

A FAMILIAR VIEW of USS Ranger (CV-4) shows forward palisade placed aboard carriers with cross-deck tie-downs to protect planes and men from wind, spray and water. She entered the Fleet Problems in 1935 and with comparatively light tonnage indicated role of small carriers.

Evolution of Aircraft Carriers

LAST OF THE FLEET PROBLEMS

'The culmination of the year's operations arrives when the carriers with their squadrons participate in the annual cruise of the Fleets. On these cruises, the year's efforts to perfect the detail of aircraft operations are given the test of simulated major campaigns against possible enemies. Our efforts in the past have been crowned with a certain amount of success, but every success has only indicated new possibilities of the employment of aircraft in fleet operations and has emphasized the vital importance of continuously operating with the Fleet the maximum number of aircraft that can be carried on our surface vessels.'—RAdm. J. M. Reeves, USN, Commander, Aircraft Squadrons, Battle Fleet, 1929

RADM. REEVES described the year-long training schedule of Naval Aviators as the Twenties came to an end:

"Concurrently with . . . gunnery exercises, the squadrons are embarked on the aircraft carriers and they participate in the monthly exercises with the Fleet. These fleet exercises are arranged to present new and increasingly difficult problems to all arms of the Fleet and to insure the effective coordination of these arms in major fleet operations and engagements.

"It is not sufficient for one officer, Commander, Aircraft Squadrons, to be proficient in effectively employing aircraft. This knowledge must be possessed by all flag officers. To this end, aircraft on the various carriers, and the carriers themselves, are assigned from time to time in fleet exercises to the various subdivisions of the Fleet. In part of a problem, the aircraft will cooperate with destroyers; in another pint, they operate offensively against

By Scot MacDonald

destroyers; in another part, they operate with and against submarines; they operate continually with battleships and these battleship planes must continue their activities during the attack of 'hostile' aircraft. This employment of aircraft on widely differing missions reacts not only to the vast improvement of the air arm, but also and equally important, it acquaints the officers of command rank with the possibilities and effective means of employing aircraft to further the main mission of the Fleet, the destruction of the enemy."

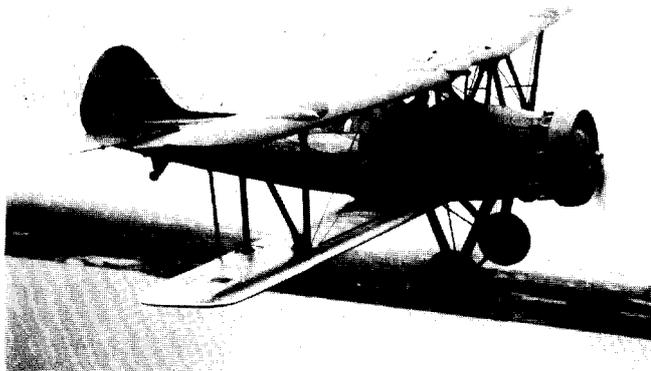
Fleet Problem Nine, conducted in 1929, created a profound impression on the tacticians of the day. In March and again in April of 1930 two more problems were presented the Fleet, both conducted in the Caribbean, and both concerned with the versatility of aircraft carriers as naval weapons. They were Fleet Problems X and XI.

Fleet Problem X investigated the maneuvers necessary to gain a tactical superiority over a force of approximately the same strength and in the use of light forces and aircraft in search operations. Carriers were here defined as a complete tactical unit, operating with cruisers and destroyers as a high-speed striking force.

The *Blue* force, representing the U. S., was assigned both *Saratoga* and *Langley*, while the *Black* force, a coalition of enemy nations, operated the *Lexington*. Earliest control of the Caribbean was crucial to solving the problem.

At the outset, neither force knew exactly where his opponent was, though *Black*, through intelligence reports, had enough information available to assume the *Blue* ships would transit the Panama Canal to the Atlantic side. The ships already had.

Blue's commander considered the water too rough for the safe operation of seaplanes on the first day of the



VOUGHT CORSAIR attached to *Ranger's* utility unit was typical of Corsairs used for scouting observation duties during the later war games.

MONOPLANE TYPES, such as this Vought SB2U-1 of VB-3 on the *Saratoga*, were employed in the Fleet Problems conducted in the late Thirties.

problem and was reluctant to send his carrier-based planes, for he expected to contact the *Black* carrier force before dark. The *Black* ships were in a position just north of the island of Haiti. By dawn next morning, they had moved to the west side of the island.

On the second day of the problem, the *Blue* commander again called off air operations because of bad weather and rough seas. *Black*, on the other hand, conducted extensive scouting operations while advancing to the west. Haitian-based planes scouted from daylight to dark, while *Lexington*-based fighters and scouts launched every three hours for a 12-hour period.

Weather improved on the third day and the *Blue* commander ordered his carrier planes launched. Still neither side had any idea where the opponent was. This status continued through the fourth day, and it was not until the fifth that contact finally was made.

Saratoga was spotted by *Lexington* aircraft and as a result of the attack that followed, *Sara's* flight deck was damaged. Before her planes could be

respotted for launching off the usable end of her deck, *Sara* suffered another and finishing attack. *Lexington* next turned her attention to the *Langley* and in two flights of first 15 and then 12 planes successfully placed the converted collier's flight deck out of commission.

Next, USS *Litchfield*, one of *Saratoga's* plane guards, was dive-bombed and placed out of action. *Blue's* battleships then felt the effects of *Lexington's* planes with the result that the *West Virginia* suffered the destruction of two anti-aircraft guns, the *California* lost an observation plane on deck, injury or death to personnel, foretop material damaged, and a 15 per cent reduction in main battery fire; and the *New Mexico*, lost four AA guns as well as an observation plane still on one of the ship's turrets. Neither *Saratoga* nor *Langley* took part in the main action that followed the destruction of their flight decks.

At its conclusion, Fleet Problem X demonstrated the suddenness with which on engagement could be com-

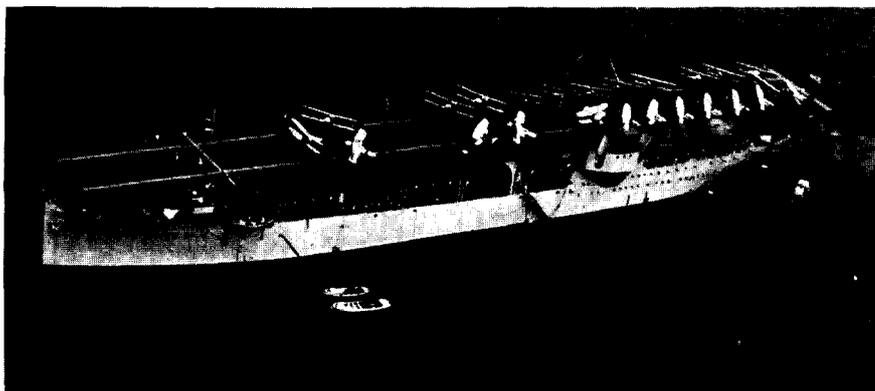
pletely reversed by the use of air power. Scouting planes and scouting operations were also scored, the planes found wanting in range and the scout pilots unable to bomb carrier decks when contact was made.

A month later, Fleet Problem XI investigated further the limitations of scouting planes as well as their most effective use. After the game, it was recommended that scouting squadrons be increased to 18 planes and that a more suitable scouting plane be developed. It was felt that better flotation was needed for amphibians and that a greatly increased range for carrier-based scouts, as well as the ability to take off with a short run were necessary. Among desirable secondary characteristics were small size, folding wings, and high speed, even at the cost of ceiling and armament.

It was also recommended that semi-permanent task groups be organized, each consisting of one large aircraft carrier, a division of cruisers, and a division of destroyers. These ships were to be trained as a unit in frequent exercises.

The 1931 Fleet Problem (XII), conducted in the Pacific-Panama Bay area, had among its tasks exercises in strategic scouting, in the employment of carriers and light cruisers, and refueling at sea.

Primarily, this problem dealt with actions between a fleet strong in aircraft and weak in battleships, and in a reverse situation where the fleet was weak in aircraft. At its conclusion, it was considered that two cruisers and two destroyers were minimum protection for an aircraft carrier in a carrier group. Further, the commander of that group should be stationed in the air-



LANGLEY'S ROLE in the war games became decreasingly important as new aircraft carriers were added to the Fleet. Aboard are an assortment of O2U, SU, and F6C aircraft. Note port stack.

craft carrier, rather than in a cruiser or destroyer, so that he could fully understand the mission of that group and obtain its quickest cooperation. Also, it was pointed out, escorting vessels must maintain the speed and proportionate fuel capacity of the carrier.

At the end of the problem, the three carriers transited the Canal and headed



CANAL ZONE- based aircraft, such as this early Corsair, participated in the games.

for Cuban waters and more exercises. On the last day of March, Capt. Ernest J. King, commanding *Lexington*, was ordered to assist Navy and Marine units in relief operations in Nicaragua. An earthquake had destroyed most of the city of Managua. When *Lexington* launched five aircraft with medical personnel and supplies aboard, in addition to provisions, she inaugurated carrier aircraft relief operations in the U.S. Navy. This was to become a frequent peacetime mission.

During Fleet Problem XIII, held in the Pacific-West Coast area in 1932, the vulnerability of submarines to air detection and attack, at that time, was clearly demonstrated. Four out of five submarines of one force, assigned scouting missions, were detected by land and carrier-based planes and "sunk." C.O.'s of these submarines reported their own vulnerability when operating in an aircraft-screened area.

Aircraft carriers assigned to the problem were forced to exercise in widely separated areas of the Pacific. RAdm. H. E. Yarnell, who commanded the "U. S." aircraft during the exercise, noted that in event of actual war in the Pacific, the number of aircraft carriers on hand would be totally inadequate to meet the needs.

Also, the admiral pointed out, this problem was not greatly dissimilar from all other problems conducted in the past, in that when one aircraft carrier was assigned to each of the forces in the war games, each of the forces invariably made the destruction of the other's carrier the prime tactic. This



MORE MODERN Consolidated P2Y-1's replaced older flying boats in the mid-Thirties.

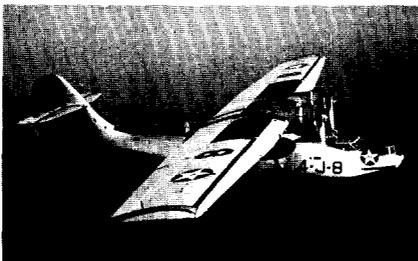
resulted in both forces losing their carriers early in the game.

It was therefore obvious, he repeated, that the side with the greater number of carriers had a tremendous advantage. In time of war, this would be critical. He suggested that at least six or eight more aircraft carriers be added to the Navy's inventory.

THE NEXT problem, XIV, was conducted in the same area the next year, 1933. Its conditions were that "during preparation for escorting an expeditionary force overseas in a campaign, an outlying possession was in danger of a raid, and important industrial, military and mobilization centers of a long coast line were threatened by carrier raids."

The *Blue* force was to protect the West Coast while *Black* was ordered to make at least one raid in the San Diego-San Pedro, San Francisco, and Puget Sound areas. *Black* divided its force into three groups. Its Northern Carrier Group was to raid San Francisco and then proceed to Puget Sound to the north. The Southern Carrier Group was to raid San Pedro and then San Francisco, rendezvousing later with *Black's* Support Group.

The first four days were uneventful. On the fifth day, a *Lexington*-based plane of the Northern Group spotted an enemy submarine, causing the carrier to change formation for the approach to the launching point of the



WITH THE PBV's, VP squadrons made the change to monoplanes. This one was a target tow-er.

raid. Weather worsened, forcing the suspension of flight operations. Early the next morning, as *Lexington* warmed up her planes, a *Blue* battleship was sighted at a 4500-yard range. As the carrier tried to escape, a second enemy battleship came into view and the Northern Carrier Group was declared out of action, caught unexpectedly between two enemy battleships at close range.

The Southern Carrier Group had better luck. On the seventh day of the problem, *Saratoga*-based planes successfully launched the attack. *Black* reported that 12 scouts had attacked the oil refinery at Venice with 24 100-lb. bombs, five scouts attacked a power house at Long Beach with ten equally powerful bombs, encountering no enemy force and sustaining no losses. The force lost three bombers to the enemy's two fighters during an 18-bomber attack on an enemy transport, an oil field at El Segundo and docks at Long Beach. *Saratoga* sustained slight damage. The force moved north for the San Francisco raid.

When she arrived in the San Francisco area, *Saratoga* launched her planes. Before she completed, aircraft from the cruiser *Richmond* and the carrier *Langley* bombed her flight deck. After *Sara's* planes returned from the raid, 37 per cent of her flight deck was assessed damaged, 36 planes lost, and her flight deck out of commission for 38 hours. The CV-2 aircraft had succeeded in making a dive bombing attack on the *Langley*, temporarily dis-



BOEING F3B-1 was typical of the light fighter bombers which used dive bombing tactics.

abling her flight deck, and attacked Crissy Field, San Francisco docks, San Andreas reservoir, and the drydock at Hunter's Point.

This exercise underscored the urgent requirement for the development of better planes, particularly carrier bomber and torpedo planes. Adm. Yarnell again pleaded for three addi-

tional 18,000-ton carriers which were permitted under existing treaties.

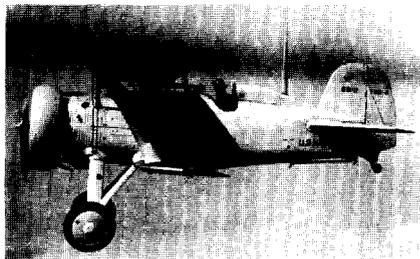
In the period 1933-34, the Fleet conducted a series of 20 tactical exercises. The last three of these comprised Fleet Problem XV, which also proved the last of the war games of the three-carrier period.

In his official monograph "Aviation in the Fleet Exercises, 1911-1939," historian LCDr. James M. Grimes, USNR, described the war games: "The primary effort of the Commander-in-Chief when drawing them up had been to introduce realism into fleet tactics and to simulate as nearly as possible actual wartime operations. For this reason, the opposing fleets represented actual navies of the period. Carrier operations were extensive throughout the problem. . . ."

"There were several important results of Fleet Problem XV as regards the development of Naval Aviation. The most important, perhaps, was the realization brought out by air operations during the problem, that if the carrier was to be the offensive weapon it was considered to be, carrier-based planes would have to be so armed that they could carry the offensive to the enemy.

"It was seen that planes carrying 100-lb. bombs were obsolete and of little use against an enemy force equipped with planes capable of carrying 500- and 1000-lb. bombs. The Commander-in-Chief, in his remarks at the critique held on Fleet Problem XV, stated that at least three-fourths of the carrier-based planes should be so equipped. "

USS *Ranger* joined the Fleet for the next war game, Fleet Problem XVI, conducted in 1935. Actually, this game consisted of five separate exercises, none of them related, spread over



BOEING F4B-4's were famous carrier fighters. One is now in National Air Museum collection.

the Pacific from the Aleutians to Midway, to Hawaii. Both the Army and Coast Guard participated.

The major air operations took place during the third phase of the problem. Unfortunately, these were marred by a series of plane and personnel casualties that, unfortunate in themselves, also seriously affected later air and sea operation. Although valuable experience was obtained in mass flight of patrol squadrons, nothing of significance developed in the operation of aircraft carriers.

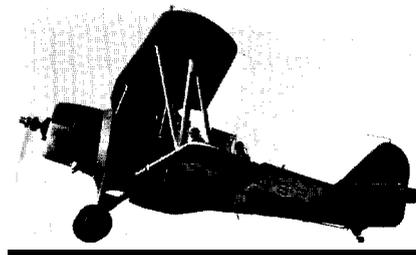
Fleet Problem XVII was conducted in the Panama-Pacific area in 1936. The exercises (again five) saw extensive use of patrol planes and the effective use of automatic pilot, but there was no major contribution to, or effect on, the evolution of carriers, either in design or tactics.

The question of proper employment of aircraft carriers was brought up again in Fleet Problem XVIII of 1937: Should they operate with the main body of a fleet or should they operate at a distance?

Black's aircraft commander held that a carrier tied down to a slow main body formation was certain to be destroyed. "Once an enemy carrier is within striking distance of our Fleet,"

he said, "no security remains until it, its squadrons, or both, are destroyed, and our carriers, if with the main body, are at a tremendous initial disadvantage in conducting necessary operations."

But his force commander took a different view. He felt that carriers should be an integral part of the main body and defended his decision to em-



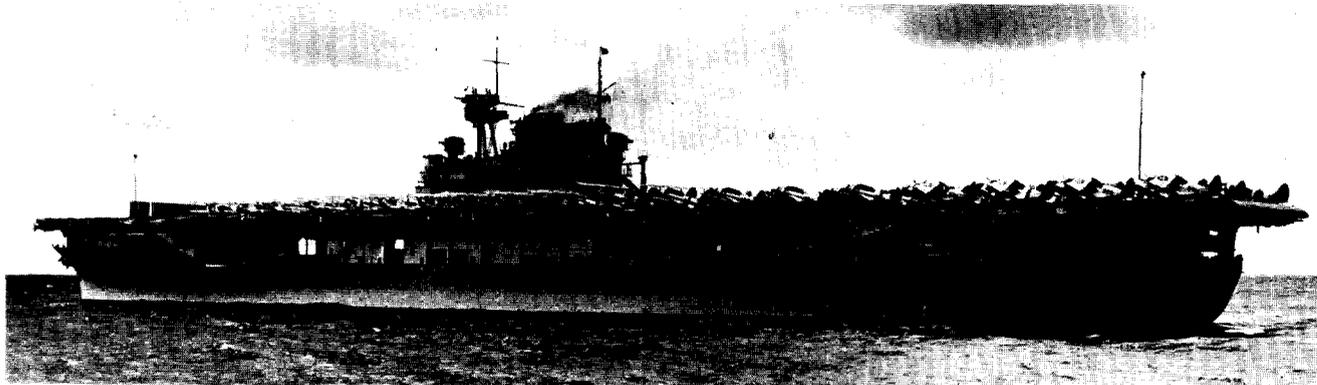
VOUGHT SBU-1's, last fixed gear biplane dive bombers, flew in late Thirties war games.

ploy them in such a way, as he did in this problem. He suggested that *Ranger*, because of her small size could provide scouting and spotting with less chance of being detected. He hoped that when *Yorktown* and *Enterprise* joined the Fleet, such an employment of *Ranger* might be possible.

Fleet problem XIX was the last of the *Ranger* phase of the war games. It was conducted in 1938 and consisted of Parts II, V, and XI of the Annual Fleet Exercises.

In the first phase, the outstanding performance was a long-range San Diego-based patrol plane bomber attack which successfully eliminated Lexington as a carrier unit in the game.

The notable development of the second phase of the war game, Part V, was an attack on Pearl Harbor, launched from *Saratoga* some 1000 miles off the coast of Oahu. *Sara's*



WITH THE ENTRY of the USS *Enterprise* (CV-6), above, and USS *Yorktown* (CV-5) into the war games in 1939, the Fleet problems entered their final phase. Tactics and ships' operations were refined in the tense years immediately prior to the United States' entry in WW II

recon group flew over Lahaina area, photographing beaches and reporting the enemy's strength there.

At the same time, *Sara* sent an attack group which bombed Fleet Air Base, Hickam Field, Wheeler Field, Wailupe Radio Station, and returned to the carrier. This tactic was to be employed by the Japanese some three years later, in December 1941.

In phase three (Part XI), the outstanding air operation was an unopposed air attack by *Lexington*- and *Saratoga*-based planes launched against Mare Island and Alameda.

"Excellent experience was provided in planning and executing a fast carrier task force attack against shore objective," says Grimes. "The problem of defending a coast line, or even an isolated portion thereof, against fast enemy raiding forces equipped with large carriers and protected by powerful surface ships was seen to be one difficult of solution."

Yorktown and *Enterprise* entered into the 1939 exercises of Fleet Problem XX, which were conducted in the Caribbean area and off the northeast coast of South America. The war games entered their final phase. Neither *Langley* nor *Saratoga* participated.

As a result of this game, reports indicated that carrier operations reached a new peak of efficiency; particular credit was given the two new carriers which, despite inexperience,

contributed significantly to the success of the problem. These exercises studied employment of planes and carriers in connection with convoy escort, development of coordinating measures between aircraft and destroyers for anti-submarine defense, attack on mobile patrol plane bases, scouting and attack by patrol planes, defense of surface ships against aircraft attack, and trial of various forms of evasion tactics against attacking aircraft and submarines.

The last war game, XXI, was played in 1940 in the Hawaiian-Pacific area. It consisted of two separate exercises. Historian Grimes describes them:

"The first exercise was designed to afford training in making estimates and plans; in scouting and screening; in the coordination of various types of fighting units; in employing standard and fleet dispositions; and finally to train the opposing forces in decisive engagement."

"The second major exercise of the problem was designed to afford training in scouting, screening, communications, coordination of types, protection of a convoy, seizure of advanced bases and finally, decisive engagement."

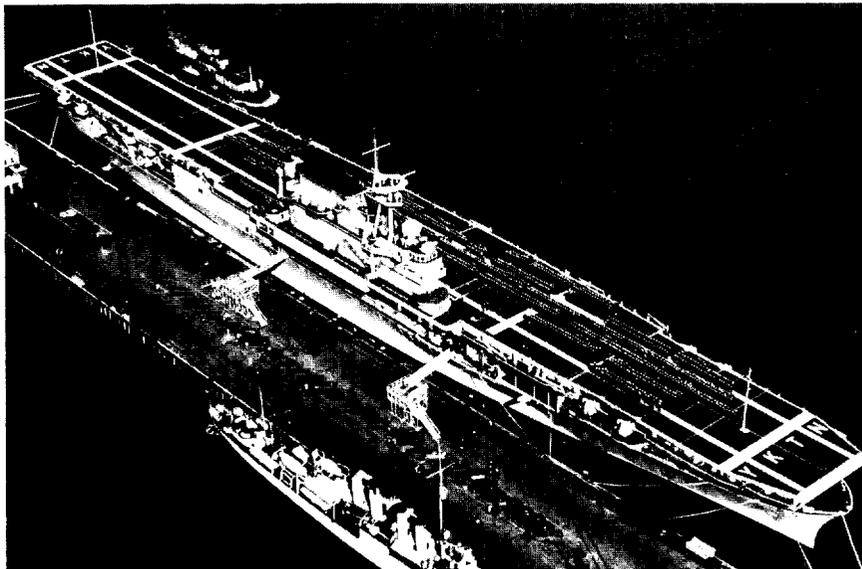
Between the two major parts of the problem were two minor exercises in which air operations played a major part: Fleet Joint Air Exercise 114A and Fleet Exercise 114. Exercise 114A underscored the need for greater coop-

eration between the Army and Navy in organizing the defense of the Hawaiian area. Exercise 114 compared patrol plane attacks on surface units with use of planes in high altitude tracking. The former proved the planes vulnerable, while the latter met with great success.

Few new difficulties emerged from this war game. Reiterated was the question of latitude given carrier commanders by force commanders. *Yorktown's* commanding officer stated his belief that success could best be achieved when aircraft personnel in carriers operated under a broad directive. The exercise proved again—as it did in Fleet Exercise 114—that low-level horizontal bombing attacks had little chance of success—especially against a ship that was not otherwise engaged.

By 1940, the war games were halted. Although one was planned for the next year, worsening of world tensions caused their cessation. Various tactical exercises were held instead.

Naval Aviation grew with the war games. The first phase—the pre-aircraft carrier years—employed "constructive" carriers and merely indicated to the Navy the potentials of this new weapon. The *Langley* phase was an



DURING COMMISSIONING ceremonies at the Naval Operating Base, Norfolk, in 1937, men lined up on the flight deck of USS *Yorktown* (CV-5). It entered the war games two years later.



GRUMMAN F3F biplanes were mainstay of carrier fighters until shortly before WW II.

informative one, but this was more an experimental ship than an aircraft carrier. The games reached fruition with the addition of the *Lexington* and *Saratoga* in Fleet Problem IX. It saw the employment of an aircraft carrier as a separate striking force and introduced a new tactic in the book of naval strategy. The *Ranger* phase showed the potentials of small aircraft carriers, employed with telling effect in WW II. And the final phase, the addition of *Yorktown* and *Enterprise*, increased and refined carrier operations in the critical years prior to WW II.