

AIR SAFETY BOARD
of the
CIVIL AERONAUTICS AUTHORITY

PRELIMINARY REPORT OF INVESTIGATION OF
THE DISAPPEARANCE OF AN AIRCRAFT OF
PAN AMERICAN AIRWAYS, INCORPORATED,
IN THE VICINITY OF LATITUDE 12° 27'
NORTH, LONGITUDE 130° 40' EAST,
ON JULY 29, 1938.

In an order dated August 17, 1938, issued by the Secretary of Commerce, pursuant to the provisions of the Air Commerce Act of 1926, as amended, R. D. Hoyt, Aeronautical Inspector, Phil C. Salzman, Airline Maintenance Inspector, and W. T. Miller, Airways Superintendent, International Section, were designated as a Board to investigate the facts, conditions and circumstances surrounding the disappearance of the Hawaii Clipper, an aircraft of Pan American Airways, Incorporated, while flying westbound between Guam and Manila, P. I., on July 28, 1938, and to make a report thereon. Colonel Sumpter Smith and Mr. Thomas O. Hardin of Washington, D. C., were designated as advisory members of the Board.

The Board convened at Alameda, California, on August 18, 1938, and promptly instituted an investigation. After a preliminary survey, the Board deemed it inadvisable to hold a public hearing at that time and a report to that effect was made to the Secretary of Commerce.

Thereupon the Secretary of Commerce directed that the Board be relieved of that duty, and directed that it continue the investigation and deliver its report of such investigation to the Air Safety Board of the Civil Aeronautics Authority, as part of the records of the Department of Commerce transferred to the Civil Aeronautics Authority pursuant to Executive Order 7959 dated August 22, 1938.

The Board, therefore, proceeded with the investigation and reports as follows:

On July 29, 1938, at 0411, Greenwich Civil Time, the Captain of the Hawaii Clipper, an aircraft of Pan American Airways, Incorporated, flying westbound between Guam and Manila, P. I., in regular scheduled foreign air commerce, sent a routine radio position report giving their 0400 G.C.T. position as being Latitude 12° 27' North, Longitude 130° 40' East. This position is approximately 582 nautical miles east southeast of Manila, P. I. The position report was received by the radio operator at Panay, P. I., who was at that time standing radio guard over the operation. Panay acknowledged this report and requested the Clipper to stand by for a routine weather sequence report. The radio operator on the Clipper requested that the report be held up for a minute on account of rain static. Following that request, the radio operator at Panay was unable to obtain acknowledgment of messages sent the Clipper, and since that date no reasonable explanation for its disappearance has been found.

The date and time mentioned above correspond to 12:11 A.M. of July 29th, Local Time at Manila, P. I., and 11:11 P. M. of July 28th, Eastern Standard Time.

At the time of the aircraft's disappearance, it was being flown in scheduled foreign air commerce under a letter of Authority dated September 19, 1936, and carried passengers, mail and express. The crew consisted of the Captain, First Officer, Second Officer, Third Officer, Fourth Officer, Engineer Officer, Assistant Engineer Officer, Radio Officer and Flight Steward.

The Captain, Leo Terletsky, held a current and appropriate Federal Pilot's Certificate of Competency, and the required ratings for the flight involved. His last physical examination as required by the Department of Commerce was taken on April 20, 1938, with a subsequent physical examination taken on July 21, 1938, in conformity with Company regulations for all flight personnel, both of which showed him to be in satisfactory physical condition. Captain Terletsky's record indicates that he had a total of 9,200 hours flying experience, of which 1626 hours had been in trans-Pacific operation. His total flying experience in the Martin, Model 130 Flying Boat, was 1614 hours. His total flying time in the preceding year was 826 hours, and his flying time in the month preceding the start of the subject trip was 6 hours.

First Officer Mark A. Walker held a current and appropriate Federal Pilot's Certificate of Competency, and the required ratings for the flight involved. His last physical examination as required by the Department of Commerce was taken on February 28, 1938, with a subsequent physical examination taken on July 21, 1938, in conformity with Company regulations for all flight personnel, both of which showed him to be in satisfactory physical condition. His record showed that he had a total of over 1900 hours flying experience, 1575 hours of which had been in trans-Pacific operation.

Second Officer George M. Davis held a current and appropriate Federal Pilot's Certificate of Competency (License), and the required ratings for the flight involved. His last physical examination as required by the Department of Commerce was taken on February 14, 1938, with a subsequent physical examination taken on July 21, 1938, in conformity with Company regulations for all flight personnel, both of which showed him to be in satisfactory physical condition. Pilot Davis' record showed that he had a total of 1650 hours flying experience, 1080 hours of which had been in trans-Pacific operation.

Third Officer Jose M. Sauceda held a current and appropriate Federal Pilot's Certificate of Competency (License), and the required ratings for the flight involved. His last physical examination as required by the Department of Commerce was taken on January 7, 1938, with a subsequent physical examination taken on July 21, 1938, in conformity with Company regulations for all flight personnel, both of which showed him to be in satisfactory physical condition. His record showed that he had a total of 1900 hours flying experience, 570 hours of which had been in trans-Pacific operation.

Fourth Officer John W. Jewett held a current and appropriate Federal Pilot's Certificate of Competency, and the required ratings for the flight involved. His last physical examination as required by the Department of Commerce was taken on June 23, 1938, with a subsequent physical examination taken on July 21, 1938, in conformity with Company regulations for all flight personnel, both of which showed him to be in satisfactory physical condition. His record showed that he had a total of 2000 hours flying experience, 700 hours of which had been in trans-Pacific operation.

Engineer Officer Howard L. Cox held a current and appropriate Federal Aircraft and Engine Mechanic's Certificate of Competency. His last physical examination, taken on July 21, 1938, in conformity with Company regulations for all flight personnel, showed him to be in satisfactory physical condition. His record showed that he had over 944 hours flying experience in trans-Pacific operation.

Assistant Engineer Officer T. B. Tatum held a current and appropriate Federal Aircraft Mechanic's Certificate of Competency. He had boarded the aircraft at Honolulu and was on a training flight.

Radio Officer William McCarty held a federal Radio License, First Class. His last physical examination, taken on July 21, 1938, in conformity with Company regulations for all flight personnel, showed him to be in satisfactory physical condition. His record showed that he had 1352 hours radio experience in trans-Pacific operation.

The Flight Steward was Ivan Parker. His last physical examination, taken on July 21, 1938, in conformity with Company regulations for all flight personnel, showed him to be in satisfactory physical condition. His record showed that he had 1200 hours flying experience in trans-Pacific operation.

The passengers were:

Edward E. Tyman, 15 Edgewood Lane, Bronxville, New York
K. A. Kennedy, 2534 Mountain Boulevard, Oakland, California
Dr. Earl E. McKinley, 2101 Connecticut Ave., Washington, D. C.
Fred C. Meier, U.S. Department of Agriculture, Washington, D. C.
Major Howard French, 2560 North East 30th Ave., Portland, Oregon
Choy Wah Sun, 2928 Hudson Boulevard, Jersey City, N. J.

The aircraft, a Martin, Model 130 Flying Boat, was owned and operated by the Pan American Airways, Incorporated, whose principal place of business is 135 East 42nd Street, New York City, N. Y. It was delivered to the operator by the manufacturer at Baltimore, Maryland, on December 27, 1935, and was last certificated as air-worth on July 23, 1938. It bore Federal Certificate of Airworthiness (License) Number NC-14714.

On September 19, 1936, the Department of Commerce granted authority to the operator to utilize this aircraft for the carriage of passengers and cargo in scheduled service between Alameda, California, and Manila, P. I., with intermediate stops at Honolulu, Midway, Wake, and Guam, to a maximum gross weight of 52,000 pounds. The specified conditions included a mandatory provision for the jettisoning (dumping) of sufficient fuel to reduce the gross weight to 42,000 pounds for landing. While in trans-Pacific service, the aircraft completed 35 round trips between Alameda, California, and Manila, P. I.

The total flying time of the Hawaii Clipper prior to departure from Alameda on Trip No. 229 was 4751:55 hours. It had flown an additional 55:56 hours when last reported between Guam and Manila.

The engines, which are overhauled after each three round trips, or at approximately 390 hours, had the following hours of service, since last overhauled, at the time of departure from Alameda:

- | | |
|--------------------------|--------------|
| 1. Left outboard engine | 3:48 hours |
| 2. Left inboard engine | 137:26 hours |
| 3. Right inboard engine | 3:48 hours |
| 4. Right outboard engine | 273:25 hours |

The propellers, which are overhauled at the same periods as the engines had the following hours of service, after overhaul, at the beginning of Trip No. 229:

- | | |
|-----------------------------|--------------|
| 1. Left outboard propeller | 140:41 hours |
| 2. Left inboard propeller | 140:41 hours |
| 3. Right inboard propeller | 3:48 hours |
| 4. Right outboard propeller | 140:41 hours |

The operation and maintenance history of this aircraft has been normal in all respects in comparison with other flying boats operated by the Pan American Airways Company between San Francisco and Manila.

All changes recommended by the Glenn L. Martin Company had been completed on the Hawaii Clipper and there were no incomplete overhaul items carried over to the next arrival at Alameda.

The trip in question was known as Trip No. 229, scheduled from Alameda, California, to Manila, P. I. Departure from Alameda was made on July 23, 1938, the flight arriving at Honolulu on July 24th. On July 25th the trip was continued from Honolulu to Midway on schedule, arriving there July 26th. A scheduled departure was made from Midway on July 26th and the flight arrived at Wake on July 27th. It departed from Wake on July 27th and arrived at Guam at 0555 G.C.T. on July 28th. Departure from Guam was made at 1938 G.C.T. (3:39 A.M. Manila Time) on July 28, 1938, the aircraft actually leaving the water 29 minutes later. Sunset at Manila, the destination, was at 6:29 P.M., Manila Time, thus giving 14 hours and 50 minutes of daylight for the flight. The flight time analysis indicated that in standard cruising at a density altitude of 7800 feet, the flight would take 12 hours 30 minutes. There were 2550 gallons of gasoline on board; and 120 gallons of oil. This amount of gasoline was calculated to provide a cruising endurance of 17 hours and 30 minutes at cruising R. P. M. under the conditions stated above. The aircraft carried six passengers, 1138 pounds of cargo, and was loaded to a gross weight of 49,894 pounds at the time of takeoff.

At 0930 G.C.T., 41 minutes before the last radio contact, there remained aboard the aircraft 1420 gallons of gasoline which is sufficient for 10.1 hours of normal cruising. This would indicate that there was ample fuel aboard to reach Manila and continue the flight for several hours thereafter.

The records show that the trip from Alameda to Guam was uneventful. Weather conditions were better than average, and each leg of the trip was accomplished on schedule. Between Midway and Wake, the course followed was considerably to the South of the regular route due to bad weather along the route and to the north. This procedure is normal, as regular alternate routes are laid out for each leg of the Pacific operation. The route selected for any trip is based on weather forecasts made prior to departure, and may be changed enroute at the discretion of the Captain.

The records also show that the ordinary routine radio contacts were maintained between the aircraft and the shore stations on guard on each leg of the trip. Company procedure requires that a constant guard be maintained by radio stations at the point of departure and destination, at all times while the aircraft is in flight.

Prior to departure from Alameda, the aircraft was inspected, and routine service procedure, known as "long airplane service" and "long engine service" was carried out. The "shore run up report" and engineering flight tests showed satisfactory operation. The Company's routine procedure calls for a test flight of at least three hours on the day preceding departure from Alameda. This flight is conducted by the same crew scheduled to make the trip.

During this flight an emergency landing is made and a routine "abandon ship" drill is carried out. This drill consists of inflating the life raft and getting it over-side, with the crew, emergency equipment and rations aboard. An emergency radio is set up and communication with shore stations is established. All members of the crew have a definite assignment during this maneuver.

During over-night stops at Honolulu, Midway, Wake and Guam the aircraft was serviced and inspected in accordance with routine procedure which calls for "over-night airplane service" and "over-night engine service". The former requires inspection of vital parts and the addition of fuel, oil, water and auxiliary fluids. The latter requires a detailed inspection of the engines, and their controls and installations. No significant irregularities were reported by the Flight Engineer or detected by the respective airport Chief Mechanics.

At Wake Island, the Hawaii Clipper met the Philippine Clipper which was eastbound, both aircraft making a scheduled overnight stop at that point. Testimony from members of the crew of the Philippine Clipper indicates that the entire crew of the Hawaii Clipper were in the best of spirits and that they reported a comfortable and normal trip up to that time.

The trip weather forecast, prepared at 1322 G.C.T., July 28, on the basis of which the aircraft was dispatched from Guam, was as follows:

	Zone 1 Long 145° ⁰ to 140° East	Zone 2 Long 140° ⁰ to 130°	Zone 3 Long 130° ⁰ to 120° East
Weather conditions	Scattered showers	Scattered showers	Scattered Thunder showers
Visibility	Good	Good	Good
Ceiling	2,500 ft.	2,500 ft.	3,000 ft.
Cloud tops	8,000 ft.	8,000 ft.	8,000 to 10,000 ft.
Sea Conditions	Slight	Slight	Slight
Base of Upper Clouds	4 OS AS 14,000 ft.	8 CS AS 14,000 ft.	6 AS 14,000 ft.
Wind at 4,000 Ft.	SW 14	WSW 10	W 12
Wind at 7,800 Ft.	WSW 14	WSW 10	W 12
Wind at 11,500 Ft.	WSW 12	W 10	WNW 10

Remarks: Thunder clouds all zones 14,000 to 16,000 feet.
Widely scattered thunder showers over Archipelago.

The foregoing forecast was issued by the Company Meteorologist, whose headquarters is in Manila, P. I.

Local weather at Guam at 1939 G.C.T., the time of departure from that point, was as follows:

Weather Conditions	-Partly Cloudy
Visibility	-Unlimited
Amount of Clouds	-2/10 - lower 5/10 total
Height of lower clouds	-2,000 feet
Weather for past hour	-Partly Cloudy
Wind	-WSW 6
Barometer	-29.83
Temperature	-80° F
Water conditions	-Moderate

The local weather at Cavite, P. I., at this time, was as follows:

Weather Conditions	-Partly Cloudy
Visibility	-Unlimited
Amount of Clouds	-1/10
Height of lower clouds	-2,500 feet
Weather for past hour	-Partly Cloudy
Wind	-SW 4
Barometer	-29.76
Temperature	-81° F
Water Conditions	-Smooth

Guam upper air at 1830 G.C.T.
was as follows:

Surface	- WSW 6
1,000 ft.	- WSW 10
2,000 ft.	- WSW 14
3,000 ft.	- WSW 17
4,000 ft.	- WSW 18
5,000 ft.	- WSW 19
6,000 ft.	- WSW 21
7,000 ft.	- WSW 18
8,000 ft.	- WSW 19
10,000 ft.	- WSW 17

Cavite upper air at 1700 GCT
was as follows:

Surface	- SW 3
1,000 ft.	- W 10
2,000 ft.	- W 16
3,000 ft.	- W 16
4,000 ft.	- W 15
5,000 ft.	- WSW 21
6,000 ft.	- W 11
7,000 ft.	- W 12
8,000 ft.	- WSW 20
9,000 ft.	- WSW 12

Radio facilities at Guam consist of a Company Station KMBC. Other stations standing guard on the operation between Guam and Manila were Panay KZDY and Manila KZBQ. In addition, other Pan American Airways radio stations in the Philippine Islands were standing watch. The aircraft was equipped with two independent transmitters, either of which could be used for communicating on assigned frequencies or on the international distress frequency of 500 kilocycles. Radio communication was maintained in a normal manner up to 0411 G.C.T. At that time a routine report was sent by the Clipper giving their position at 0400 G.C.T. (12 Noon Manila Time).

The message was as follows (all communications are in code and messages quoted are interpretations):

"Flying in rough air at 9100 feet. Temperature 13° centigrade. Wind 19 knots per hour from 247°. Position Latitude 12°27' N. Longitude 130°40' E dead reckoning. Ground speed made good 112 knots. Desired track 282°. Rain. During past hour cloud conditions have varied. 10/10ths of sky above covered by strato cumulus clouds, base 9200 feet. Clouds below, 10/10ths of sky covered by cumulus clouds whose tops were 9200 feet. 5/10ths of the hour on instruments. Last direction finder bearing from Manila 101° True."

The radio operator at Panay acknowledged this message and indicated that he wished to transmit weather sequence reports based on observations compiled at 0400 G.C.T. by the Philippine Stations and relayed to him in accordance with Company procedure. The radio operator on the Clipper replied as follows: "Stand by for one minute before sending as I am having trouble with rain static."

The radio operator in Panay again called the Clipper at 0412 G.C.T., giving him the weather sequences. This message was not acknowledged. The radio operator at Panay continued calling the Clipper until 0415 G.C.T., at which time he sent the Clipper's 0400 G.C.T. position report to Manila. At 0435 G.C.T., the Communications Superintendent, Pacific Division, Alameda, Calif., was notified of the failure of communication between ground stations and the Clipper. All Philippine stations were requested to stand by on emergency communication frequencies at 0449 G.C.T. This is a standard emergency procedure which is followed whenever there is an interruption of communication between shore stations and the aircraft on which they are standing guard. Such interruptions occur from time to time and while they occasion no alarm, the emergency procedure is put into effect as a matter of routine.

At 0900 G.C.T. (5 P.M.) the Clipper was due at Manila. Up to that time, while some alarm had been felt, it was believed that she might be proceeding to her destination with the radio out of commission. As soon as she was overdue, the Naval Commandant, at the request of Pan American Airways, ordered all Navy vessels at Manila, to stand by for maneuvers. At 1030 G.C.T. (6:30 P.M.) all Navy vessels were ordered to refuel and prepare to put out to sea. At 1600 G.C.T. (midnight) 13 vessels were under way to begin a search for the missing aircraft.

The nearest surface vessel at the time was the United States Army Transport "Meigs", which at 0411 G.C.T. was approximately 103 miles west north-west of the Clipper's last reported position and headed east. Upon receipt of a report that shore stations had lost contact with the Clipper, the Meigs altered her course at 0740 G.C.T. (3:40 P.M.) Manila Time, and proceeded to the Clipper's last reported position, arriving in that vicinity at 1400 G.C.T., July 29 (10 P.M.) Manila Time.

A search was conducted in the vicinity for approximately three hours. Following that time, the search was conducted over various areas throughout that night, and the following day, in accordance with instructions from Pan American Airways. At 0910 G.C.T. (5:10 P.M.) Manila Time on July 30, an

oil slick was discovered about 28 miles south southeast of the Clipper's last estimated position. This slick was variously estimated by officers of the Meigs to be from 500 to 1,500 feet in diameter and roughly circular in shape.

The area in the vicinity of the slick was carefully searched and a small boat was put over in charge of Second Officer J. A. Harrington, for the purpose of obtaining samples of oil from the slick. Due to the limited amount of time before darkness, only a small sample of oil was obtained. The Meigs remained hove to during the night in the hope of being able to pick up the slick again in the morning. The log of the Meigs shows that at the point the slick was found, there was a current set of 140° True at the rate of about one knot per hour. At daylight, on July 31, the Meigs attempted to relocate the slick on the theory that both the slick and the Meigs would have drifted approximately the same distance during the night. No sign of the slick was discovered and at 3:18 P.M., Manila Time, the Meigs set a course to return to the original position of the oil slick. Another search was made in that vicinity but no trace of oil was found.

Following that time, an intensive search over a large area of the ocean was conducted by the Meigs, Navy destroyers and submarines, and by Army and Navy aircraft. Other surface vessels in that part of the Pacific lent their assistance. A search of the shores and interior areas of Luzon and Mindanao, and other smaller islands of the Philippine group, was conducted by Army bombers and Navy amphibians.

During the period of the search there was no surface winds reported over 6 to 8 miles per hour, and the sea was exceptionally calm. This condition was ideal for the search for small articles such as should have been floating on the surface, and the aircraft crashed in that area, or for oil, which, in the event of a crash, would have been released in large quantities.

The search was continued until August 5, at which time the searchers felt that every possible theory as to the location of the Hawaii Clipper had been exhausted, and the search was abandoned.

An employee of a telephone company, who lives on the Island of Lahuy, is reported to have heard a large airplane flying above the clouds about 3 A.M. Manila Time, on July 29. As a result of this report, a careful aerial search was made of the Island of Lahuy and nearby areas. It was also ascertained that there were no Army, Navy or private aircraft in that vicinity on that date.

Weather reports from nearby Pan American Airways Stations indicate that at the time there was an overcast, with a ceiling of about 2,500 feet, and light rain.

Lahuy is a small island lying East of and close to the Southeastern tip of Luzon, and is directly on the course from the Clipper's last reported position to Manila. At normal cruising speed the Clipper should have reached that vicinity at approximately 3:46 P.M. (Manila Time). Luzon is the largest island in the Philippine group. The Southern part of Luzon and the larger islands in the vicinity, are moderately well settled. There are, however, large areas of tropical jungles and mountain ranges which rise to an altitude exceeding 7000.

The sample of oil obtained from the slick was placed in two glass jars and delivered to the U.S.S. Paul Jones. One of the samples was tested for lead content in Manila. The result was negative. The residue of this sample and the untouched sample were sent to New York for complete analysis. The samples amounted to less than 3 cc's each, which made it impossible to analyze in the usual manner; however, an investigation of the properties of these samples was conducted by chemists who were selected for their ability in this particular kind of work. At the completion of these tests they were able to announce definitely that the oil recovered from the slick was not the type of oil used in the engines of the Hawaii Clipper.

The Meigs arrived in San Francisco while the Board was in session at that point and before the laboratory tests had been made. Tests were conducted in San Francisco Bay in the presence of officers of that vessel and officials of Pan American Airways Company in an effort to identify the oil in the slick. These tests consisted of dumping samples of various kinds of oil on the surface of the waters of the Bay under conditions that approximated as nearly as possible, those existing in the Pacific Ocean on July 30. As a result of these tests, the following facts were ascertained.

- (1) - Any oil dumped on the water produces a film of the same general appearance.
- (2) - The odor of high test gasoline does not remain in an oil slick more than a few minutes. This was ascertained by drawing a cloth through the slick produced from the mixture of used engine oil and 87-octance gasoline. The film adhered to the cloth, but when drawn into the boat there was no noticeable odor of gasoline remaining, even after so short a time as five minutes. This fact is mentioned because the officers of the Meigs testified that a strong odor of gasoline was noticeable at the time they were obtaining samples of oil from the slick.

Since the officers of the Meigs had handled the sample obtained and had observed its characteristics after it had been placed in two small glass jars, the following experiments were made:

Small samples of various oils were placed in glass jars. The jars were then filled with sea water and shaken up and the result was observed for characteristic beading, odor, color and tendency to emulsify. In the opinion of the observers, none of the oil so treated appeared to duplicate the appearance or characteristics of the oil taken from the slick. It was particularly noticeable that in the experiments made with samples of new and used engine oil, the color was found to be radically different from that of the oil taken from the slick. There was aboard the Clipper 120 gallons of engine oil and a variety of other oils in small quantities; therefore, in the event of a crash, the engine oil would predominate.

SUMMATION

In reviewing the evidence, it appears to the Investigating Board, that:
1. The captain and members of the crew were qualified and physically fit.
2. Trip No. 229 progressed normally from Alameda to Guam. Inspections made at Division points along the route show that the aircraft, engines and instruments were functioning properly.

3. The aircraft and its equipment were in an airworthy condition when it departed from Guam.

4. The flight was properly dispatched from Guam to Manila in accordance with regular Company procedure.

5. Radio conditions, i.e. atmospheric conditions, were not unusual, and while communication with the plane was occasionally difficult, at no time during the trip from Alameda to Guam was communication lost. The flight from Guam west proceeded normally, and the radio equipment aboard continued to function satisfactorily until 0411 G.C.T. on July 29, 1938.

6. There was a failure of communication between the Clipper and shore stations immediately following 0411 G.C.T.

7. A wide-spread and intensive search by surface vessels and aircraft failed to disclose any evidence as to the whereabouts of the Clipper.

8. The chemical analysis of the oil sample obtained by the officers of the U. S. A.T. Moigs definitely establishes the fact that there is no connection between the oil slick discovered by them and the disappearance of the Clipper.

9. The report from the Island of Lahuy, that an aircraft was heard flying in that vicinity above the clouds on the afternoon of July 29, cannot be ignored.

10. Due to the character of the terrain, the Board is not prepared to say that the aerial search of Lahuy and other areas in the islands can be considered as conclusive.

11. The reward offered by the Pan American Airways Company for information concerning the Clipper should stimulate the search by land, and may produce results.

In conclusion, it appears that the only definite facts established up to the present time, are that between 0411 and 0412 G.C.T. on July 29, 1938, there was a failure of communication between the ground and the Clipper; that communication was not thereafter reestablished; and that no trace of the aircraft has since been discovered. A number of theories have been advanced as to the possible basic cause of or reason for the disappearance of the Clipper. The Board has considered each of them. Some have not been disproved, others have been contradicted by the known facts. However, the Investigating Board feels that this report cannot properly include a discussion of conjectures unsupported by developed facts. The Board, therefore, respectfully submits this report with the thought that additional evidence may yet be discovered and the investigation completed at that time.

Robert D. Hoyt - Chairman

Phil C. Salzman - Member

A. T. Miller - Member