boat hull	1937	Grumman "Duck"	Pratt & Whitney R-1820-08 750 h.p.	34'	39'
113. JO-2	Transport, 2-engine, 2-crew, 6-passenger, low-wing, monoplane	1937	Lockheed	2 Pratt & Whitney Aircraft R-985-48 400 h.p.	36'4"	49'6"
114. SBC-3	Scout bomber, 1-engine, 2-crew, biplane, carrier-land	1937	Curtiss "Helldiver"	Wright Whitney Aircraft R-1535-94 750 h.p.	28'	34'

<i>Designation</i>	<i>Type</i>	<i>Year Assigned</i>	<i>Manufacturer and Name</i>	<i>Engine Type and Horsepower</i>	<i>Dimensions Length and Span</i>	
115. XB2G-1	Experimental bomber, 4-engine, 2-crew, biplane, land-carrier	1937	Great Lakes	Pratt & Whitney Aircraft, R-1535-94 750 h.p.	28'10"	36'
116. XF13C-3	Experimental fighter, 1-engine, 1-crew, high-wing, monoplane, land-carrier	1937	Curtiss	Wright XR-1510-12 700 h.p.	26'4"	35'
117. J2F-2	Utility, 1-engine, 2-crew, biplane, amphibian, boat hull	1938	Grumman "Duck"	Wright R-1820-30 750 h.p.	33'	39'
118. JRS-1	Utility transport, 2-engine, 5-crew, parasol wing, high-wing, monoplane, flying boat	1938	Sikorsky	Wright R-1690-52 600 h.p.	51'1"	86'
119. O3U-3	Observation, 1-engine, 2-crew, biplane, convertible	1938	Vought "Corsair"	Pratt & Whitney Corp. R-1340-12 600 h.p.	31'	36'
120. SB2U-1	Scout bomber, 1-engine, 2-crew, low-wing, monoplane	1938	Vought-Sikorsky "Vindicator"	Pratt & Whitney Twin-Wasp 750 h.p.	34'	42'
121. SOC-3	Scout observation, 4-engine, 2-crew, biplane, convertible, catapult	1938	Curtiss Wright "Seagull"	Pratt & Whitney R-1340-22 550 h.p.	31'1"	36'
122. TG-1	Torpedo bomber, 4-engine, 3-crew, 2-float, biplane, convertible, carrier	1938	Great Lakes	Pratt & Whitney R-1690-28 525 h.p.	34'8"	53'
123. F3F-3	Fighter, 1-engine, 1-crew, biplane, land-carrier	1939	Grumman	Wright Cyclone 750 h.p.	23'3"	32'
124. J2F-2A	Utility, 1-engine, 4-crew, biplane, amphibian	1939	Grumman "Duck"	Wright R-1820-F5A 775 h.p.	34'	39'
125. J2F-4	Utility, 1-engine, biplane, amphibian, boat hull	1939	Grumman "Duck"	Wright Cyclone 725 h.p.	34'	39'
126. JRF-1A	Utility, 2-engine, 4-crew, high-winged, monoplane, boat hull	1939	Grumman "Goose"	2 Pratt & Whitney Wasp Junior SB Radial 450 h.p.	38'4"	49'
127. SBC-4	Scout bomber, 1-engine, 2-crew, biplane, land-carrier	1939	Curtiss "Helldiver"	Wright Cyclone R-1820-C-3 875 h.p.	27'5"	34'
128. XSBC-4	Experimental scout-bomber, 1-engine, 2-crew, biplane, land-carrier	1939	Curtiss "Helldiver"	Wright Cyclone R-1820-C-3 875 h.p.	27'5"	34'
129. R3D-2	Transport, 2-engine, 4-crew, high-wing monoplane	1940	Douglas	2 Wright Cyclones GR-1820-G102A 1100 h.p.	62'2"	78'

<i>Designation</i>	<i>Type</i>	<i>Year Assigned</i>	<i>Manufacturer and Name</i>	<i>Engine Type and Horsepower</i>	<i>Dimensions Length and Span</i>	
130. SBD-1	Scout bomber, 1-engine, 2-crew, low-wing, monoplane	1940	Douglas "Dauntless"	Wright Cyclone R-1820 950 h.p.	32'	41'
131. SNJ-2	Scout trainer, 1-engine, 2-crew low-wing, monoplane	1940	North American "Texan"	Wright Whirlwind 400 h.p.	28'11"	42'
132. F2A-3	Fighter, 1-engine, 1-crew, mid-wing, monoplane, carrier	1940	Brewster "Buffalo"	Pratt & Whitney F-1820-40 1000 h.p.	26'4"	35'

NOTE: In its earliest years, Marine aviation had no system of aircraft type and manufacturer identification. For example, the HS-2L was built by Curtiss; Lowe, Willard, and Fowler; and others. In 1922, a system was devised whereby the first letter indicated manufacturer, the second letter the plane's mission, and an appended number for modifications. A number between the letters stood for the order or model number of the designer's aircraft in the same class—the first design "1" was omitted. Thus a U2O-1 indicates a (U) Vought, (2) second design of, (O) observation aircraft, with (1) its first modification. In 1923 the system was reversed so that the mission letter came first and the manufacturer's letter came second. This system remained in effect through the period covered in this history.

## TYPE LETTERS

A—Attack; ambulance	P—Patrol
B—Bomber	PB—Patrol bomber
F—Fighter	R—Transport (Multiengine)
G—Transport (single engine)	S—Scout
H—Helicopter; hospital	SB—Scout bomber
J—Transport and general utility	SN—Scout trainer
JR—Utility-transport	SO—Scout observation
N—Trainer	T—Torpedo bomber; trainer
O—Observation	TB—Torpedo bomber
OS—Observation-scout	U—Utility
	X—Experimental

## MANUFACTURERS' SYMBOLS

Date indicates first year that particular manufacturer's symbol appeared in the designation of an aircraft assigned to the Marines.

A—Atlantic	(1927)	M—Glenn L. Martin	(1922)
A—Brewster	(1936)	O—Lockheed	(1939)
B—Beech	(1941)	P—Pitcairn	(1931)
B—Boeing	(1925)	P—Spartan	(1937)
C—Curtiss (Curtiss-Wright)	(1926)	R—Ford	(1929)
D—Douglas	(1923)	S—Sikorsky	(1931)
E—Bellanca	(1923)	T—New Standard	(1931)
F—Crumman	(1934)	U—Vought	(1927)
G—Great Lakes	(1935)	W—Dayton-Wright	(1925)
J—North American	(1940)	X—Cox-Klemin	(1926)
L—Loening	(1926)	Y—Consolidated	(1926)



## APPENDIX D

### Awards to Marine Officers and Enlisted Men for Aviation Duty, 1912-1940

#### Medal of Honor

Christian F. Schilt	1stLt	Nicaragua
Ralph J. Talbot	2dLt	World War I
Robert C. Robinson	GySgt	World War I

#### Distinguished Service Medal

Ross E. Rowell	LtCol	Nicaragua
Francis P. Mulcahy	Capt	World War I
Robert S. Lytle	Capt	World War I
Frank Nelms	2dLt	World War I
Amil Wiman	GySgt	World War I

#### Navy Cross

Alfred A. Cunningham	Maj	World War I
Roy S. Geiger	Maj	World War I
William M. Mellvain	Maj	World War I
Douglas B. Roben	Maj	World War I
Robert E. Williams	Capt	World War I
Karl S. Day	Capt	World War I
Donald M. Whiting	1stLt	World War I
John R. Whiteside	1stLt	World War I
Arthur H. Wright	1stLt	World War I
Ford O. Rogers	1stLt	World War I
Herman A. Peterson	1stLt	World War I
Eynar F. Olsen	1stLt	World War I
George McC. Laughlin, III	1stLt	World War I
Albert E. Humphreys	1stLt	World War I
Everett R. Brewer	1stLt	World War I
Clyde M. Bates	1stLt	World War I
Fred S. Robillard	1stLt	World War I
Chapin C. Barr	2dLt	World War I
John H. Weaver	2dLt	World War I
Caleb W. Taylor	2dLt	World War I
Harvey C. Norman	2dLt	World War I
Harold A. Jones	2dLt	World War I
John K. McGraw	1st Sgt	World War I
Harry B. Wershiner	GySgt	World War I
Thomas L. McCullough	Sgt	World War I

#### Distinguished Flying Cross

Thomas C. Turner	Col	Pioneer Flight, 22 Apr 1921
Ross E. Rowell	LtCol	Nicaragua
Ralph J. Mitchell	Maj	Nicaragua
Louis M. Bourne	Maj	Nicaragua
Arthur H. Page	Capt	Pioneer Flight, 2 Jul 1930
Byron F. Johnson	Capt	Nicaragua
Alton N. Parker	Capt	Antarctic
Hayne D. Boyden	1stLt	Nicaragua
Lawson H. M. Sanderson	1stLt	Pioneer Flight, 22 Apr 1921
Basil Bradley	1stLt	Pioneer Flight, 22 Apr 1921
Herbert P. Becker	1stLt	Nicaragua
Frank H. Lamson-Scribner	1stLt	Nicaragua
Frank D. Weir	1stLt	Nicaragua
Charles L. Fike	1stLt	Nicaragua
John N. Hart	1stLt	Nicaragua
John S. E. Young	1stLt	Nicaragua
Michael Wodarczyk	MG	Nicaragua
Albert S. Munsch	MSgt	Nicaragua
Charles W. Rucker	GySgt	Pioneer Flight, 22 Apr 1921
Gordon W. Heritage	SSgt	Nicaragua
Hilmar N. Torner	Sgt	Test Flight, 22 Mar 1932



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*The device reproduced on the back cover is the oldest military insignia in continuous use in the United States. It first appeared as shown on Marine Corps buttons adopted in 1804. With the stars changed to five points, the device has continued on Marine Corps buttons to the present day.*

