

crew members voiced that opinion as a direct result of the terrific force with which the China Clipper struck the water.

Thus ended the saga of the Martin Clippers. Their contribution to aerial navigation and development of blind flight and navigation equipment can never be stressed enough. Through operation of these aircraft, Pan American gained the knowledge and experience that enabled them to set up the world's longest airline.

The exploits of the Clippers, especially during the 1935 to 1938 period, probably did more to stimulate aircraft development and public acceptance than any other event since Lindbergh landed at Paris. Yet, all this was done by three airplanes in a daily routine fashion without the fanfare usually associated with noteworthy aviation events. Even their final ends, though spectacular and tragic, went almost unnoticed by the world. From the courageous captains who directed their many flights throughout the world, to the little girl who used to row out to the China Clipper in Middle River, Maryland to bring ham sandwiches to the ground crews, no one will ever forget their Royal Highnesses, the real Queen of the Skies, "Sweet 16" China Clipper and her princesses, Philippine and Hawaii Clippers.

Philippine Clipper

By CHARLES E. ANDERSON

The Philippine Clipper was accepted by Pan American on November 14, 1935 and set off for Alameda, California with Captain Ralph A. Dahlstrom in command on November 22, 1935. The flight was via Miami to Acapulco, Mexico, to San Diego and then to Alameda where it arrived at 12:35 on the 24th. Plans were immediately made to dispatch her to Manila.

Captain John "Dad" Tilton was to command the Philippine Clipper on this and many subsequent flights, so he took her up for the first time on November 29th for a checkout. He had first flown the China Clipper on November 17th, just before her departure for Manila, and did not have too much time in the M-130s, so he spent several hours after the 29th in the Philippine Clipper building up time in the San Francisco area.

Following her first Pacific crossing, the China Clipper arrived back in Alameda on December 6th and Captain Musick had time to work with Captain Tilton and Captain Dahlstrom (who was to be First Officer) and bring them up to date on conditions at the various bases in the Pacific. Even though this was Captain Tilton's first trans-Pacific flight in a Martin, he was familiar with the Pacific route and had first flown a Sikorsky S-42, the Pan American Clipper, NC 823M, to Guam on August 1, 1935.

The day of departure arrived December 9, 1935, and mail, cargo and fuel were loaded, after which the nine crew members and three passengers went aboard. Hatches were closed, mooring lines cast off and the engines started. Captain Tilton maneuvered the aircraft into the Alameda estuary and at 3:17 P.M., Pacific Standard Time, the Philippine Clipper became airborne and headed out through the Golden Gate toward Hawaii.

Five days later, after 58 hours and 37 minutes flying time, the Clipper landed on Manila Bay. In spite of the fact that this was the second visit of a Martin M-130, the reception at Manila was enthusiastic as it had also been at Honolulu. A two day stay was planned, but a typhoon in the vicinity of Guam lengthened the stay and it was not until 2:43 A.M. on December 23rd that the flying boat lifted from Manila Bay and headed east for the first time. The takeoff was not without incident, for a sailboat had cut across the Clipper's takeoff path, and only a slackening of the engines and a swerve avoided a collision in the darkness.

The flight to Hawaii was routine, but a few minutes

after takeoff from Hawaii for the trip to Alameda one engine started to act up, and Captain Tilton was forced to dump fuel and return to the base. The trouble was minor, and soon the airplane was refueled and airborne again. This leg of the flight was destined to be troublesome, for about 800 miles off the California coast, the outboard left engine had to be shut down for the rest of the flight. Captain Tilton would one day, much later, near Manila, wish his troubles were as simple as these. On December 26th, after 58 hours and 43 minutes of flying, the Philippine Clipper was home again.

Thus, her life pattern was set until a December morning in 1941.

Captain Tilton looked upon the Philippine Clipper as his plane, and his log book shows that a good deal of his flying in the years of 1935-1938 was done in her. He was number three in seniority in the division, and later he became chief pilot after the death of Captain Musick in the Samoan Clipper on January 11, 1938, and the transfer of Captain Sullivan.

Many of the men who knew the Captain in those days remember him as a dashing, handsome man, and if you meet him today in his Atherton, California home you still see a dashing, handsome man at 71 years of age. He earned the nickname "Dad" at an early age because of his habit of addressing everyone, regardless of age, as "son".

He and his log book tell many tales. One entry reads, "October 14, November 2, 1936, NC 14715, Alameda-Hong Kong and return--156 hours". When the plans for a route across the Pacific were first drawn up they included a route segment past Manila on to Hong Kong and eventually to Shanghai. Pan Am bought half interest in a Chinese airline which would carry passengers from Hong Kong to Shanghai, and Pan Am's trans-Pacific route would terminate at Hong Kong. Quite early in the operation, Captain Musick had advised against taking the Martins past Manila, for the Martins required service at Manila, and if they went to Hong Kong, maintenance would be cut dangerously low in order to keep schedules. He recommended that a Sikorsky S-42A be ordered and kept at Manila for the Hong Kong shuttle. However, prior to the delivery of the S-42 and prior to the start of scheduled passenger service on October 21, 1936, Captain Tilton took the Philippine Clipper to Hong Kong and noted the incident with the simple entry in his log noted previously. Captain Tilton says he thought it only natural that the China Clipper made the first flight to the Philippines and the Philippine Clipper made the first flight to China.

He also tells the story of a flight to Manila when he lost an engine just past the halfway point between Guam and Manila. The loss didn't particularly bother him, but he got a little nervous when the second engine quit while he was still a few hundred miles off the coast of Luzon. He really got upset when the third engine quite just as he crossed the mountains East of Manila Bay, but the lone good engine stretched the glide enough to reach the Bay. While still a few hundred feet up, the fourth engine quit.

As the crews grew familiar with both the routes and the aircraft, the runs settled down to a fairly routine operation. The average flying time between Alameda and Manila and Alameda was about 120-125 hours, and the weekly schedules were kept with a fair degree of regularity. Tragedy came with the loss of the Hawaii Clipper on July 28, 1938 between Guam and Manila, but the two remaining Martins carried on until the war.

As tension increased between Japan and the United States, sealed orders which, told exactly what action was to be taken if war broke out, were given to the Captains and carried on each flight.

At 7:00 A.M. on December 8, 1941 the Philippine Clipper left Wake Island on a scheduled flight to Guam with eight crew members and five passengers. Shortly after takeoff word came via radio of the attack on Pearl Harbor, and the airport manager, John Cooke, called the Clipper back via radio telephone to Wake Island. (1) By 7:30 she was moored at her dock at the end of a long narrow pier, and by 11:30 A.M. a ground crew had removed all

the cargo, refueled the Clipper and started to walk back along the pier to shore and lunch.

In the meantime, a radio listening watch had been kept in an attempt to obtain fresh news, but matters were confused all over the Pacific. No one had any real idea of what was happening. It was not unusual, therefore, that the arrival of a flight of aircraft, also at 11:30 A.M., was greeted enthusiastically by the people at the Pan Am base in the belief they were from an American carrier in the vicinity. The enthusiasm quickly died when the planes swept over the U. S. Naval Base and left it in ruins and then headed for the Pan Am base on Peale Island.

The men on the pier sprinted for shore and took cover as best they could. One man dove into the water and hid under a raft; another buried himself in the sand; and yet another man crawled into a length of dredging pipe lying on the beach. The latter man was not lucky, for a bullet bounced around inside the pipe and wounded him in the leg.

The Philippine Clipper obviously made an attractive target as she lay at her moorings and the attacking planes were just as obviously trying to destroy her. She was hit over 20 times by bullets, the pier was set afire and a native boy who had remained on the pier, was seriously wounded. The power house near the foot of the pier received a bomb hit as did the hotel and the transmitting shack of the radio installation. Miraculously, no one was killed, nor was the Clipper destroyed. Two men were seriously wounded, there were a few minor wounds, but no vital parts of the Clipper were hit.

As soon as the attack was over, Jack Eagan, the Chief Mechanic, ran to the plane and started the engines. Captain Hamilton also ran for the plane and joined Jack Eagan in making her ready for flight. A decision was made to immediately load the entire Pan Am station crew into the Clipper, along with its eight crewmen and five passengers and start for Midway.

As quickly as possible all non-native Pan Am personnel was located and loaded into the plane with the exception of one man who could not be found, and the painful decision had to be made to leave him behind. He was later captured by the Japanese but survived internment during the war.

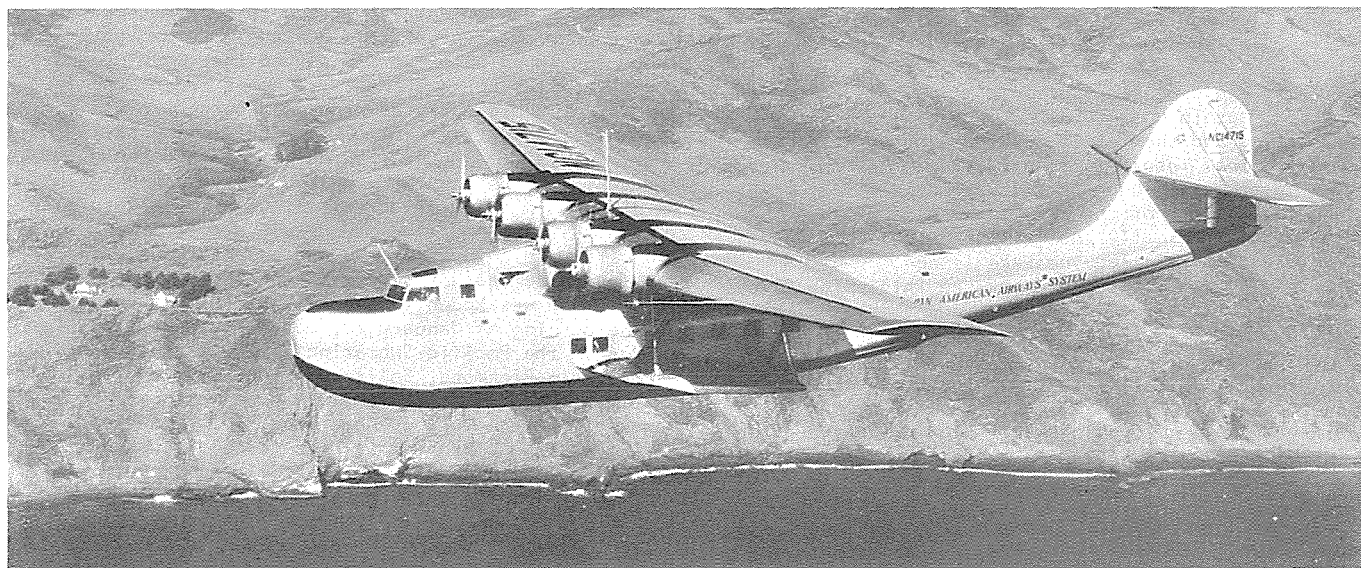
The roster of the men who left for Hawaii with the Philippine Clipper was:

J. R. Hamilton	Captain
John Hrutky	2nd Officer, Navigator
Ted Hrutky	Radioman and Engineer
W. W. Moss	1st Officer

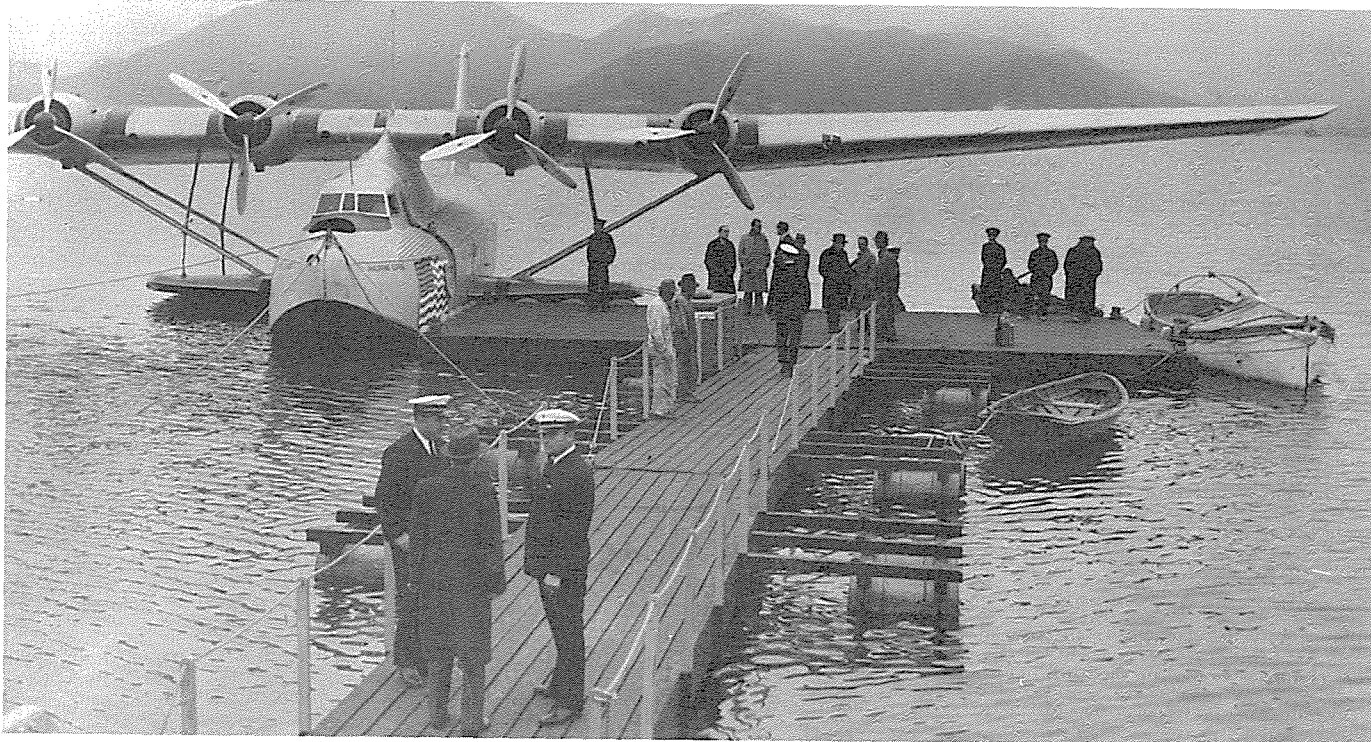
R. R. Delareulle	3rd Officer
Donovan McKay	Radio Officer
Charles Relyea	Steward, seriously wounded
Ed Barnett	Flight Engineer
John B. Cooke, Jr.	Airport Manager at Wake
Jerry Eldridge	Mechanic
Ed Beers	Mechanic, hid under float
Win Horne	Mechanic
Bob Carpenter	Mechanic
Jack Eagan	Chief Mechanic
Leo C. Valiton	Airport Clerk, hid in pipe
Frank Call	Plumber
Hank Willinger	Construction Foreman
George Ferris	Construction Foreman
Frank Lloyd	
Rudolph Hemza	Construction Worker
Bill Ball	Construction Worker
Bill Comer	Radioman, on duty radio shack
Fred Streib	Radioman
Walter Nabs	Flight Meteorologist
Loy	
James Williams	Carpenter
Happy McCullough	Diesel Engineer
Jerry Jordan	Carpenter's Helper
Godfrey Free	Hotel Steward
Oroville Bodenhause	Construction Worker
Bab Barto	Radioman
Hugh States	Radioman
Dean Rogers	Airport Clerk
Ralph Young	Head airport constr. proj.
Frank McKenzie	Company passenger
And an Army Colonel, Major, Lieutenant and a Sergeant.	

As soon as everyone was aboard and goodbyes were said to the men of a construction company who were left behind, Captain Hamilton taxied into the bay for takeoff. He opened the throttles and roared across the lagoon, but the heavily loaded airplane would not break loose from the water, so the throttles were closed and Captain Hamilton taxied back in a series of S's to make waves in the lagoon. Back at the starting point, he again opened the throttles for takeoff and roared across the lagoon. The third time the small waves broke the bond between plane and water and the Clipper lifted into the air.

Captain Hamilton took up a heading for Midway Island and held the Martin only a few feet above the sea to avoid possible detection by the Japanese if any were in the area. As night fell, he brought the plane up to several thousand feet which created an unexpected hardship on the passengers. On Wake, the station crew was very lightly dressed, some wearing shorts and light short-



Flying gracefully along the coastline in 1938, the Philippine Clipper in all of her majesty. (Photo - Pan American)



First arrival in Macao, 1938, for the Philippine Clipper. Captains Nixon and "Chili" Vaughn in foreground. (Pan Am)

sleeved shirts. As long as the Clipper flew at sea level, everything was fine, but with nightfall and the higher altitude, the passengers began to be very cold and uncomfortable.

At first, radio contact could not be made directly with Midway, so a message telling of the plane's flight to Midway was sent to Pearl Harbor where it was then relayed by submarine cable to Midway. At least the Clipper would be more-or-less expected. Later, as the plane drew nearer to Midway, the radio operator started blind transmissions and simply repeated every few minutes the number 1135. Midway properly interpreted this as the Clipper's ETA.

During the day, a flotilla of Japanese naval ships had steamed close to Midway and shelled everything in sight, and about 75 miles out from Midway, the Clipper flew directly over the ships and noted their position. (Two witnesses aboard the plane and the radio operator at Midway give conflicting stories about the position of the ships, but the consensus is the story given here.) The base at Midway was still burning that night, and the bright glow could be seen for some miles before reaching the base. Captain Hamilton landed, the aircraft was hurriedly fueled and the flight continued on to Pearl Harbor. As a final insult to the tired crew and passengers, the air became very rough on the attempted flight to Hilo, and a good many of the very tired group became thoroughly airsick. Finally the Philippine Clipper landed, almost 24 hours after leaving Wake Island.

For the duration of her career the Philippine Clipper wore a wound stripe on her bow, and then came the night of January 21, 1943.

It had rained heavily and the wind had howled around the farmhouse all night. In fact, it was one of the worst storms Mrs. Wallach had ever seen or heard during the many years she had lived in the valley. Early in the morning she began to worry about the creek that ran a few feet in front of her house. The possibility of its overflowing worried her so much that she finally got up and walked through the heavy rain to see just exactly how high it was.

Having satisfied herself that her house was in no

apparent danger, she went back to the house, climbed the few steps to the long porch, removed her coat and started to dry herself. The storm was making a great deal of noise, and she was surprised to hear above its roar what sounded like an approaching airplane. Because she had been a Ground Observer since December 8, 1941, she reacted automatically to the sound by immediately running off the porch and looking back over the house towards the noise.

It was still too dark to see much, but she had a brief chance to see the large dark form of an airplane, its running and cabin lights aglow, pass just above the house and then disappear northward into the storm.

The suddenness of its appearance, the fact it was during a raging storm, and its awesome nearness frightened her, and it was several seconds before she regained her senses. Then she did two things; she worried for its safety at that low altitude in a hilly area such as she was in, and she immediately tried to perform her function as a Ground Observer by telephoning in her reported sighting. The phone was dead and stayed that way for two days.

Five miles north of Mrs. Wallach's ranch, the large airplane slammed into the side of a barren mountain just a few feet below the summit. The Philippine Clipper died and took with it 19 souls; nine crewmen and ten Navy passengers. It was 7:30 A.M. on the 21st of January 1943 on a mountain a few miles west of Ukiah, California.

The Clipper had flown to Hawaii almost a week before from its base on Treasure Island and had waited in Hawaii for favorable weather before making the return trip. A large storm was known to be off the coast of California on the morning of January 20, but Admiral English, Commander of the Pacific Submarine Fleet, and his staff, were due in Richmond, California to attend a very important meeting concerned with submarine warfare. Refinements to be made to new submarines, as well as anti-submarine warfare improvements were to be discussed, and the Admiral carried with him a briefcase containing very confidential notes and papers on the subject. ②

On his orders, the flight was dispatched after the following crew had been rounded up and the aircraft fueled and made ready: Robert Elzay, Captain; Orvan Judd, First Officer; J. R. Maynard, Second Officer; George

Haabel, Third Officer; Leo Mackota, First Engineer, John J. Eagan, Sr., Second Engineer; C. P. Thompson, First Radio Officer; George W. Angus, Second Radio Officer; and John G. Hill, Steward.

George Angus was the Division Radio Superintendent and had been on a long trip throughout the South Pacific inspecting various radio installations, and he was anxious to get home to his family in Oakland. In those days no one deadheaded and took up valuable passenger space and weight, so Angus took the place of the scheduled operator, Jake Stroud, and C. P. Thompson bumped Leon P. Minear in order to get home to his wife who had just had a baby. In addition to Admiral English, there was a sizeable staff with him made up of the following Naval officers: Capt. Robert Smith, Capt. Robert Thomas, Capt. Donald C. Godwin, Cdr John J. Crane, Cdr Francis L. Black, Cdr William G. Myers, Lt Cdr John Coll and Lt Cdr George Stone.

The tenth passenger was a Navy nurse, Edna Morrow. She had been assigned to duty in Hawaii and had worked there some time when she fell ill herself, with cancer. She was awaiting transportation to go home to the States to die, and she filled the last empty seat on the last flight. (3)

The Clipper was dispatched from Honolulu as flight V1104 at 5:30 P.M. (Pacific War Time) on January 20th with fuel aboard for just over 24 hours of flying, since possibility of prolonged holding because of weather was anticipated. Based upon anticipated winds aloft, an estimated arrival time at San Francisco of 10:18 A.M. the following morning (the 21st) was calculated. (4) After takeoff the usual CW radio communications were established and the flight progressed normally until 3:30 A.M. It was usual practice for brief radio messages to be exchanged between aircraft and ground stations even if it was only a couple of distinctive letters every few minutes. If these brief messages were not received by the ground station, the aircraft was assumed to be down and a search was initiated. (5)

At 5:35 A.M. the flight notified the Pan American flight watch office at Treasure Island that V1104 was ahead of schedule, and a new ETA at San Francisco of 6:35 A.M. was given which was some 3 3/4 hours ahead of schedule. Obviously a strong tail wind had been picked up as the Clipper neared the coast, and apparently the Clipper was flying in clear air so that celestial sightings could be made.

Before departing Honolulu the crew had been advised when reaching the California coast that moderate to moderate-intermittent rain, a 1000-ft ceiling and 24-knot winds from the southwest could be expected. At 4:30 A.M. a revised forecast was radioed to the flight stating a front could be expected to move through the San Francisco area at about 8:00 A.M. followed by rain, a 1000-ft ceiling, 3 miles visibility and a SSW wind of 40 knots. A 40-knot wind would obviously make the bay very choppy.

At 6:16 A.M. radiotelephone communication between Clipper and Treasure Island was established, an event which by itself established the fact that the Clipper was not too far from the coast since radio-telephone transmitters were low powered and normally used only for close-in work. At 6:18 V1104 corrected the ETA to 7:10 A.M. At 6:22 Treasure Island gave the flight a surface weather report as follows: "Weather, heavy rain, wind south 44 to 48, ceiling 900-1000, visibility 1 mile to 2 miles. Kollsman 999 millibars." San Diego was suggested as an alternate by Treasure Island since the Clipper could definitely not land before daylight and probably should wait for the expected front to pass through at 8:00 A.M. Flying time to San Diego would be 5 hours more-or-less, but since the plane had fuel enough to remain aloft until 5:30 P.M. The pilot could well afford to wait awhile near San Francisco to see how weather might change and still have the opportunity of going to San Diego. Because of this, the Treasure Island operator was not disturbed when the pilot seemed indecisive about his course of action. V1104 later asked

Treasure Island what weather might be expected if the Clipper waited until daylight. Treasure Island gave the anticipated 9:00 A.M. surface weather as "North Bay weather, light rain, wind southeast, force variable, ceiling 900-1000, visibility 2 miles."

At 6:32 A.M. Treasure Island gave the flight a position report as 37° 29' North, 123° 49' West, and later at 6:50 A.M. gave a new position as 37° 30' North, 123° 22' West. It is not clear just how these fixes were obtained, but it is most likely they were taken with the aid of the Pan Am Direction Finder at Alameda and possibly the government D.F. at Pt. Arena. However, they were taken, and they indicated that the aircraft was making a track of approximately 90° true.

A reading of the CAB accident report is not satisfactory from this point onward, for the facts given do not in the author's opinion, adequately explain the ultimate position of the aircraft. Official reports cannot speculate, but a bit of unofficial speculation may offer a more satisfactory explanation for the pilot's final position near Ukiah.

The flight advised Treasure Island that it was over the Farallone Islands about 25 miles off the coast and proceeding to KPA (now KNBR) near Belmont, California. The CAB report does not indicate the time of this transmission, but using a speed of 150 miles/hour, this would have put V1104 over the Farallones about 7:00 if the previous D.F. fixes were correct. It also indicated that Captain Elzey had either drifted north or turned north since the Farallones lie at 37° 42' N and 123° 0' W.

How the aircraft's position was fixed over the Farallones is also not clear, although D. F. equipment was carried aboard the Clipper and fixes could have been obtained from local broadcast stations. There was no Radio Homing Beacon on the Farallones at this time, although Pan Am pilots had been requesting that one be installed for some time.

At 7:15, V1104 advised Treasure Island that the flight had been over the area but was now taking a course due west. The accident report states that southwest winds of 100 mph could have been expected at 10,000 feet, and if the heading and wind are plotted and a flying time of 15 minutes taken from KPO, the resulting location ends up nowhere near the final crash site.

One can imagine Admiral English being very impatient at the probable delay while holding, or the equally long one which might be caused by going to San Diego, and his reminding the Captain of the necessity for arriving in time for his meeting. One can also imagine the Captain deciding to do what many other pilots had done before by flying out to sea and letting down for a look to see personally just how bad things were. (6) If one further speculates that the 7:15 transmission reporting that the flight had been in the area contained an error and that Captain Elzey had actually continued his turn to the north (started before reaching the Farallones) and taken up a heading of approximately 280°, then the plot places the Clipper near the crash site at 7:30. Not realizing that he had a southwest wind of 100 mph, Captain Elzey would have thought he was several miles off the coast and could safely let down for a look-see.

At the time of the crash, there was speculation the pilot had been trying to land at Clear Lake which was an approved alternate, but this idea cannot be supported too well since Clear Lake is surrounded by mountains and could only be approached VFR. Captain Elzey certainly knew it would be suicidal to approach the lake in IFR conditions.

The last message from the Clipper was 7:20 A.M. requesting a radio "fix". At 7:26 Treasure Island tried to contact V1104 but received no answer. For the next 12 hours Treasure Island, KPO, CAA and other radio stations attempted to contact the flight and weather reports were sent blind until after 6:00 P.M.

At 10:00 A.M., Pan Am notified the CAA and Western Sea Frontier, and a search was organized immediately under the direction of Vice Admiral John W. Greenslade,

Commander of Western Sea Frontier. Army, Navy and Pan Am equipment and employees participated. Early Marshall, a Pan Am radio operator, remembers being called from his home and driving to Treasure Island in weather that was still poor and being loaded in a Navy seaplane as an observer. He flew up and down the area north of San Francisco through snow squalls and apparently flew directly over the wreckage without seeing it. He landed that night on Clear Lake and spent the night. (7)

Mrs. Wallach finally got her phone call through two days after the crash to District Attorney James E. Busch of Mendocino County and followed it up with a letter. Her reports were ignored, for no one really believed the Clipper could have been so far off course, and in addition, there had been other reported sightings all over the San Francisco Bay Area. Finally, on January 30th, 10 days after the crash, someone listened to her. She believed, as did her husband, Charles, that the airplane must have crashed on high ground north of her ranch. A Martin Mariner was dispatched, and just before dusk the Mariner reported sighting wreckage exactly as predicted. The clumsy Mariner could not get down in the canyon to make positive identification, so a Lockheed Electra was dispatched hurriedly from Alameda and flown low over the wreckage. Identification was positive and a ground party started out that very night. By morning the area for several miles around was sealed off by guards who had orders to shoot anyone attempting to approach the crash site. The Booneville to Ukiah road was shut off at both ends, and some of the ranchers could not get to their homes.

The 19 bodies were removed from the burned wreckage and a frantic but fruitless search started for Admiral English's briefcase. The CAB gathered evidence for its investigation, and finally the Navy gave up the search for the briefcase and brought in a bulldozer in an attempt to bury the wreckage. As soon as the carcass was abandoned by officialdom, the sightseers climbed the hill to the wreck and pulled out various bits and pieces. One boy found the missing briefcase not far from the wreck and another a finger ring.

The CAB held closed hearings in San Francisco on February 8 and 9, 1942 as is customary when national security is at stake. The rather dry CAB report laid the blame squarely on Captain Robert Elzey for not having fixed his location properly although Pan Am was also censured for not having more formal holding procedures over San Francisco. The report also recommended installation of the long-requested radio beacon on the Farallones.

AUTHOR'S NOTE: The remains of the Philippine Clipper still lie on the hillside near Ukiah only a short distance from the present Ukiah VORTAC navigation station. Engines, props, big chunks of wing and cabin structure



Author, Charles E. Anderson, by the tail cone from the Philippine Clipper, July 1964. (Photo - C. Anderson)

lie in a heap at the bottom of a ravine. Further up the ravine lies the tail cone and vertical stabilizer. Almost to the summit of the hill the ground is covered with fragments of metal which sprayed the area at impact.

Mrs. Wallach still lives in her small ranch house on the Booneville-Ukiah Road, and she will gladly dig out a box of newspaper clippings about the crash and tell you how the huge airplane looked that morning as it flew just above her house.

FOOTNOTES: (1) Interview with Fred Streib. The entire Wake Island episode is taken from the Kansas City Star, March 22, 1942, Section C, p. 1, and interviews with Fred Streib and Bill Comer who were Pan Am radio operators stationed at Wake and with Fred Canham who was a Pan Am radio operator at Midway. A shorter account of the incident is given in the Stockton Daily Evening Record, December 11, 1941.

(2) Interview with Admiral C. A. Lockwood, May 23, 1964. Admiral Lockwood replaced Admiral English as COMSUBPAC. The interview took place on the mountain summit overlooking the crash site, for Admiral Lockwood often hunts in the area.

(3) Interview with Mrs. Wallach. The nurse's sister visited Mrs. Wallach after the crash and told her the story.

(4) With the exceptions noted, the events from this point onward are taken from the Report of the Civil Aeronautics Board, file No. 1413-43, docket No. AC-4, released June 18, 1943.

(5) Interview with Bill Comer, ex-Pan Am radio operator.

(6) Interview with Captain Tilton. He did not contribute to the author's speculation, but he did confirm the practice of letting down at sea for a look-see.

(7) Interview with Earl Marshall, March 1963.

Other Sources: Various issues of the New York Times; "Flying the Pacific" by William Burke Miller, the National Geographic Magazine, LXX (December 1936); and FROM CRATE TO CLIPPER by William S. Grooch, New York: Longmans, Green and Co., 1936.

Summary

NC 14714, C/N 556, HAWAII CLIPPER: First of three to begin construction but last delivered. Flown much of 1935 as test plane at Middle River, Maryland with license, X 14714. Delivered late November 1935 without name on bow, although names had been assigned in 1935. Pan Am insignia was on bow. Arrived at Alameda, California base December 24, 1935. First service flight, May 2, 1936. Used on San Francisco-Manila run. Christened at Hawaii, May 3, 1936. Later Pan American insignia moved from bow to pylon in rear of pilot compartment. Had wavy American Flags painted on bow and wings in 1938. Lost July 28, 1938 between Guam and Manila. Had 4,808 hours at time of crash.

NC 14715, C/N 557, PHILIPPINE CLIPPER: Delivered to Pan American on November 14, 1935 and Alameda, November 24, 1935. Went into immediate service, San Francisco-Manila, December 9, 1935. Was Clipper used on survey flights to New Zealand, March 23-31, 1937, and Hong Kong where it arrived April 28, 1937. Had wavy American Flags on bow and wings in 1938. Escaped from Wake Island on December 7, 1941 with approximately 20 bullet holes. Carried wound stripe on nose remainder of life. Turned over to Navy early 1942. Assigned BuAer Number 48230 or 48231 but number not painted on. Received war paint and Navy overhaul, straight American Flags on nose and wings. Returned to shuttle service, San Francisco to Honolulu. Crashed near Ukiah, California January 21, 1943. Had 14,628 hours at time of crash.

NC 14716, C/N 558, CHINA CLIPPER: Was last Clipper to begin construction, but first into service. Nicknamed

"Sweet 16" by crews. Accepted by Pan Am on October 9, 1935, with one hour news flight over Maryland. Was flown to Pan Am base at North Beach, Long Island about October 16, 1935. There, it made a series of test flights to various places including at least one 2,400 mile flight to Puerto Rico and Kingston, Jamaica. Before delivery to Alameda, at 2:20 P.M., December 6, 1936, it logged 30,000 miles of test flying. Made first scheduled crossing, San Francisco to Manila and return, November 22 through December 6, 1935. Had wavy American Flags on bow and wings in 1938. Turned over to Navy in early 1942 as BuAer Number 48230 or 48231 but number not painted on. Overhauled and given war paint and straight American Flags on bow and wings in 1942. Retained Pan American Airways' name on side. Operated by Pan Am crews. Returned to Pan Am on October 13, 1943 and used on Miami, Leopoldville run. Crashed at Port of Spain, Trinidad in night landing, January 8, 1945, three weeks after its 10th birthday. In over eight years of Pacific use and one year of Atlantic use, plane flew 3,000,000 miles, averaged 10 hour/day during the war and 5 hour/day before the war. In one period of 7 years, 2 months it flew 15,769.31 hours, 2,400,000 miles, used 2,340,000

gallons of gas, 31,200 gallons of oil and 104 engines, carrying 370,000 pounds of express, 380,000 pounds of mail and 3,500 passengers at an operating cost of \$350/hour. During its life it had only one overhaul. Prior to crash it had one minor accident while refueling when a barge drifted into it causing minor damage. It was even the star of the movie, "China Clipper", which was notable as the first aviation movie ever completed without loss of life. A summary of its travels reads:

1935-1937	12 round trips, San Francisco to Manila
1938	12 round trips, San Francisco to Hong Kong
1939	12 round trips, San Francisco to Hong Kong 2 round trips, San Francisco to Manila 1 round trip, Manila to Hong Kong
1940	13 round trips, San Francisco to Hong Kong 1 round trip, San Francisco to Wake Island
1941	11 round trips, San Francisco to Hong Kong 2 round trips, San Francisco to Singapore 1 round trip, San Francisco to Honolulu
1942	88 round trips, San Francisco to Honolulu
1943-1945	15 round trips, San Francisco to Honolulu 1 trip, San Francisco to Miami Various trips, Miami to Leopoldville.

Beachey's Little Looper

By WILLIS L. NYE

There was only one of her breed ever built. She could be classed as the first biplane primarily constructed for looping the loop and other aerobatic maneuvers by the one and only, incomparable Lincoln Beachey. The Little Looper, as she was affectionately known, proved to have exceptional flight characteristics, high performance, good stability and precise controllability. Her configuration as a biplane was the product of the coordinated design ideas of Lincoln Beachey, Warren Eaton and Art Mix, the latter two being mechanics in the employ of the great pilot. The Little Looper could climb in excess of 1125 feet per minute, and at the time of her construction such a rate of climb was exceeded by only two known foreign airplanes. The first test flight by Lincoln Beachey was made in Chicago, Illinois, where she was built on May 19, 1914.

The Little Looper was constructed so the major assemblies could be assembled or disassembled quickly for the future barnstorming exhibitions around the countryside planned by Beachey's manager, William Pickens. Warren Eaton and Lincoln Beachey, at the time the plane was constructed, were experienced plane builders, in a field of technical science where engineering data was so limited. It may be superfluous to comment, but had Lincoln Beachey not cast aside this little biplane for the black monoplane, his death might have been averted. The Little Looper was a faithful performer and never failed her master.

ENGINE INSTALLATION. The engine installed in the Little Looper was a Gnome, rotary, air-cooled engine, of the monosoupape type which was capable of developing approximately 84 hp. The engine was purchased from the manufacturer in a cash sale by Lincoln Beachey on a hurried trip to France in early 1914. The engine had seven cylinders and revolved about the engine crankshaft at a speed of 1350 RPM at full throttle when using automobile type gasoline. The fuel, prior to use, was meticulously strained through a silk handkerchief to remove any impurities. Engine weight was 205 pounds, including the single magneto ignition, spark plugs, oil pump and the fore and aft engine mounting plates. The engine lubricant was pure castor oil which was mixed with the gasoline.

The throttle for the engine was of the foot type and was mounted directly on the chassis. It controlled the engine timing, which in turn controlled the engine's RPM's.

The engine mount consisted of eight, high-strength steel tubes attached by bolts to a machined engine ring turned to fit the engine mounting plate. The front steel tubes were of larger diameter than the aft steel tubes which were also bolted to the aft engine crankshaft extension ring. A floating steel collar, mounted on annular-type ball bearing assemblies, was located between the revolving engine and the propeller. This floating steel collar was stayed by wire bracing which relieved the engine supports of a major portion of the static weight. By this method of suspension, the front steel tubes were relieved of the weight and existing torsional forces generated when the engine was in operation. Although flimsy by modern design principles, this type of engine mounting served the purpose well without failure.

ENGINE OIL AND FUEL SYSTEM. The engine fuel tank was of the composite type, containing the fuel and the engine lubricant and was mounted under the upper wing in the center section. It was stayed by cable bracing. The fuel tank was built of light gauge steel and had a fuel capacity sufficient for approximately 40 minutes of flight. The tank was compartmented to hold the necessary amount of castor lubricating oil. Each compartment was filled by means of separate fillers. The flow of fuel and engine lubricant was by gravity to the engine carburetor which admitted the fuel to the engine by means of a hollow crankshaft. The lubricating oil was injected in the same manner by means of a two-cylinder engine-driven pump with two distribution ports. Thus, the fuel and oil were mixed together when the engine was in operation. Oil consumption was high, being approximately a half gallon of lubricant for every gallon of fuel. Fuel consumption was close to 80 lbs/hr. Provision was made for the fuel and oil system to function in inverted flight.

WING CELLULE. The wing cellule was simply a rectangular space framework configuration. The wings were of constant chord throughout the span for the upper and lower surfaces. The biplane configuration was of the orthogonal type with neither stagger, decalage or sweepback.