

THIRTY YEARS OF NAVY MARKINGS

by

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INTRODUCTION

From the very dawn of history the use of color and symbols has been one of the basic elements of man's existence. The ancient civilizations that waxed and waned on the shores of the Mediterranean Sea used color to identify traits and characteristics. Symbols were used as tribal or national emblems from earliest times and standards and banners were an integral part of military formations to identify units and act as rallying points. The age of feudalism gave rise to the expression "coat of arms" and the practice by individuals, families, towns etc., of preparing insignia became so widespread as to require regulation. Thus, in 1483, the Herald's College was established by King Edward IV and still functions as the authority on what has become a stylized and complicated subject.

As professional armies came into being great emphasis was placed on distinctive uniforms, unit badges and military smartness. All this became a part of the traditions that went to make for a high degree of "esprit de corps" that often meant the difference between victory and defeat on the battlefield. The British Army, in particular, takes great pride in the traditions and accomplishments of its regiments whose identity can be traced as far back as the 17th Century. Units of the Household Brigade, such as the Coldstream Guards, are known the world over.

It has been the American military practice to minimize the importance of unit symbols and tradition and this is particularly true in the aviation components of the military service. The continual organizational changes brought about by ever-improving equipment and changing concepts of war result in frequent redesignation and redeployment of units and personnel. Under such conditions there is little opportunity to develop the traditions, insignia and special badges that play such an important part in the history of European military units.

During the past 40-odd years, a remarkable variety of markings and insignia has adorned the aircraft of the U. S. Navy. From a simple letter-number painted on clear doped fabric, naval aircraft markings gradually evolved into a system that permitted the identification of every operationally-assigned aircraft by color alone. The advent of World War II brought an end to this seemingly elaborate, but actually simple, scheme and there followed a period of flat colors and almost invisible markings that made naval aircraft seem dull and uninteresting. The Korean War saw a change for the better, marking-wise, and today color is once more prominently displayed. In this article, therefore, an attempt is made to document some of the ever-changing record of markings and insignia used by U. S. Navy aviation from the acquisition of its first aircraft in 1911, to the entry of the United States into World War II in December 1941.

EARLY DAYS & WORLD WAR I

No mention of color or finish is found in early procurement records. Aircraft were delivered with a clear-dope finish on fabric surfaces with varnish occasionally being used. Markings were at a minimum and were by no means standardized. The branch of service identification appeared as U.S.N. in block letters with the combined type-serial number, such as AH-15, placed below. The location of these markings was determined by the configuration of each aircraft and considerable variation, even in aircraft of the same type, was to be found among the 50-odd aircraft on hand in April of 1917. Photos of the Curtiss Hydroplane A-1, Bureau Number AH-1, show what is most probably a solid blue vertical tail surface with the white letters U.S.N. in the center underlined with a white bar. The letters U.S.N. appear in blue or black on the underside of the lower right wing with the U inboard and the top of the letters facing to the rear.

Sometime in 1915 the symbol of an anchor was adopted to designate naval aircraft. Blue in color, this was usually applied to each side of the rudder, and in some instances also appeared on the underside of the lower wings at the tips. A line-up of Curtiss N-9's at Pensacola in January of 1917 shows the anchor on the rudder with large station numbers placed on the fuselage below the horizontal stabilizer. (Please see Figure 3). A Sturtevant Model S seaplane of the Rhode Island Naval Militia had the anchor enclosed in a circle, while the Richardson "Twin" shows the shank of the anchor applied along the hinge of the rudder and vertical stabilizer.

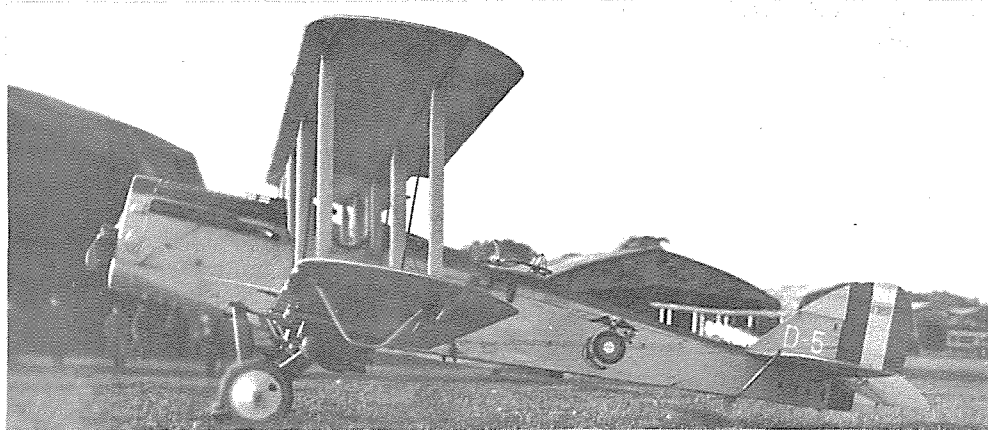
In May of 1917 a standard national insignia for Army and Navy aircraft was adopted. This was a white star superimposed on a blue circle, with a red circle in the center tangent to the inner projections of the points of the star. Applied to the wings only, this marking for a time was placed inboard of the ailerons. At the same time, a marking for the rudder was decreed; three equi-spaced vertical stripes, with blue at the rudder post, then white, then red. This order was reversed in January of 1918 and, at the same time, the star was replaced by a tricolor circle to conform to the circular markings used by the Allies. The order of colors in the circle was red on the outside, then blue, with a white center (Fig. 4). Positioning of the circle was in relation to the chord of the wing, usually one diameter inboard of the wing tip, but often inboard of the ailerons, particularly in flying boats. Only in rare cases did the circle appear on the side of the fuselage.

In May of 1917, Secretary of the Navy Daniels issued detailed instructions concerning insignia and markings. Relative to the serial number they stated that "the building number of each aircraft shall be placed in figures 3" high on each side of the rudder, at the top of the white band hereinbefore mentioned". By this time the letter-number combination to designate aircraft type and serial had been replaced by an "A", for airplane, followed by a three or four digit number. A modification of the order placed the serial number in large block letters on each side of the fuselage or hull, as well as in the rudder position (Fig. 1.).

From the latter part of 1917 on the finish generally in use was a navy-gray pigment varnish or enamel on fuselage and hull. Silver dope was applied to wings and tail surfaces. Some flying boats received a "dazzle" pattern camouflage finish and, in the case of those operating from European bases, the large fuselage serial was replaced by equally large letter-numbers indicating the station and aircraft number on the station. Application of the standard serial or the station identification was usually in white paint, but black was not uncommon. Figure 4 shows a

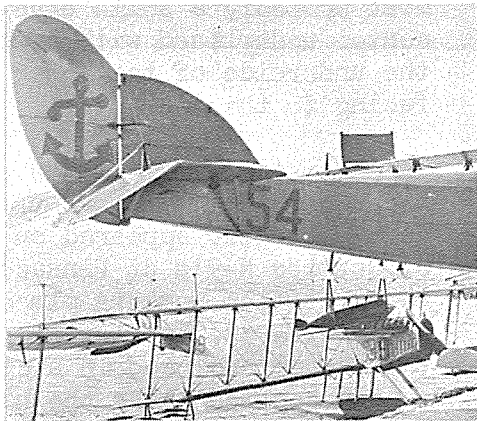


Curtiss HS-11 (A-1617) Note large fuselage serial, squadron insignia. (L.S. Smalley)



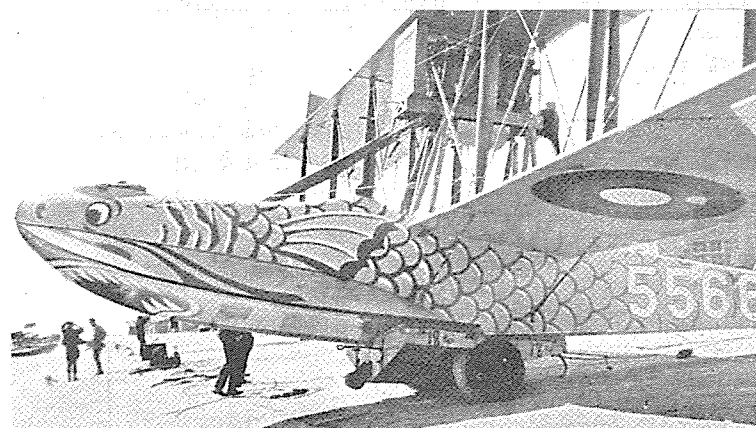
2. Dayton-Wright DH-4 (A-3280) in France

U.S. Marine Corps



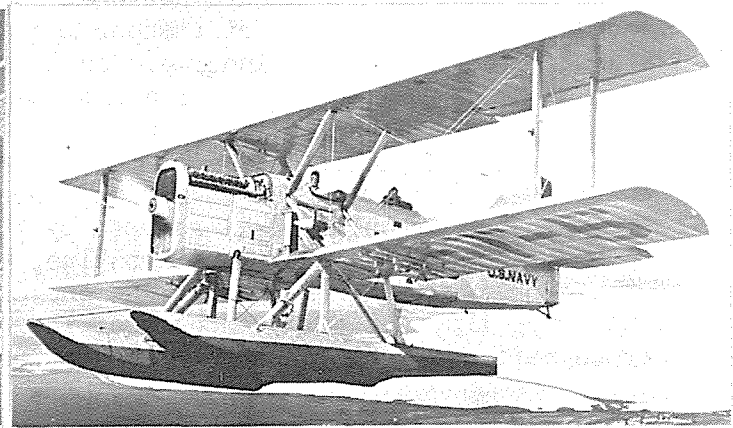
3. Blue Anchor

(Bowers)



4. N.A.S. Miami HS-2

(L.S. Smalley)



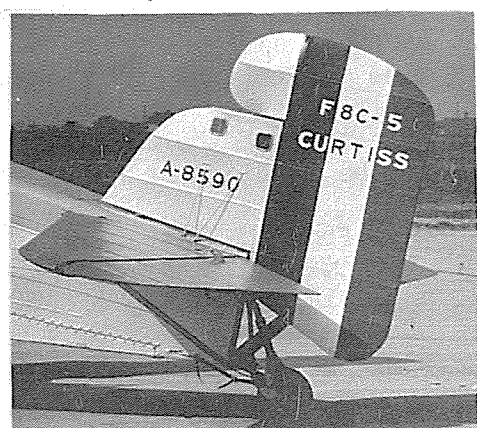
5. Sqdn marks under wing, DT-2

U.S. Navy



6. Loening OL-6, VO-2, being catapulted

Unknown



7. Tail markings

Curtiss

special paint scheme as decorated for a Regatta at Miami, Florida, in February 1919, applied to an HS-2. (An interesting point is the fact that this aircraft was built up from spare parts by the Naval Air Station at Miami, and assigned a Bureau Number just as if it was a new aircraft. This rebuilding and reserialing was common after World War I).

U. S. Marine Corps aircraft followed the Navy arrangement of finish and markings. In many cases, however, the distinctive globe and anchor of the Corps was carried on the fuselage side. Figure 2 shows an interesting, and little-known, variation of this famous insignia. Aircraft of the U.S.M.C. operating in France used the standard tricolor red-blue-white insignia in place of the globe in the Corps insignia.

BETWEEN THE WARS

FINISH AND COLOR

Following World War I, standardization of color for all service aircraft except primary trainers was achieved. All fabric surfaces except the top of the wing and tail were silver, with metal parts painted a light gray. With the introduction of aluminum construction many such aircraft retained their natural finish, particularly those not in operational units. (Aircraft based at N.A.S. Anacostia often had a special high polish buffed metal finish, not standard for Navy aircraft, as can be seen in Figure 15). To emphasize visibility the top surface of the upper wing (the majority of Naval aircraft being biplane types) and the top of the horizontal tail surfaces were painted chrome yellow. This was the standard color scheme until the change to gray "warpaint" in 1941.

Detailed painting specifications provided that all individual metallic fittings except standard parts, such as bolts, nuts, washers, turnbuckles etc., be marked with the manufacturer's piece number. Struts were numbered at the bottom, in one inch insignia blue figures, with corresponding blue numbers painted on the top of the lower wing panels close to the strut fittings. The front row of struts, from the pilot's right, bore odd numbers. Similarly, the rear row was marked with consecutive even numbers. Black paint was substituted for insignia blue in the late '20s. Each propeller blade was painted on both sides as follows:

From tip to 4" from tip: Insignia red.

4" from tip to 8" from tip: Bright yellow.

8" from tip to 12" from tip: Insignia blue.

12" from tip to hub: Unfinished, except that the blue stripe could be extended an additional 24" on the rear surface to reduce glare.

A color code, applied in 1/2 inch bands, was used on piping systems with filler caps and hand pulls were also painted in the color applicable to the material involved. Lift points were identified by the words "Lift Here" in one inch letters above the lift point. A doping code, consisting of letters and figures, was utilized and was placed in letters one inch high on the under side of the fuselage, wings, and control panels.

The above painting, including application of the Marine Corps decalcomania, was

accomplished by the manufacturer in accordance with appropriate painting specifications. As time went on, markings formally applied by operating units were also placed on planes by the manufacturer before leaving the factory. Eventually, squadrons were taking delivery of their aircraft in full markings, including unit insignia. Experiments in camouflage were conducted from time to time; in some cases closely approximating the color schemes used in World War II.

Primary trainers were painted an overall chrome yellow, and regardless of make were known as "Yellow Perils". Until about 1940 obsolete combat types served as advanced trainers at Pensacola. They carried large station numbers on the standard finish.

Instrument trainers, such as those assigned to fighter squadrons and to N.A.S. Pensacola, carried a four foot wide red band on the top surface of the upper wing and the bottom surface of the lower wing, inboard of the national insignia. A similar band was also positioned around the fuselage between the cockpit and the tail, forcing the unit marking somewhat forward (Fig. 34).

NATIONAL INSIGNIA

Following World War I, the star once again became the national insignia as did the rudder stripes, which assumed their original order. Size of the star, as stated in painting specifications, called for the diameter of the circumscribed circle to be equal to the distance between the leading edge of the aileron and the leading edge of the wing, except that the diameter could not exceed five feet. Four national insignia were required - inboard from each wing tip, on both the top surface of the upper wing and on the under surface of the lower wing. Position of the national insignia was inboard from the wing tip a distance equal to the chord of the wing. Floatplanes carried the star near the wing tip on the top wing, but well inboard on the bottom wing because of the wing tip floats (Fig. 51). As with all rules there are exceptions to be found. One such case is that of a Curtiss F6C-4 of VF-10M. This Marine Corps fighter had the star on the under side of the top wing, with the plane number occupying the star's position on the under side of the lower wing (Fig. 8).

TAIL COLORS

When the new aircraft carriers LEXINGTON and SARATOGA joined the fleet in 1928 rudder stripes had largely been abandoned by operational squadrons. Solid colors, covering the entire empennage were used to identify individual squadrons. See Table 3. At first these colors were not Bureau assigned, and it was not until 1936 that one color was used by each carrier to identify its four squadrons. See Table 3 "new", and Figure 29. The full tail colors, previously assigned by squadron, were now assigned by ship. These colors were applied on the full surface of the top and bottom and both sides of the vertical and horizontal tail surfaces. From 1937 to 1941 they were:

CV-2	SARATOGA	White
CV-3	LEXINGTON	Yellow
CV-4	RANGER	Green
CV-5	YORKTOWN	Red
CV-6	ENTERPRISE	Blue
CV-7	WASP	Black

Battleship squadrons (VO) also had the entire tail surface painted (Fig. 50), but Cruiser units (VS and later VCS) used a broad stripe, with the remaining surface

painted silver or aluminum. The stripes were painted on both the top (Fig. 38) and bottom (Fig. 51) of the horizontal tail surfaces, as well as both sides of the vertical surfaces (Fig. 52). With the addition of the 7th VCS squadron double tail stripes were adopted. Patrol squadrons (VP) used either the solid tail, broad stripe two stripes, or a checkerboard (VP-16 and 17).

Rudder stripes were retained by the following:

1. Carrier Utility Units.
2. Reserve Squadrons (a few changed to solid colors in the late 1930's).
3. Command Aircraft (most used plain or blue tail surfaces).
4. Special Projects (Aleutian Islands Survey etc.).
5. Detached Units (Asiatic Station, Sqdn 40-T in the Mediterranean etc.).
6. Experimental Aircraft (until the early 1930's).
7. Lighter Than Air units (Akron and Macon F9C-2's etc.).

The Marine Corps retained rudder stripes for all its aircraft with several notable exceptions, such as the horizontal red-white-blue tail stripes of VO-6M of the early 1930's, and the solid colored tails of the Quantico-based F4B-4's (Fig. 12). VS-14M and VS-15M, while operating from the SARATOGA and LEXINGTON in 1931-32-33, also had solid colored tails.

BRANCH OF SERVICE MARKING

During the early 1920's the branch of service marking - U.S. NAVY or U. S. MARINES - gradually replaced the fuselage application of the Bureau Number. Applied to both sides of the fuselage or hull the letters were "as large as the space permits, but in no case shall the height be less than 8 inches". Later specifications directed that the letters be "of an appropriate size so as to provide a neat appearance, consistent with the space available and congruous with other markings applied". Minimum height was set at four inches, with the last letter located approximately 12 inches from the rudder hinge. Aside from the usual variations that were bound to appear, application of the service marking was remarkably consistent both as to size and position. The Marine Corps (see Fig. 19) for a time, presumably for better publicity at the National Air Races, carried their name on the top surface of the upper wing.

BUREAU NUMBER

Retaining the three inch figures painted insignia blue, later black, the position of the serial number was moved to the vertical fin circa 1923; the fuselage application being abandoned about the same time. The "A" prefix continued to appear until 1930 (Fig. 7). By the end of 1935 seriation reached the 10,000 mark and a new series of four-digit numbers was begun. First aircraft of the "B" run was Vought O3U-6 #0001 assigned to Marine Corps Observation Squadron Seven. The accelerated rate of procurement immediately prior to World War II would have resulted in duplication of numbers since later units of the "A" series were still in service, so accordingly a five-digit "C" series was begun in 1940; progressing to six before the end of the war. Only the letter "A" was ever painted on an aircraft. Although these

numbers are often called "serial numbers", they are officially termed "Bureau Numbers" as they are issued by the Bureau of Aeronautics, Navy Department.

Continuation of war-time equipment in service (F-5-L's served until 1927) resulted in many instances of out-dated positioning. The small fin area of the Boeing F3B-1 and F4B-1 caused the Bureau Number to be placed in vertical alignment (Fig. 41), instead of the conventional horizontal arrangement. Perhaps the most unusual position was that of the Curtiss CT-1 of 1922, on which the number A-5890 appeared in 8" figures on the outboard sides of the twin floats. As colored tail surfaces became standard the color of the Bureau Number was changed to black on white, gray, aluminum, green or yellow; with white on red or blue. Again this was not always observed. With the adoption of low-visibility (war paint) color schemes in 1941 the size of the Bureau Number was reduced to 1" and remained so during World War II (Fig. 53).

MODEL DESIGNATION

The present system of utilizing coded letters and numbers to identify naval aircraft by class, production series and builder was adopted in 1922 (See Table 1). In its original form the builders letter was placed before the class letter. For example the DT-1 was Douglas Torpedo, and all existing aircraft were arbitrarily assigned designations to conform to the system. A year later a revision placed the class letter in first position and, with virtually no significant change, the system has continued to the present day.

In a typical example (F9C-2); "F" stands for Fighter; "9" identifies it as the ninth fighter design built by the manufacturer; "C" for Curtiss Aeroplane Company, the manufacturer; and "2" reveals it to be the second modification of this basic design.

Dual class letters appeared in 1932, finally disappearing in 1951 when the Convair PB4Y-2 "Privateer" was redesignated P4Y-1. The only triple class designation ever used was the Hall Aluminum XPTBH-2 of 1937. The model designation shows that this twin-engine, twin-float, plane was an experimental patrol torpedo bomber.

Application of the model designation was in 3" letters on each side of the rudder although it was not until 1928 that this marking was actually painted on the aircraft. For several years, in the late twenties, in addition to the model designation the manufacturers name was placed on both sides of the rudder. This marking was to be in one line, centrally placed, near the top of the rudder. The letters were white on the red and blue stripe, and black on the white stripe (See Fig. 7). One of those inevitable exceptions shows on the Curtiss XF7C-1, where the name "Curtiss" appears in a large six-inch script in a curve above "Navy Fighter" in four-inch block letters. As was to be expected, transposition of the Bureau Number and model designation sometimes occurred; Beech GB-1 #1595 being one instance. Another oddity was the painting of both the Bureau Number and model designation on all four tail surfaces of the Lockheed XR40-1 used as a Command plane by the Navy Department (Fig. 37).

SQUADRON ORGANIZATION

In order to properly correlate the unit group identification marks with the elaborate color code employed in this period a brief explanation of the standard squadron organization seems appropriate. The basic unit was the three-plane section with carrier squadrons operating 18 planes in two divisions of three sections each. The commanding officer led the first division; the executive officer the second. After



8. Red Devil Sqdn - 1927

U.S.Navy



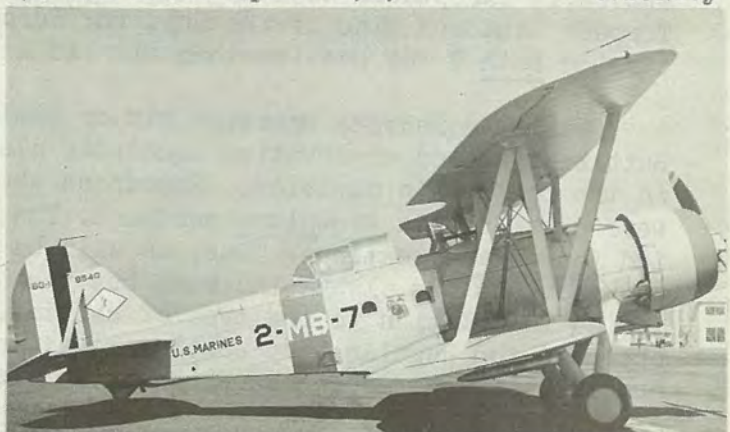
9. Red Devil Sqdn - 1929

U.S.Navy



10. Red Devil Sqdn - 1936

Larkins



11. Red Devil Sqdn - 1937

Larkins



12. 1935 Air Show markings, USMC (Larkins)



13. First Marine Wing, 1940

Larkins



14. Neutrality Patrol Star, 1941

U.S.Navy



15. High polish, buffed metal Harry Thorell

considerable experimentation carrier organization was standardized with an air group of four squadrons; fighting, bombing, scouting and torpedo. The carrier's utility unit was not part of the air group. Each fighting squadron was assigned one liaison aircraft, usually a scouting or scout-bomber type, for communication duties. This aircraft flew with the squadron. In addition, one or two obsolete observation or scouting planes were assigned to each fighter squadron as target tugs and instrument trainers.

Fleet and Force organization of the Navy determined the suffix letters assigned each squadron. The prefix and suffix letters were an integral part of the official squadron designation, but did not appear in the unit marking painted on the airplane. Two early exceptions to this were: T3M-2, 9-Ts-4 (Fig. 43), the fourth plane of Torpedo Squadron Nine of the Scouting Force; and T3M-2, 1-VT-5A, (Fig. 44), which carried both V for heavier-than-air and A for Asiatic Fleet.

Patrol squadrons operated six or twelve planes in the usual three-plane section. Battleship-based observation squadrons placed a three-plane section aboard each ship in the battleship division. Squadrons aboard the ten Omaha-class "scout" cruisers were organized in two-plane sections. The 18 "treaty" cruisers and later types carried four-plane sections. Thus, as will be noted from Table 2, the color assigned to the sections was always the same but the numbers of the aircraft within the sections varied in relation to the type of section. In some instances Reserve squadrons observed the Regular Navy section plan; in other cases Reserve aircraft were simply numbered in numerical sequence for the station.

The slow but steady growth of naval air brought constant organizational changes with frequent re-numbering and re-designation of squadrons. The battleship modernization program resulted in many changes between divisions as did the "treaty" cruiser building schedule. Tracing the continuity of any squadron is difficult and, in many cases, impossible.

UNIT MARKINGS - GENERAL

The immediate post-war organization of naval air was so small that few squadron size units were possible. In 1919, Loening M-81's of the Air Detachment, Pacific Fleet, carried a number-figure such as "P-2" on each side of the fuselage. Vought VE-7's of a year or so later, based at San Diego, bore the letter "C" followed by a three-digit number. Squadrons were slowly organized and a Chief of Naval Operations directive of 17 June 1922 established the system of numbering squadrons "serially in each class in the order of the authorization for organizing them". This policy was generally observed until July of 1937 when the four squadrons of each carrier air group were renumbered to conform to the carrier's hull number. Space limitations and deck length precluded the assignment of a torpedo squadron to the RANGER (CV-4), therefore two scouting squadrons were assigned, numbered VS-41 and VS-42 (Fig. 30), to designate the first and second scouting squadrons of CV-4. Subsequently VB-4 was replaced by a VF squadron, giving the RANGER two fighting squadrons numbered VF-41 and VF-42. The WASP (CV-7) was commissioned with two fighting and two scouting squadrons (VF-71, VF-72, VS-71, VS-72).

At the same time, the eight cruiser-based scouting squadrons (VS) were redesignated cruiser-scouting (VCS) and re-numbered to conform to their parent cruiser divisions. The four battleship-based observation squadrons (VO) had, for some time, carried the same number as their division. Patrol squadrons (VP) were not renumbered until 1939-40 when the odious "13", having been skipped in the old system, was

assigned to VP-18. In the new Patrol Wing organization the first digit indicated the wing; the second the squadron within the wing, with subsequent partial renumbering continuing.

Marine Corps squadrons also experienced a complete renumbering in 1937. Under the new system the letter "M" preceded the class letter and became a part of the unit marking (Figs. 10, 11). In addition to changing the designation of observation to scouting (Observation Seven-M, VO-7M, became Marine Scouting One, VMS-1), two fighting squadrons were commissioned to give the Corps a total of nine squadrons. In July of 1941 (see Table 6), when the 1st and 2nd Marine Aircraft Wings (MAW) were commissioned, each squadron was assigned a three-digit number. The first digit identified the Wing, the second the Group and the third the Squadron. Again a change in designation was made; scouting giving way to scout-bombing - Marine Scouting One (VMS-1) became Marine Scout-bombing 131 (VMSB-131). In applying the unit marking to the fuselage the letter "M" was no longer used and the "S" of scout-bombing was also omitted. In actual practice the pre-war Wing organization was mostly "on paper", and when war began there was only one group in each wing. A small number of staff aircraft did fly, however, as for example SBC-4's 1-MW-2 (see Fig. 13) and 2-W-2. The entire 13 squadrons of the Marine Corps were assigned either to MAG-11 at Quantico or to MAG-21 in Hawaii; plus VMS-3 in the Virgin Islands which retained its former number until decommissioned in 1944.

Renumbering and redesignation was so prevalent among carrier squadrons that unit identity was vague and confusing. Figures 8, 9, 10 and 11 illustrate this graphically. Esprit de corps, an intangible but very important factor in military organization, was difficult to achieve. Thus, squadron insignia was almost the sole means of building the history and traditions that mean so much to long-established units. The famous "Red Rippers" first organized as VF-5 in 1927, changed to VB-1 in 1928, reverted to VF-5 in 1931, became VF-4 in 1937 (moving from LEXINGTON to RANGER) and were known as VF-41 at the beginning of World War II. After undergoing additional numerical changes during WW-II and afterwards the unit now bearing the bear's head and shield takes pride in the many awards and records achieved through the years. Writing in the Naval Institute Proceedings for May, 1938, Lieutenant Ben Scott Custer deplored the renumbering situation and recommended assigning the name of an American Indian tribe to each squadron. His suggestion, of course, was not adopted, but it is interesting to note that almost 20 years later the U. S. Army has assigned Indian names to all its aircraft.

SQUADRON/UNIT MARKINGS - PRESENTATION

A system of unit markings was adopted in 1923 and consisted of a three-character group in which the first figure was the number of the squadron; the second character, a letter, identified the class of squadron; and the third character indicated the number of the particular airplane in the squadron. The characters were separated by short dashes and were as large as permissible; being applied to each side of the fuselage, on top of the upper wing, and on one panel of the lower wing (Fig. 5). Fuselage application, in the case of flying boats, was on the bow ahead of the wings. For all other aircraft the first character was located in line with the cockpit. (see Figures 23, 26, 29).

For squadrons assigned to naval air stations the first figure was followed by letters abbreviating the name of the station (if one word, the first and last letters of that word were used; if two words, the first letter in both words was used) followed by the number of the particular aircraft in the squadron. Where such a squadron

was assigned a specific function, the appropriate class letter designating the type was inserted between the abbreviation of the station and the number of the aircraft. Fig. 32 is a rare photo illustrating this system. Aircraft assigned to ships or stations but not part of a squadron carried the name of the ship or station followed by the number of the particular aircraft on the ship or station. Until 1930 a slash (/) was the class symbol for battleship observation (Fig. 6). Examples of these markings are as follows:

2/2	Second plane, Observation Squadron Two (VO-2). (Fig. 6)
5-F-18	Eighteenth plane, Fighting Squadron Five (VF-5). (Fig. 20)
HR-10	Tenth plane, Hampton Roads
2HR-3	Third plane, Second Squadron, Hampton Roads
6-GL-S-1	First plane, Sixth Squadron, Type VS, Great Lakes. (Fig. 32)
U.S.S. CALIFORNIA	Aircraft assigned to ship, but not to VO Squadron.
N.A.S. ANACOSTIA	Naval Air Station, Anacostia.

Original specifications called for application of markings in insignia blue which was later changed to black, except when white was necessary for contrast, such as a class letter on a red or blue fuselage band. In the beginning ship-borne planes carried the ship's name near the cockpit, but later on cruiser aircraft carried the parent ship's name centered below the unit marking (Fig. 52); and battleship aircraft carried it to the rear of the unit marking (Fig. 50). Variations in positioning over the years were numerous, but the system was well standardized by the late 1930's.

For a time Utility Squadrons not operating with the fleet were assigned to Naval Districts and carried the District number as part of the unit marking. An example of this was Vought VE-9 #6478, VJ-D11-3, which was the third plane assigned to the Utility Squadron of the 11th Naval District (Fig. 32). This District number was dropped in the early 1930's. Experimental squadron operated detachments widely separated from each other with individual aircraft bore out-size markings such as Vought O2U-3 #8209, marked 2 X DI 6. Figure 36 shows the same markings on a later O3U-1. The exact meaning of this marking is not known; it has been listed as the sixth plane of the Second Experimental District, as the Second Experimental Squadron of the Sixth Naval District, and as the sixth plane of the Second Experimental "Development Investigation Squadron.

The seldom seen letter "M" was used by a squadron based at N.A.S. Norfolk in the middle 1930's. Figure 35 shows this rare and unusual marking clearly. Additional special unit markings were:

I.N.A. (+ location)	Inspector of Naval Aircraft
N.P.G. Dalgren	Naval Proving Grounds, Dalgren, Va.
N.A.F.	Naval Aircraft Factory, Philadelphia.
N.A.S. (+ location)	Naval Air Station

The standard marking for each carrier Utility unit (4 to 6 planes) was the ship's name in large letters on the side of the fuselage between the rear cockpit and the tail, with U.S. NAVY centered below, and a large aircraft number near the tail. No further markings, such as cowl colors etc., were used. See Figure 21.

Marine Corps aircraft followed Navy procedure in applying these markings, except that the class letter appeared within a circle. In most cases the circle was the same size as the other figures with the class letter being reduced in size. For a short period a small "M" for Marines was carried to the right rear of the circle. Exceptions to the size and placement of unit markings are so numerous as to prohibit mention. One notable variation is that of F6C-1 #6969 of VF-2, in which the unit marking 2-F-1 on the top wing is facing forward instead of to the rear as was the normal custom (Fig. 25).

Application of the identification group to the wings was abandoned about 1927 but continued to appear for some years - as late as 1935 on the O2C-1's of the Marine Corps. Fuselage markings continued "of an appropriate size" ahead of the service marking "in such position that the centers of the two groups are on a horizontal axial plane". While not a standard application, the branch of service marking sometimes appeared on the under surface of the bottom wing in such a position as to be read as the aircraft approached. "U.S." was on the right side of the wing (right in relation to the pilots right and left hands), "NAVY" or "MARINES" on the left.

UNIT MARKINGS - COLOR CODE

The use of color to identify sections within a squadron commenced in the middle 1920's and was almost universal by 1930. These colors were standardized as follows:

1st Section	-	Insignia red
2nd Section	-	White
3rd Section	-	True Blue
4th Section	-	Black
5th Section	-	Willow green
6th Section	-	Lemon yellow

Section leaders were identified by a 20" band painted around the fuselage forward of the service marking. Early applications of the band were ahead of or behind the unit marking but later practice was to position the band across the unit marking, covering the class letter and the short dashes on either side. The band was often outlined in white or black. When appropriate, class letters and dashes were repainted to provide the greatest contrast and visibility. The use of fuselage bands cowl painting and wing chevrons was "to facilitate maneuvers and rendezvous".

Distinguishing colors on the engine cowling conformed to the colors specified for each section. Almost all liquid-cooled aircraft were out of squadron service when the painting of cowlings became general. In the case of air-cooled aircraft the nose of the cowling forward of the engine was painted as follows: Section leader - completely; No. 2 plane - upper half; No. 3 plane - lower half. Infrequently a small

numeral on the upper half, in contrasting color, was used to indicate the number of the aircraft within the squadron. When anti-drag rings came into use the entire width of the ring was painted, but with the introduction of full cowlings the band on the cowling was limited to 12" in width.

The fourth plane in a four-plane section of a Cruiser Scouting Squadron at first bore a plain cowl; later this plane carried a 12" vertical stripe in the center of the cowling facing forward. This little-known marking is shown in Figure 51.

A chevron of the same color as the section leader's band was painted on all planes of the section. The number of the plane in the squadron was painted in the center of the chevron in figures of the largest practicable size. Normally the chevron pointed forward, but in some cases, due to wing shape, it was reversed. In the O3U/SU type the center section cut-out left insufficient area for the plane number unless a reversed chevron was used. Many photographs, however, show a conventional forward-pointing chevron in use on such aircraft.

With the introduction of low-wing monoplanes to operational service it was necessary to apply half of the chevron to each side of the wing. The individual plane number then appeared on the top surface of each wing, either inboard or outboard of the chevron stripe (Fig. 24). The high-wing PBY also carried two plane numbers, positioned well outboard of the center section. With the assignment of the Curtiss SOC's to VCS squadrons it was common practice to place individual plane numbers on the under surface of the lower wing, outboard of the float fittings, at the tip (Fig. 51).

Marine Corps units generally followed Navy marking directives, but considerable variation was apparent in the 1930's as has already been noted. The colorful designs of VO-6M, VO-7M and VO-8M are clearly illustrated in the photographs on page 159. The sharp-pointed triangular scheme of VO-6M was obviously derived from the "points" on an "Accey-Duecy Board", the Navy version of the ancient game of Backgammon. These were confined to the cowling and rudder, while the two-tone design of VO-7M included the wheel covers. The nose plate was also colored with distinctive markings, such as the cross shown in Figure 18. VO-7M's red-white-blue tail and cowling markings are shown by Figure 17, the Boeing F4B-3 #8911, the command plane for the Marine operations at the National Air Races. The cowling was marked with four red and four white stripes, and the wheel covers in a similar pattern. "Headquarters" appeared above the branch of service marking and "Washington, D.C." below. This particular aircraft had previously been assigned to Fighting Squadron One, and later to the Naval Air Station at Anacostia.

A marking peculiar to the Marine Corps was their early practice of showing full information as to squadron number, branch of service and air station assigned on the side of the fuselage, forward of the cockpit. This usually appeared in block letters approximately 3" high, being abandoned about 1930. This shows faintly in Figure 18, and is further illustrated by the following example;

FIGHTING SQUADRON 6M
U.S. MARINE CORPS
NAVAL AIR STATION, SAN DIEGO

Another marking peculiar to the Marine Corps was the famous "Globe and Anchor" which adorned all aircraft and was generally placed forward of the unit marking in the largest possible size. Later, decalcomanias were furnished by the Bureau of Aeronautics with the size being reduced to that of the unit marking letters.

SQUADRON INSIGNIA

Individual squadron insignia comprise an interesting and colorful phase of the marking story. Little if any regulation was applied to the selection of insignia. Squadron personnel agreed upon a design, someone with a degree of artistic ability did the art work, the squadron painter handled the application and, eventually, the Bureau of Aeronautics was notified that the insignia had been adopted. Some insignia reflected careful research and painstaking attention to detail with the squadron's mission, operating locale and other information being a part of the design. Others came about by mere chance, such as the adoption of the High Hat in 1927 by Fighting Squadron One "just because it seemed like a good idea at the time". The insignia was a most durable one, however, as the squadron was successively known as Torpedo 5, Patrol 4-1, Combat 4, Fighting 1, Bombing 2, Bombing 3, Bombing 4 and Scouting 41 at the outbreak of World War II. Few insignia could have withstood so many type changes and still have been appropriate.

However, the reverse is also true, in that several squadrons changed their insignia. It appears that this occurred as a result of a change in operational status such as VJ-1, which in 1933 used a lion superimposed on the national insignia, and a few years later carried the awkward looking pelican loaded down with a mail sack, tow target and aerial photographer.

"Felix the Cat" is probably the oldest Navy insignia while the "Ace of Spades" is the senior Marine Corps design. These units have, like the High Hats, experienced many redesignations through the years. Many of the distinctive insignia in use during this period will be found in the photographs which illustrate this article. Insignia used by the older carriers were particularly appropriate. They were carried by the aircraft of the ship's utility unit and were not painted on the carrier itself. Shortly after its appearance with the fleet in 1922 the old LANGLEY, CV-1, was dubbed the "Covered Wagon" because of the awkward-appearing flight deck built upon the hull of the ex-collier. The nickname was soon converted into the well-known insignia. Naturally, the LEXINGTON, CV-2, used the statue of the Minuteman, and the RANGER, CV-4, the head of John Paul Jones who commanded the first RANGER in 1777.

On naval aircraft the squadron insignia was placed forward of the unit markings on all planes except flying boats. Positioning here was forward of the unit marking on the hull. Exceptions to these rules were a rarity, and were most likely due to the whims of a local command rather than official policy. One such case is that of the CPO Chevron of VF-2 appearing on the vertical fin of the Vought FU-1's, the aircraft then assigned to the famous enlisted pilots' squadron.

For many years Marine Corps squadron insignia (not the Corps emblem) was placed on the after part of the fuselage, near the horizontal stabilizer. In the middle 1930's the position was changed to the vertical fin. Display of squadron insignia was not mandatory and there are many photographs of Navy and Marine Corps aircraft in full markings except for this insignia.

Special purpose units usually adopted an insignia which was utilized only as long as the unit remained in commission. The various Alaskan Surveys are prime examples of this practice.

SPECIAL MARKINGS

A number of special markings came into use during this period; most of them as a result of ordnance and communication competitions. One of the oldest was the Gunnery Trophy Pennant awarded to one squadron of each type for general excellence in gunnery competition. This red, triangular shaped mark was placed forward of the unit markings; its size being specified in the Orders for Gunnery Exercises.

Individual Battle Practice (IBP) was an annual affair and those pilots who qualified could place a Gunnery "E" on their aircraft. This was in white and located forward of the unit markings. Subsequent re-qualifications saw slanting stripes, called "hashmarks", placed beneath the "E", one for each year. SOC-1 #9981, 3-CS-8, carried four - a rare achievement (Fig. 22). In some instances a small "B" for Bombing, or an "M" for Machine Gunnery (infrequently, both) was placed below the "E" in smaller letters. See Figures 22 and 51.

One of the least known special markings is the Communications "C", which was in white and positioned forward of the unit markings. The Marine Corps had at least one example of this enclosed in a circle, in black, in the same manner as the copyright symbol. See Figures 26 and 27.

Another seldom-seen special marking was the "Shellback" Turtle. This winged turtle was applied to aircraft which had flown across the Equator. Prior to World War II this was an unusual accomplishment as few U. S. Navy vessels operated so far south. The Turtle was usually placed high on the vertical fin (Fig. 23), but photos of a BM-1 show it forward of the pilots cockpit.

The introduction of low-wing monoplane equipment to carriers resulted in higher landing speeds and less time for the Landing Signal Officer (LSO) to perform his duties. To assist him in aligning the aircraft into proper landing attitude a narrow stripe was painted on the left side of the vertical fin. The Northrop BT-1 and Douglas TBD-1 seem to have been the first aircraft types to carry this marking. See Figure 28.

It was a practice of long standing to place the name of the pilot, and often that of the plane captain, in small block letters just below the cockpit. These are barely visible in most photographs, but in the case of Curtiss F7C-1 #7664, "Capt. James T. Moore" appears in letters nearly four inches high. This is undoubtedly a prerogative of command, as further block lettering identifies the Captain as the Commanding Officer, Aircraft Squadrons, East Coast Expeditionary Force. (Fig. 31).

RESERVE UNIT MARKINGS

Off to a slow start in 1922 at Squantum, Massachusetts, Reserve aviation literally led a "hand-to-mouth" existence for many years. Obsolete equipment, and little of that, was the rule, with the Curtiss O2C-1/F8C-4 "Helldiver" being the standby for many years..

Reserve markings closely followed those of the regular Navy. Reserve units were organized as training squadrons (VN), and the standard three-character unit marking such as 6-N-5 was used at first (Fig. 46). These were dropped in the late 1930's and replaced with the words N.R.A.B. (Naval Reserve Air Base) and an individual plane number from that station. The name of the base followed the letters NRAB. At first

all of the bases (squadrons) used the standard Navy red-white-blue tail stripes, but in the late 1930's nearly half of the units adopted solid tail colors. The Great Lakes, Illinois, unit used Red; the New York City unit used Blue; the Seattle, Washington, unit used Green.

At this time a standardized insignia was developed for the Navy/Marine Corps Air Reserve. This design, consisting of a shield and anchor, was applied by decal to the aircraft, usually in the area of the pilots cockpit. The name of the individual base was painted on the flukes of the anchor. See Figure 39.

During the early 1930 period most, if not all, of the Naval Air Reserve bases developed individual "squadron" insignia. Research is currently under way for an illustrated article on this subject for a future issue of the AAHS Journal. In general these insignias reflected the operating locale in which the unit was based. The winged alligator on wheels, encircled, and titled "The Golden Gaters", was used for many years by the N.R.A.B. at Oakland, California, and its squadron VN-14 (Fig. 46). The name was derived from the Golden Gate, entrance to the San Francisco Bay, of which Oakland is a part.

COMMAND AIRCRAFT

Early command aircraft bore standard finish and markings with the addition of a plaque near the cockpit denoting the rank of the officer using the plane. In some cases a standard Rear Admiral's flag (two white stars in vertical alignment on a blue field) was flown from the interplane struts. As the years passed several color schemes evolved which bore a direct relationship to the color schemes used on Admirals barges in the surface Navy.

All parts of command aircraft, except the wings, might be painted. In a few instances rudder stripes were used in conjunction with plain or silver tail surfaces. Brackets to hold rank plaques, often termed "command cards", were almost always attached just below the cockpit. With the advent of twin-engine command planes, such as the Lockheed XR20-1, R50-1 etc., the rank plaque was quite often mounted on the external sides of the engine cowlings or nacelles. Painting specifications for command aircraft are vague or non-existent, and considerable variation in minor details is evident from a study of photographs.

Command aircraft may be generally classified as follows:

Air Group Commanders

A diagonal stripe across the fuselage was used, with the color being the same as that used by the squadrons operating from the same ship. The title "Air Group Commander", over the carrier's name, was lettered below the cockpit. See Figure 40. Late model two-seat types were utilized for this purpose.

Staff Officers

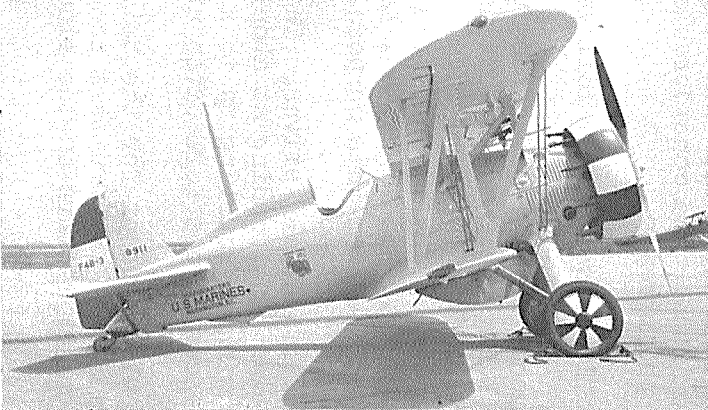
Half blue and half silver. The forward half of the plane was blue, ending at about the trailing edge of the lower wing and curving up to a point past the cockpit. Obsolescent types were often utilized. (Fig. 41)

Flag Officers

Solid blue, except for the tail surfaces. Title of the command, such as "Cruisers Scouting Force" appeared in white block letters on the side. Contemporary a/c. (Fig. 42)



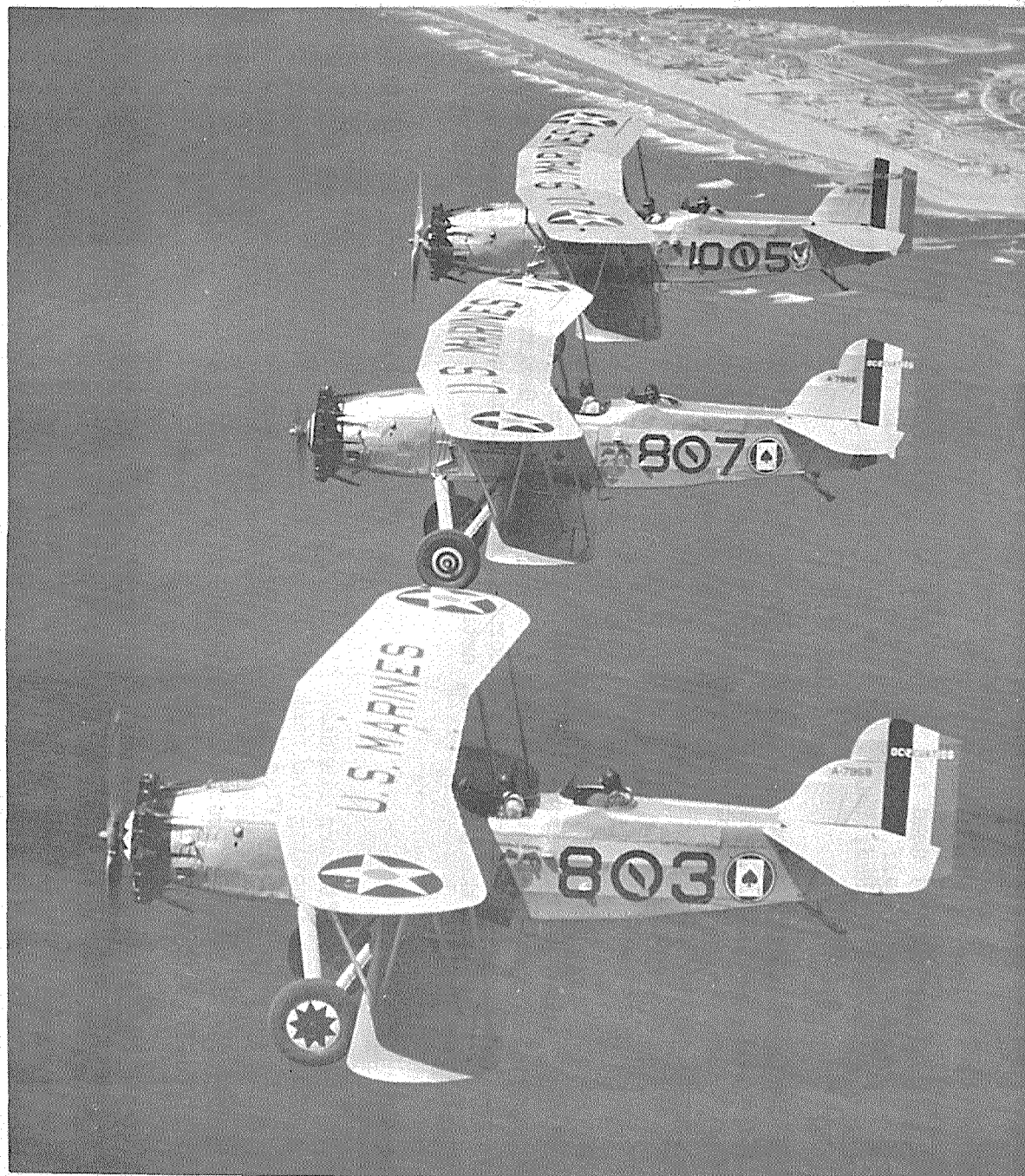
16. F8C-5. VO-6M (Larkins)



17. F4B-3, HQ USMC Brinsley



18. Cross on nose, VO-10M (Larkins)



19. Curtiss OC-2's of VO-8M and VO-10M. Note the special markings on the noses & wheel covers, straight U.S. MARINES on 8-0-3, famous "Ace of Spades" Squadron Insignia. Photo October 1930 by U.S. Navy

Fleet & Force Commanders

Solid blue, including the tail surfaces. The title of the command, such as U. S. FLEET, appeared on the side of the fuselage in white block letters. Contemporary types were used. Figure 43 shows the all-blue SOC-3 of CINCUS (Commander-in-Chief, U. S. Fleet), a one-only command plane.

Bureau & Navy Department

Generally solid blue with white or silver tail surfaces. With the later twin-engine transports the fuselage was all silver, with blue engine nacelles and tails. Modern, contemporary types were used. The Boeing F4B-1 #8133 (Figure 44) was an unusual case of a single-place high performance fighter used for the Assistant Secretary of the Navy for Air, and carried his flag of four stars plus an anchor on a white field.

Miscellaneous

In the late 1930's several experimental patrol boats such as the Sikorsky XPBS-1, Douglas XP3D-2, and Consolidated XPB2Y-1 were utilized as "flying flag-ships" with the title of the command lettered on the hull. Figure 45 shows the XPB2Y-1 which carried then Secretary of the Navy Frank Knox from San Francisco to Hawaii on an inspection trip before World War II.

RACE NUMBERS

Participation by the Navy in the Pulitzer, Schneider and Curtiss Marine Trophy Races in the early 1920's, as well as the National Air Races, resulted in a number of unusual color schemes and temporarily applied race numbers.

In the 1927 National Air Races at Spokane, Washington, FB-5's of VF-1 and VF-6 carried large numbers applied to solid colored tails, and to the fuselage sides. In the 1928 Races at Los Angeles, the Three Sea Hawks (Tomlinson, Storrs and Davis) flew F2B-1's with red, white and blue rudder stripes, and large numbers 1, 2 and 3 on the fuselage sides. The remaining 12 aircraft of VF-2B (squadron strength at the time was 15) retained the unit's white empennage and standard unit markings. Similar variations were seen at subsequent air displays. Unlike the Marine Corps (Fig. 12) which retained these colorful markings over a long period of time, the Navy quickly reverted to its standard color schemes and markings.

NEUTRALITY STAR AND WARPAINT

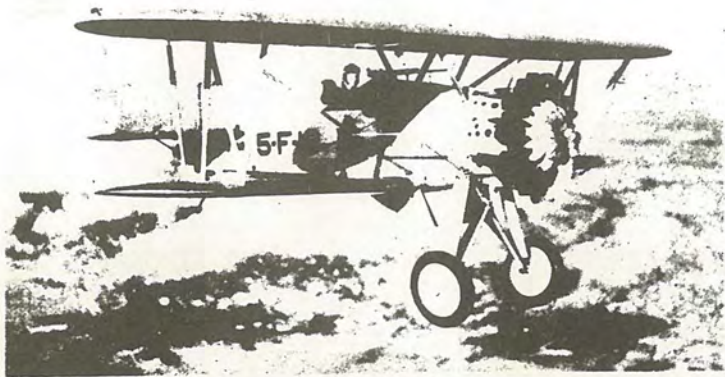
Subsequent to the declaration of a "state of limited emergency" by the President the Navy established a Neutrality Patrol in 1940. The national insignia, designated the Neutrality Patrol Star, was applied to each side of the nose of those aircraft assigned to the patrol in as large a size as was practicable (Fig. 14).

In the summer of 1941 a gradual change to "warpaint" was made. The national insignia appeared only on the upper left and lower right wings. For the first time, other than in the case of the Neutrality Patrol Star, the national insignia was applied to each side of the fuselage, forward of the empennage. The over-all finish was a light shade of gray. Unit markings, applied in white paint, were retained in their former position. The model designation, bureau number were reduced to white figures one inch in height. The word NAVY was also reduced to one inch and moved to the fin above the bureau number, dropping the letters "U.S." (Figure 53).

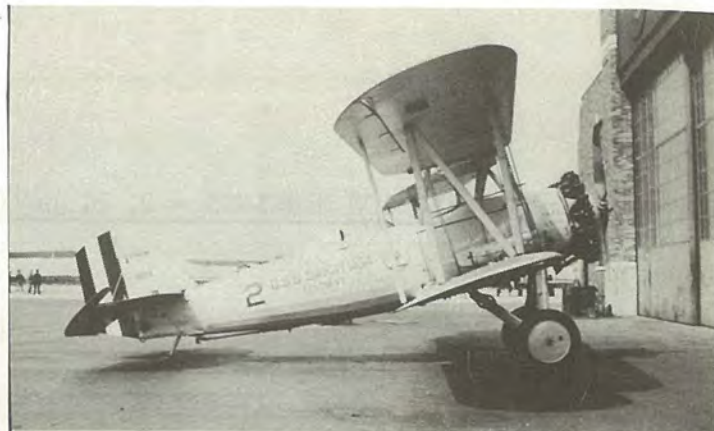
Table 1. AIRCRAFT TYPE SYMBOLS AND MANUFACTURERS LETTERS

The use of these symbols, in various combinations, make up both the official designation of squadrons and aircraft and, in modified form, those markings painted on the aircraft.

<u>CLASS AND TYPE SYMBOL</u>		<u>MANUFACTURERS LETTERS</u>	
VB	Bombing	A	Atlantic (Fokker), Brewster
VEF	Bombing and Fighting	B	Boeing, Beech
VF	Fighting (at one time termed "combat")	C	Curtiss
VG	Transport, single-engine	D	Douglas
VJ	Utility	E	Bellanca
VJR	Utility-Transport	F	Grumman
VM	Miscellaneous	G	Great Lakes
VN	Training	H	Hall-Aluminum, Stearman-Hammond
VO	Observation	J	Berliner-Joyce, General Aircraft, North American
VOS	Observation-Scouting	K	Keystone, Krieder-Reisner (later known as Fairchild), Kinner
VP	Patrol	L	Loening, Bell
VPB	Patrol-Bombing	M	Martin
VR	Transport, multi-engine	N	Naval Aircraft Factory
VS	Scouting	O	Viking, Lockheed
VSB	Scout-Bombing	P	Pitcairn Autogiro, Spartan
VSN	Scout-Training	Q	Stinson, Fairchild
VSO	Scout-Observation	R	Ford (Stout), Ryan
VT	Torpedo	S	Sikorsky, Stearman
VTB	Torpedo-Bombing	T	Northrop
		U	Vought (Chance-Vought)
		W	Waco
		Y	Consolidated
		Z	Pennsylvania Autogiro
A	Suffix to aircraft model designation for Amphibian a/c.		
X	Experimental. Used both as prefix to model designation on aircraft, and as squadron class letter.		
V	Prefix letter for all Heavier-Than-Air types. Used in all official references to aircraft squadrons.		
Z	Prefix letter for all Lighter-Than-Air types.		



20. Full markings, VF-5, F4B-1 U.S.Navy



21. Carrier Utility Aircraft (Larkins)



22. Excellency E Larkins



23. Shellback Turtle+ Larkins



24. Wing Chevron Larkins



25. Sqdn on top wing USN



26. Comm."C" EM



27. Comm."C" L



28. Deck Landing Stripe WT



29. Full markings, VF-5, F2F-1 U.S.Navy



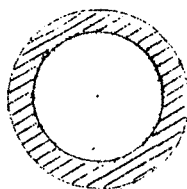
30. VS-42, RANGER, SBU-1.'s Larkins

Table 2. SECTION MARKINGS - U. S. NAVY AIRCRAFT

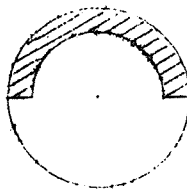
<u>COWL STRIPE COLOR</u>	<u>TWO AIRCRAFT SECTION (Light Cruiser)</u>		<u>THREE AIRCRAFT SECTION (Carrier & Battleship)</u>			<u>FOUR AIRCRAFT SECTION (Heavy Cruiser)</u>			
Red	<u>1</u>	2	<u>1</u>	2	3	<u>1</u>	2	3	4
White	<u>3</u>	4	<u>4</u>	5	6	<u>5</u>	6	7	8
Blue	<u>5</u>	6	<u>7</u>	8	9	<u>9</u>	10	11	12
Black	<u>7</u>	8	+ <u>10</u>	11	12	<u>13</u>	14	15	16
Green	*		<u>13</u>	14	15	<u>17</u>	18	19	20
Yellow	*		<u>16</u>	17	18	#			

NOTES:

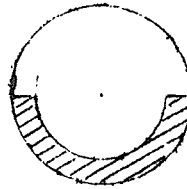
- * Normally, not more than four Light Cruisers in a Cruiser Division. The two aircraft section applies to the ten OMAHA Class CL's.
- + Normally, not more than four Battleships in a Battleship Division. The three aircraft section applies to the "old" BB's.
- # Normally, not more than five Heavy Cruisers in a Cruiser Division. The four aircraft section applies to the "Treaty" CA's and subsequent.

COWL MARKINGS - U. S. NAVY AIRCRAFT

Section Leader



Left Wingman



Right Wingman

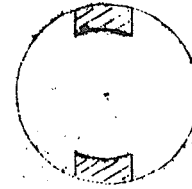
Applies to 4th
a/c in VCS Sqdn
only.

Table 3. CARRIER SQUADRON REORGANIZATION - 1 JULY 1937

<u>OLD</u>				<u>NEW</u>	
<u>SQDN NO.</u>	<u>SHIP</u>	<u>TAIL</u>	<u>INSIGNIA</u>	<u>SQDN NO.</u>	<u>SHIP NO., TAIL, CAG</u>
VB-5B	Ranger	Green	Bellerophon	VB-2B	(LEX,
VF-2B	Lexington	Yellow	CPO Chevron	VF-2B	CV-2,
VS-3B	Lexington	Yellow	Indian Head	VS-2B	Yellow,
VB-1B	Lexington	Yellow	"Bombsman"	VT-2B	CAG-2)
VB-2B	Saratoga	Red	High Hat	VB-3B	(SARA,
VF-6B	Saratoga	White	Felix the Cat	VF-3B	CV-3,
VS-2B	Saratoga	White	Pointer Dog	VS-3B	White,
VT-2B	Saratoga	Red	Red Dragon	VT-3B	CAG-3)
VB-3B	Ranger	Green	Black Panther	VB-4B	(RNGR,
VF-5B	Lexington	Blue	"Red Rippers"	VF-4B	CV-4,
VS-1B	Ranger	Green	Galloping Goose	VS-41B	Green,
-	-	-	Dodo Bird	VS-42B	CAG-4)
-	-	-	Satan's Head	VB-5B	(YKTN,
VF-3B	Ranger	Green	Striking Eagle	VF-5B	CV-5,
-	-	-	Man-o-War Bird	VS-5B	Red,
-	-	-	Valkyrie	VT-5B	CAG-5)

Table 4. BATTLESHIP AND CRUISER REORGANIZATION - 1 JULY 1937

<u>OLD</u> <u>SDN NO.</u>	<u>BB CRU</u> <u>DIV No.</u>	<u>TAIL</u>	<u>INSIGNIA</u>	<u>NEW</u> <u>SDN NO.</u>	<u>NO. A/C</u> <u>EA. SHIP</u>
VO-1B	BatDiv 1	Red	Shield & Turret	VO-1B	Three
VO-2B	BatDiv 2	White	Pelican	VO-2B	Three
VO-3B	BatDiv 3	Blue	"Oswald" on Bomb	VO-3B	Three
VO-4B	BatDiv 4	Black	BB in V on O	VO-4B	Three
VS-5B	CruDiv 2	Blue Stripe	Bat	VCS-2B	Two
VS-6B	CruDiv 3	Red Stripe	Winged Seahorse	VCS-3B	Two
VS-9S	CruDiv 4	White Stripe	(unknown)	VCS-4S	Four
VS-10S	CruDiv 5	Yellow Stripe	Duckling on Cat	VCS-5S	Four
VS-12S	CruDiv 6	Black Stripe	Flying Fish	VCS-6S	Four
VS-11S	CruDiv 7	Green Stripe	Winged Binoculars	VCS-7S	Four
-	CruDiv 8	(unknown)	Four Dolphins	VCS-8S	Four



31. Special Name

WTL

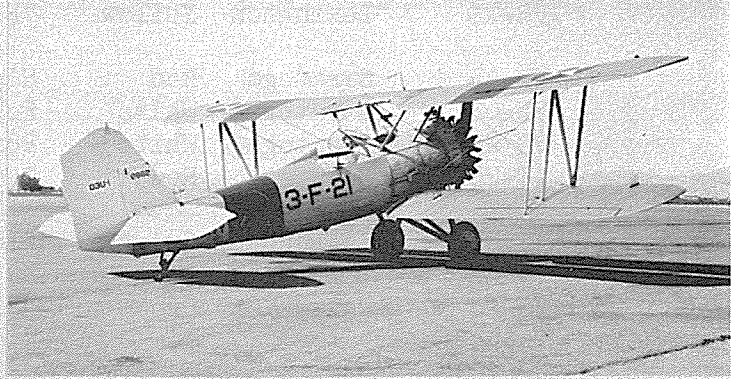


32. Vought UO-1 (A-6992) 6-GL-S-1

U.S. Navy



33. VE-9, VJ Sqdn, 11th Naval Dist. U.S. Navy



34. Instrument Trainer Stripes (Larkins)



35. Miscellaneous Squadron, VM

(Larkins)



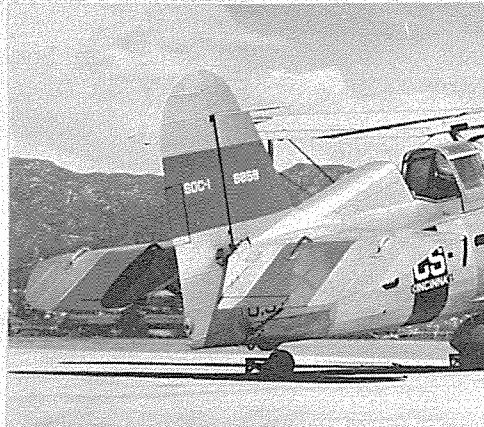
36. District (?) markings

(Larkins)



37. Double tail mks

WTL



38. VCS tail stripes

WTL



39. Reserve Insignia

WTL

Table 5. PATROL SQUADRON REORGANIZATION - 1 JULY 1939

<u>OLD</u> <u>SDN No.</u>	<u>PATROL</u> <u>WING</u>	<u>TAIL</u>	<u>INSIGNIA</u>	<u>NEW</u> <u>SDN No.</u>	<u>OPER</u> <u>AREA</u>
VP-7S	ONE	Blue	Albatross	VP-11S	San Diego
VP-9S	ONE	Red	Mallard	VP-12S	San Diego
VP-18S	ONE	(unknown)	"Wings over Globe"	VP-13S	San Diego
VP-1S	TWO	Red	Elephant on Cloud	VP-21S	Hawaii
VP-4S	TWO	Yellow	Rainbow circle	VP-22S	Hawaii
VP-6S	TWO	Blue	Pegasus	VP-23S	Hawaii
VP-8S	TWO	White	Winged 8-ball	VP-24S	Hawaii
VP-10S	TWO	Black Stripe	Bomb on Compass	VP-25S	Midway
VP-2S	THREE	White Stripe	Keystone Cop	VP-31S	Canal Zone
VP-3S	THREE	Red Stripe	Prancing Elephant	VP-32S	Canal Zone
VP-5S	THREE	Black Stripe	Wings over Panama	VP-33S	Canal Zone
VP-16S	FOUR	Checkerboard	Husky Dog	VP-41S	Seattle
VP-17S	FOUR		Seal holding bomb	VP-42S	Seattle
VP-19S	FOUR		Polar Bear	VP-43S	Seattle
VP-20S	FOUR		(unknown)	VP-44S	Seattle
VP-21S	FOUR		Pine Tree	VP-45S	Sitka
VP-12S	FIVE		Totem Pole	VP-51S	East Coast
VP-14S	FIVE		Geese over coast	VP-52S	East Coast
VP-15S	FIVE		Indian Scout, kneels	VP-53S	East Coast
VP-11S	FIVE		Head of Odin	VP-54S	East Coast

Table 6. MARINE CORPS SQUADRON REORGANIZATION - 1937 and 1941

<u>Pre-1937</u> <u>SQDN No.</u>	<u>BASE</u>	<u>TAIL</u>	<u>INSIGNIA</u>	<u>1937</u> <u>SDN No.</u>	<u>1941</u> <u>SDN No.</u>
VO-7M	Aircraft	R-W-B stripes		VMS-1	VMSB-131
VB-6M	One,	R-W-B stripes	Snake on Triangle	VMB-1	VMSB-132
	Fleet	R-W-B stripes	Devil Dog	*VMF-1	VMF-111
	Marine	R-W-B stripes		-	*VMF-121
	Force,	R-W-B stripes		VMO-1	VMO-151
VJ-6M	Quantico.	R-W-B stripes		VMJ-1	VMJ-152
VO-8M	Aircraft	R-W-B stripes	Ace of Spades	VMS-2	VMSB-231
VB-4M	Two,	R-W-B stripes	Red Devil	VMB-2	VMSB-232
	Fleet	R-W-B stripes	Red Lion	*VMF-2	VMF-211
	Marine	R-W-B stripes			*VMF-221
	Force,	R-W-B stripes			*VMO-251
VJ-7M	San Diego.	R-W-B stripes	Shield	VMJ-2	VMJ-252
VO-9M	Virgin Isl.	Plain	Devilbird	VMS-3	VMS-3

* = Newly Formed

UNITED STATES COAST GUARD

Although the U. S. Coast Guard was a civilian part of the Treasury Department during the peace-time years prior to World War II, the painting and marking of Coast Guard aircraft has always followed a modified form of the Navy standard, and thus is included as a part of this study.

The beginning of Coast Guard aviation, on paper, may be dated as of 29 August 1916 when Congress authorized the establishment and equipment of ten Coast Guard Air Stations in the United States. However, before any money had been allotted the U.S. entered World War I and the Coast Guard became part of the Navy. From that time to the present the Coast Guard has been a Navy Reserve organization, automatically being called to active duty with the Navy in time of war.

After the armistice the Coast Guard was returned to the Treasury Department and the former Naval Air Station at Morehead City, North Carolina, was made available as a temporary Coast Guard Air Station. The Navy loaned the Coast Guard six surplus Navy HS-2 flying boats. Unfortunately no data has been uncovered concerning the markings of these planes. This station was discontinued due to lack of funds after a year and the airplanes were returned to the Navy. Hence it may, or may not, be assumed that a Curtiss HS-2L was the "first" Coast Guard airplane.

Coast Guard aviation lay dormant through 1922, 1923 and 1924. In 1925 Lt Cdr G. C. von Paulsen, on his own initiative, borrowed a Vought seaplane from the Navy for a period of one year, and purchased a surplus Army tent hangar for \$1.00. The Department of Fisheries owned a small island in Gloucester Harbor, Mass., and they allowed von Paulsen to set up a temporary base there. This was the famous "Ten Pound Island" aviation base of the Coast Guard. This was discontinued a year later, due to lack of funds, and the airplane was returned to the Navy.

Finally, as a result of a Congressional Act of 3 March 1926, appropriations to purchase five new airplanes were received and arrangements made to get them from Army and Navy contracts. Five seaplanes were purchased under Navy inspection and two air stations were opened in 1927. Thus "Coast Guard No. 1" became the serial number of a new Loening OL-5. Coast Guard No. 1, 2 and 3 were OL-5's, and Nos 4 and 5 were Vought UO-4's. The OL-5's went out of service by 1933, but the UO-4's remained in service through June 1935.

From 1927 on Coast Guard aviation was definitely established and its growth continued. In 1941 there were nine air stations and 49 aircraft in operation.

1927-1936 AIRCRAFT MARKINGS

The "blue and silver" period. From the first OL-5, until the inception of the V Serials in 1936, all USCG planes had blue fuselages. The top of the wing, i.e. the top surface of the upper wing as most were biplanes, was painted chrome yellow. The under side of the top wing, and both surfaces of lower wings, were painted silver in standard Navy fashion, as were the horizontal tail surfaces. The under-side of the hull on flying boats was painted silver. Wing struts were silver, with the FLB wing floats being all silver, and the Douglas Dolphins' half silver and half blue. The entire vertical tail surface (both fin and rudder) was equally divided



40. Air Group Commander / SBC-3 (Larkins)



41. Staff Officer / F3B-1 John Mitchell



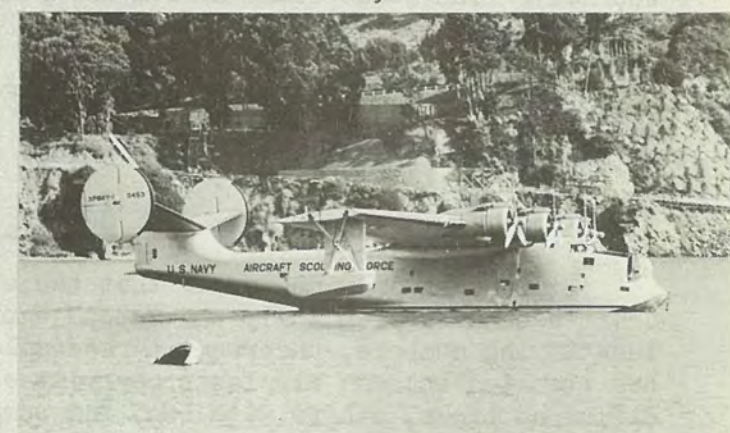
42. Flag Officer / O3U-3 John Mitchell



43. Fleet & Force Cdr, CINCUS Larkins



44. Asst SEC NAV, Air / F4B-1 U.S. Navy



45. A/c Scouting Force / XPB2Y-1 Larkins



46. Original Reserve Marks / O2C-1 C. Bates



47. Later, optional, Reserve / XOJ-3 WTL

into three sections, one each of red, white and blue. This was a definite change from the Navy standard. Another was the elimination of the national insignia (star) from the plane, done because it was not a military aircraft. See Fig. 55 which shows this important point.

On flying boats the engine nacelles were silver, the cowls blue. The name " U S COAST GUARD" was painted in large letters on the side of the fuselage. The letters USCG were painted on the underside of each wing. The letters US were placed on the top of the left wing, and CG on the top of the right wing.

1936-1941 AIRCRAFT MARKINGS

All aircraft now became an over-all aluminum color. The top of the upper wing was chrome yellow with no markings. The remainder of the plane was silver except for the rudder.

Starting in late 1935 the top one-third of the rudder was painted insignia blue, the bottom two-thirds being divided into five equal vertical stripes; three red and two white. The model designation, based on the Navy system, was placed in white on the blue section of the rudder. The serial number appeared in black under the words U.S.COAST GUARD on the side of the fuselage between the rear cockpit and the tail.

The letters USCG were on the underside of both wings, and the serial number (in the V system) was painted on the bottom of the hull or fuselage. (This shows in the excellent flight photo of the Coast Guard J4F-1 in Volume 2, page 44, of the AAHS Journal). The Coast Guard emblem was placed on the forward part of the hull or fuselage near the pilots compartment.

In late 1941 two-tone dark camouflage was adopted, and red-center stars were placed on in approved Navy fashion. The rudders of some amphibians were painted with horizontal bars, 7 red and 6 white.

THE SERIAL NUMBER MAZE

It is certainly no wonder that the correct over-all picture of Coast Guard aircraft has never been fully understood when one realizes that the serial numbers, or identifying numbers, underwent three complete changes prior to World War II. This has resulted in some airplanes carrying as many as three different serials, at three different times, others with two, and some with only one. *

Since the external numbers painted on the planes are so much a part of the marking story, and since this material is so hard to find, it was felt that the entire serial listing should be included. By careful attention to the following material you will be able to identify any photograph of a Coast Guard airplane that may come along. For example, the General Aviation PJ-1 "Arcturus" was at first Number 55, later 255, and still later V115. Instead of there having been three PJ1's with these three serials, as many have assumed, it is actually the same airplane. Photos of the FLB's have a potential of showing 15 different serial numbers although there were only five of them in the Coast Guard.

Before attempting to digest the actual lists, a brief introduction may be of some help. This follows on the next page.

* Five changes by 1952.

ONE AND TWO DIGIT SERIALS

The first serials belong to a system starting in 1927 with the first airplane, and running through 1934. There were only 16 aircraft with these serials, as may be seen in Table 1, but they were broken up into selective groups so that the "Dolphins" fell into the "20" series, and the FLB's fell into the "50" series.

Certain odd markings appear during this period, such as "CG9" and "FLB-51". The CG-9, which appeared on the Douglas O-38C, was simply a means of stating "Coast Guard Airplane Number Nine".

The FLB was a little more complex. As a result of a design competition entered by eight companies a contract for five flying boats, specifically designed for Coast Guard use, was awarded to the General Aviation Company in 1931. These planes were delivered in 1932 and were known for years as "Flying Life Boats". The serial number appeared on the tail of each plane as FLB-51, FLB-52 etc., and this merely meant Flying Life Boat Number 51 etc. Since the Fokker Company of America became a subsidiary of General Aviation in 1930 it is not correct to call these planes, delivered in 1932, Fokkers. The company designation was General Aviation AF-15. Later, when General Aviation became North American, the PJ-1 model designation was adopted, but during their early years these planes were known throughout the service as the FLB's.

THREE DIGIT SERIALS

In January 1935 the aircraft that were still flying were re-assigned to a new system of Three Digit Serials. These were completely systematized according to this formula: 100 Series for amphibians; 200 Series for flying boats; 300 Series for land planes; and 400 Series for convertible land/sea planes. This system was in effect until October 1936. One of the freak results of this new system was the painting of the model designation of the Douglas RD-2 as "RD-129" and this shows in many photos.

"V" SERIALS

On 13 October 1936, at 0001 hours, all serial numbers were completely re-assigned. This was a sweeping revision which included not only all of the aircraft flying at that time, but for administrative purposes also included every aircraft that the Coast Guard had ever owned regardless of the fact that the aircraft may have been destroyed prior to 1936.

Thus the OL-5, Coast Guard No. 1, became V101 under the new system. The V Numbers started with 101, the V presumably adopted from the standard Navy terminology for heavier-than-air equipment.

The V System was consecutive and complete, with no numbers being left out as had been done with the previous two systems. This system stayed in effect for ten years.

MIXED V AND NAVY SERIALS

After the Coast Guard went on active duty in the Navy in November 1941 they kept their V Serials on their own aircraft, but new Navy planes assigned to the "Coast Guard" kept their Navy Bureau Numbers. This mixture has continued to this day.

Table 1. CROSS-REFERENCE OF FIRST THREE SYSTEMS

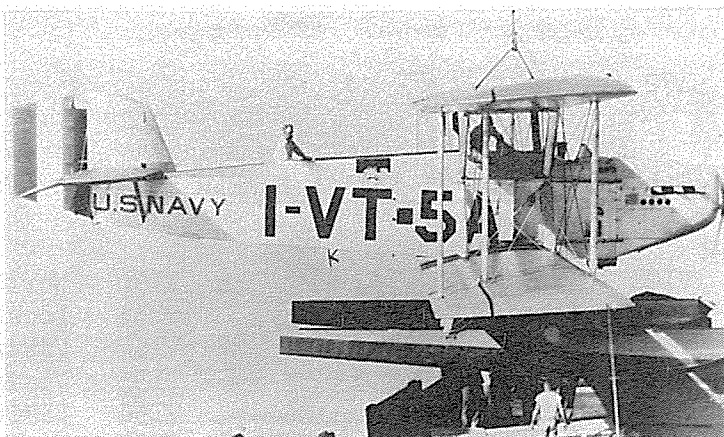
<u>ONE & TWO DIGIT SERIALS</u>		<u>-to-</u>	<u>THREE DIGIT SERIALS</u>	<u>-to-</u>	<u>V SERIALS</u>
1	Loening OL-5		none		V101
2	Loening OL-5		none		V102
3	Loening OL-5		none		V103
4	Vought UO-4		404		V104
5	Vought UO-4		405		V105
8	F. B. A. 17HT4		none		V107
9	Douglas O-38C		none		V108
10	Consolidated NY-1 (21-A)		310		V110
27	Douglas RD		227		V106
28	Douglas RD-1		128		V109
29	Douglas RD-2		129		V111
51	General Aviation PJ-2 (FLB-51)		251		V116
52	General Aviation PJ-1 (FLB-52)		252		V112
53	General Aviation PJ-1 (FLB-53)		253		V113
54	General Aviation PJ-1 (FLB-54)		254		V114
55	General Aviation PJ-1 (FLB-55)		255		V115
			130	Douglas RD-4	V125
			131	Douglas RD-4	V126
			132	Douglas RD-4	V127
			133	Douglas RD-4	V128
			134	Douglas RD-4	V129
			135	Douglas RD-4	V130
			136	Douglas RD-4	V131
			137	Douglas RD-4	V132
			138	Douglas RD-4	V133
			139	Douglas RD-4	V134
			161	Grunman JF-2	V135
			162	Grunman JF-2	V136
			163	Grunman JF-2	V137
			164	Grunman JF-2	V138
			165	Grunman JF-2	V139
			166	Grunman JF-2	V140
			167	Grunman JF-2	V141
			168	Grunman JF-2	V142
			169	Grunman JF-2	V143
			170	Grunman JF-2	V144
			171	Grunman JF-2	V145
			172	Grunman JF-2	V146
			173	Grunman JF-2	V147
			174	Grunman JF-2	V148
			301	Vought O2U-2	V117
			302	Vought O2U-2	V118
			303	Vought O2U-2	V119
			304	Vought O2U-2	V120
			305	Vought O2U-2	V121
			306	Vought O2U-2	V122
			311	New Standard NT-2	V123
			312	New Standard NT-2	V124
			381	Stinson R3Q-1 (RQ-1)	V149
			382	Northrop RT-1	V150
			383	Lockheed R30-1	V151

Table 2. THE "V" SERIAL NUMBER LIST (In effect from 13 October 1936 to 28 Dec 1945)

V101	Loening OL-5	V150	Northrop RT-1	V199	Grumman J4F-1
V102	Loening OL-5	V151	Lockheed R30-1 (XR30-1)	V200	Grumman J4F-1
V103	Loening OL-5	V152	Viking OO-1	V201	Grumman J4F-1
V104	Vought UO-4	V153	Viking OO-1	V202	Grumman J4F-1
V105	Vought UO-4	V154	Viking OO-1	V203	Grumman J4F-1
V106	Douglas RD	V155	Viking OO-1	V204	Grumman J4F-1
V107	F. B. A. 17HT4	V156	Viking OO-1	V205	Grumman J4F-1
V108	Douglas O-38C	V157	Waco J2W-1	V206	Grumman J4F-1
V109	Douglas RD-1	V158	Waco J2W-1	V207	Grumman J4F-1
V110	Consolidated N4Y-1	V159	Waco J2W-1	V208	Grumman J4F-1
V111	Douglas RD-2	V160	Fairchild J2K-1	V209	Grumman J4F-1
V112	General Aviation PJ-1	V161	Fairchild J2K-1	V210	Grumman J4F-1
V113	General Aviation PJ-1	V162	Fairchild J2K-2	V211	Grumman J4F-1
V114	General Aviation PJ-1	V163	Fairchild J2K-2	V212	Grumman J4F-1
V115	General Aviation PJ-1	V164	Hall Aluminum PH-2	V213	Grumman J4F-1
V116	General Aviation PJ-2	V165	Hall Aluminum PH-2	V214	Grumman J4F-1
V117	Vought O2U-2	V166	Hall Aluminum PH-2	V215	Grumman J4F-1
V118	Vought O2U-2	V167	Hall Aluminum PH-2	V216	Grumman J4F-1
V119	Vought O2U-2	V168	Hall Aluminum PH-2	V217	Grumman J4F-1
V120	Vought O2U-2	V169	Hall Aluminum PH-2	V218	Grumman J4F-1
V121	Vought O2U-2	V170	Hall Aluminum PH-2	V219	Grumman J4F-1
V122	Vought O2U-2	V171	Curtiss SOC-4	V220	Grumman J4F-1
V123	New Standard NT-2	V172	Curtiss SOC-4	V221	Grumman J4F-1
V124	New Standard NT-2	V173	Curtiss SOC-4	V222	Vultee SNV-1
V125	Douglas RD-4	V174	Grumman JRF-2	V223	Vultee SNV-1
V126	Douglas RD-4	V175	Grumman JRF-2	V224	Grumman JRF-5
V127	Douglas RD-4	V176	Grumman JRF-2	V225	Grumman JRF-5
V128	Douglas RD-4	V177	Hall Aluminum PH-3	V226	Grumman JRF-5
V129	Douglas RD-4	V178	Hall Aluminum PH-3	V227	Grumman JRF-5
V130	Douglas RD-4	V179	Hall Aluminum PH-3	V228	Grumman JRF-5
V131	Douglas RD-4	V180	Hall Aluminum PH-3	V229	Grumman JRF-5
V132	Douglas RD-4	V181	Hall Aluminum PH-3		
V133	Douglas RD-4	V182	Hall Aluminum PH-3		
V134	Douglas RD-4	V183	Hall Aluminum PH-3		
V135	Grumman JF-2	V184	Grumman JRF-2		
V136	Grumman JF-2	V185	Grumman JRF-2		
V137	Grumman JF-2	V186	Grumman JRF-2		
V138	Grumman JF-2	V187	Grumman JRF-2		
V139	Grumman JF-2	V188	Lockheed R50-1		
V140	Grumman JF-2	V189	Consolidated PBX-5		
V141	Grumman JF-2	V190	Grumman JRF-3		
V142	Grumman JF-2	V191	Grumman JRF-3		
V143	Grumman JF-2	V192	Grumman JRF-3		
V144	Grumman JF-2	V193	N.A.F. N3N-3		
V145	Grumman JF-2	V194	N.A.F. N3N-3		
V146	Grumman JF-2	V195	N.A.F. N3N-3		
V147	Grumman JF-2	V196	N.A.F. N3N-3		
V148	Grumman JF-2	V197	Grumman J4F-1		
V149	Stinson R3Q-1 (RQ-1)	V198	Grumman J4F-1		



48. T3M-2, VT-9, Scouting Force U.S. Navy



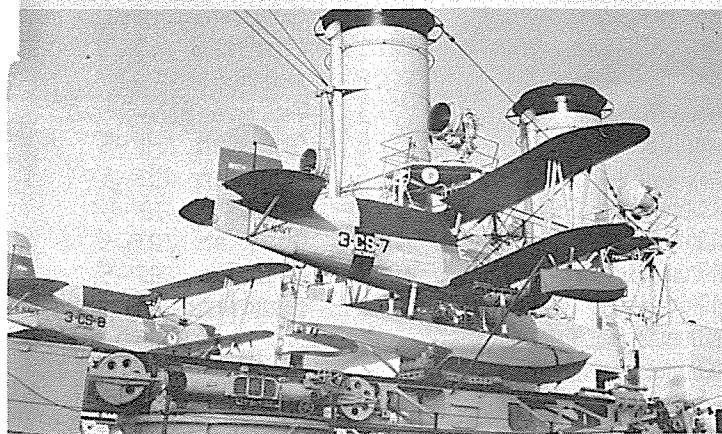
49. T3M-2, VT-5, Asiatic Fleet U.S. Navy



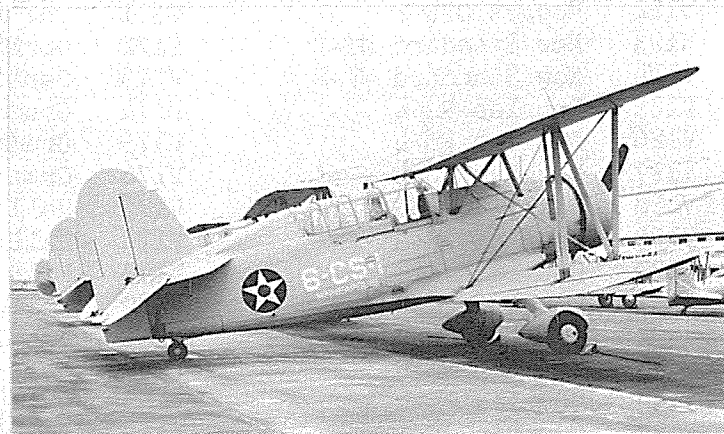
50. Battleship Observation, VO-4 Larkins



51. SOC-1, 9-S-8, Note cowl stripe Mitchell



52. VCS Markings (Cruiser) Larkins



53. VCS, Warpaint, Late 1941 Larkins



54. PJ-1, USCG Blue Markings G.S. Williams



55. JF-2, USCG Silver Markings G.S. Williams

Table 3. AIRCRAFT NAMES

The Coast Guard, in its early history, was able to make use of one of those fascinating luxuries that are limited to small organizations - the naming of individual aircraft. This usage was so common that many official Coast Guard communications, and nearly all press releases and newspaper stories, referred only to the name of the aircraft. All flying boats and amphibians were named after stars during the period 1933 to 1936. These names appeared on each side of the nose of the airplane and serve as an accurate means of identification of the individual plane. In photos where the serial number does not show it is the only means of identification.

<u>NAME</u>	<u>TYPE OF AIRCRAFT</u>	<u>3 DIGIT SERIAL</u>
*ACAMAR	PJ-1	254
*ACRUX	PJ-1	253
*ADHARA	RD-2	129
ALDEBARAN	RD-4	135
ALIOTH	RD-4	132
*ALTAIR	PJ-1	252
*ANTARES	PJ-2	251
*ARCTURUS	PJ-1	255
BELLATRIX	RD-4	138
CANOPUS	RD-4	139
CAPELLA	RD-4	137
DENEK	RD-4	134
MIZAR	RD-4	131
*PROCYON	RD	227
RIGEL	RD-4	136
*SIRIUS	RD-1	128
SPICA	RD-4	130
VEGA	RD-4	133

* These aircraft had names and Two Digit Serials in 1933-1934, prior to the Three Digit System, as well as from 1935-1936.

BIBLIOGRAPHY

In addition to the following references there are several concerning Navy markings to be found on pages 48 and 49 of the Volume 2 Number 1 AAHS Journal. Since one of the most difficult items to locate, for model builders and others, are color photographs of pre-war Navy aircraft some are listed below.

1. Henry Woodhouse, Textbook of Naval Aeronautics, New York 1917.
2. U. S. Naval Institute Proceedings, 1920 to date.
3. D. W. Tomlinson, The Sky's The Limit, Philadelphia, 1930.
4. U. S. Navy, SR-2a Painting Instructions, 1933.
5. National Geographic, May 1933, plate V. (Color photo of USCG FLB-52)
6. Harold Blaine Miller, Navy Wings, New York 1937.
7. Instructions for Painting Coast Guard Aircraft, U.S.C.G., 1937.
8. Popular Aviation, November 1938, Front cover. (Color photo showing details of FF-2 with VS-9R reserve insignia etc.)
9. Popular Aviation, April 1939, Front cover. (Color photo showing nose and wing colors, as well as sqdn insignia on TBD-1)
10. James C. Fahey, Ships & Aircraft of the U.S. Fleet, 1939 and 1941.
11. Air Trails, November 1939, Front cover. (Color photo of USCG JF-2)
12. Popular Aviation, September 1940, Front cover. (Color photo showing SBU-1's of VS-42. Shows Neutrality Star, as well as colors for five different sections.)
13. S. Paul Johnson, Flying Fleets, New York, 1941.
14. William T. Larkins, "Navy Markings", Air Trails, July 1941, pp22-23+.
15. Fortune, March 1941, pp 72-74. (Color photographs)
16. The National Geographic Society, Insignia and Decorations of the U.S. Armed Forces, 1944. (This book includes the article "Aircraft Insignia, Spirit of Youth" from the National Geographic Magazine, June 1943, pp 710-722)
17. Flying, January 1942. (Special U. S. Naval Aviation issue, many color plates)
18. Turnbull & Lord, History of United States Naval Aviation, New York 1949.
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22. Peter M. Bowers, "U.S. Navy Aircraft Color Schemes", Air Trails Model Annual, 1957, pp 56-58.

Note: The most important item of all, particularly for model builders, is the back cover of the February 1937 issue of Popular Aviation. A full description of Navy squadrons, units, aircraft designations and other data is contained on the inside of this cover. On the outside, in full color, the whole scope of pre-war colors is presented. This includes exterior paint (general), section colors (a full squadron of 18 planes are shown individually), tail colors for carrier aircraft as well as Scouting and Patrol, and additional information.
