

# *TIGHAR TRACKS*

THE JOURNAL OF THE INTERNATIONAL GROUP FOR HISTORIC AIRCRAFT RECOVERY





*... that they might escape the teeth of time and  
the hands of mistaken zeal.*

— JOHN AUBREY  
STONEHENGE MANUSCRIPTS  
1660

**TIGHAR** (pronounced “tiger”) is the acronym for The International Group for Historic Aircraft Recovery, a non-profit foundation dedicated to promoting responsible aviation archeology and historic preservation. TIGHAR’s activities include:

- Compiling and verifying reports of rare and historic aircraft surviving in remote areas.
- Conducting investigations and recovery expeditions in co-operation with museums and collections worldwide.
- Serving as a voice for integrity, responsibility, and professionalism in the field of aviation historic preservation.

TIGHAR maintains no collection of its own, nor does it engage in the restoration or buying and selling of artifacts. The foundation devotes its resources to the saving of endangered historic aircraft wherever they may be found, and to the education of the international public in the need to preserve the relics of the history of flight.

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### COVER:

*This photo of Amelia Earhart was taken sometime after October of 1936. How do we know? See "The Earhart Electra" starting on page 17. Photo courtesy Purdue University Library Special Collections. Used by permission.*

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*Our sincerest thanks.*

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## SPECIAL ANNOUNCEMENT

**WE HAVE SET FOR OURSELVES THE GOAL OF ENDING THE  
AMELIA EARHART MYSTERY BY JULY 2, 1997, THE  
60TH ANNIVERSARY OF HER DISAPPEARANCE.**

You'll notice that we say "end the mystery," not "solve the mystery." There's a difference.

We are convinced that TIGHAR has already solved the basic mystery of what happened to Amelia Earhart and her navigator, Fred Noonan. They landed and died on the remote, uninhabited island of Nikumaroro. However, we also recognize that the evidence recovered so far has not been adequate to convince the general public and (perhaps more to the point) the media sufficiently to end the mystery. Indeed, the four years since TIGHAR's return from the Pacific have seen a rebirth of groundless speculation about Earhart's fate.

We feel that sixty years is long enough for the facts of the Earhart disappearance to be clouded with myth and legend. Accordingly, TIGHAR's Executive Committee and Board of Directors is now fine tuning a comprehensive two-year program designed and budgeted to:

- **Return to Nikumaroro in 1996** to find and recover additional components of the Electra as well as other artifacts and, if possible, human remains.
- Perform the post-expedition analytical work, write the reports, obtain the impartial expert endorsements, prepare the press releases, and produce the videotapes necessary to **truly end the mystery once and for all by July 2, 1997.**



It will cost an estimated one million dollars, about the same amount TIGHAR has already raised – and spent – on the project. Naturally, we don't need all of that money immediately and, in fact, the budget has been set up as a series of reasonable quarterly amounts. **We're asking our members to help us meet the first goal.**

As with all campaigns, the first money is not the biggest money, but it is the most important money. It's the war chest that pays for the production of the written and visual materials that are the ammunition of fund raising. It's the seed money that buys the time and the travel needed to bring in the big corporate and individual contributions. It's the snowball of personal endorsement that starts the avalanche of popular support. And **it can only come from within TIGHAR, from those who already know and are a part of TIGHAR's ability to make things happen.**

Our first quarterly goal is \$76,655.39. This is where it starts and **now is when we need your help.** What will come later – the ship, the team, the technology, the discoveries – all rely upon our ability to implement the plan that will make it real. And although no one but us will probably ever give you credit for it, **your contribution now is what will ultimately replace sixty years of speculation with incontrovertible fact.** Please use the enclosed *Once And For All* card to make your donation to the Niku III Project Fund. You may charge your contribution to VISA or MasterCard if that is more convenient for you – just use the charge slip enclosed. Thanks for your help.



## The TIGHAR Cub Fund

One of the United States' best known aviation insurance agencies, Ed Marshall Insurance of Salem, VA has become the sponsor of an important new TIGHAR program. Recognizing the educational value of TIGHAR membership for young aviation enthusiasts, company president Tom Cook (TIGHAR #0510) has made a special contribution which allows TIGHAR to extend complimentary membership to students who could not otherwise afford to join. Like the Chris Hollinger Memorial Scholarship for graduate studies, the TIGHAR Cub Fund is an expression of TIGHAR's commitment to aviation historic preservation education. Earmarked contributions to either fund are always welcome.





# CHARIOTS IN A PHAROAH'S TOMB

## Project Reports

**T**he prospect of World War Two German aircraft surviving intact in sealed underground hangars is irresistible. Prefaced by cautionary glances, told in hushed tones and received with knowing nods, the stories tell of children who crawl down ventilation shafts to play on airplanes underground; of photographs said to show fighters in flooded vaults standing up to their wingroots in water; of mysterious sub-basement stairways which lead to sealed metal doors. Seldom is the teller a direct witness but has usually received the information from some other source considered to be unimpeachable.

In 1986 TIGHAR took on the formidable task of running these tales to earth (so to speak) to determine if any of them might be true. Dubbed Operation Sepulchre, the

project began with archival research in Germany which soon turned up Nazi documents establishing beyond doubt that subterranean aircraft shelters were, indeed, built. Unfortunately, however, their specific locations were not always clear. A search of U.S. Army records showed that several underground aircraft production facilities were found, thoroughly investigated, and ultimately destroyed by the invading Allies in 1945. The question remains, did others go undiscovered or were some perhaps sealed up rather than destroyed? Luftwaffe veterans interviewed by TIGHAR unanimously dismissed the notion as ridiculous. It was apparent that only a relentless case by case investigation would reveal the truth.



*A Messerschmitt Bf 110 waits in the night for its next mission. Do others still wait in the darkness of sealed underground*



To date, Operation Sepulchre has looked into a number of sites:

## **KASSEL**

Sealed doors leading to underground hangars were rumored to be found somewhere in or near this ancient city in the district of Hesse. During the war, Kassel was the site of several aircraft production plants and suffered terribly under Allied bombing, so it seemed logical that some kind of underground aircraft facility may have been built there. However, on-site research in 1986 by TIGHAR Executive Director Richard Gillespie and President Patricia Thrasher failed to turn up any local corroboration of the story nor any likely location for the alleged doors. Subsequent research in the U.S. revealed that a nightfighter airfield near the suburban town of Rothwesten had, late in the war, featured an aircraft assembly operation and some thought was given to someday returning to inspect that location.

## **ESCHENLOHE**

The possible survival of a known wartime Messerschmitt facility in a walled up road tunnel near Eschenlohe in Bavaria was investigated by Stephan Wilkinson (TIGHAR #0180E) in 1987. Another dead end – the tunnel had been gutted and was once more in use.

## **WALHALLA**

In 1988 came a bizarre tale of how, in the final days of the war, a group of boys manning a flak battery helped hide three Me262 jet fighters in a bunker below Walhalla, an incongruous replica of the Parthenon near Regensburg. The nearby location of an Me262 assembly plant and some unaccounted for irregularities in the hillside below Walhalla made the story worth checking out. Albrecht Weissman (TIGHAR #0360L) conducted an in-depth investigation which turned up serious flaws in the original tale and revealed the suspicious ground contours to be abandoned 19th century construction work. Once again – good story, good scholarship, dead end. (See *TIGHAR Tracks* Vol. 4, #2 for the full write-up.)

## **MAINZ-FINTHEN**

In 1991 we heard that, in the early 1970s, a crew chief with a U.S. Army helicopter unit, a “Specialist Palshaw,” had taken photographs of German aircraft in a flooded underground hangar at a former Luftwaffe airfield. Tom Palshaw, as it turned out, had only heard about the photos of the airplanes long rumored to be hidden beneath the airfield at Mainz-Finthen. Since becoming TIGHAR #1290C, Tom has led the investigation of this site and, with the help of TIGHAR’s premier European researcher Lou Schoonbrood (TIGHAR #1198) has solved some, but not yet all, of the field’s mysteries. Here is the result of their detailed and fascinating research.

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**S**ituated on a triangle of land formed by the town limits of Finthen, Wackernheim, and Ober Olm, the estate which became Luftwaffe Mainz-Finthen was formerly known as “Layenhof” after the large farmhouse which still stands at its northwest corner. In early 1938 the land was purchased by the Luftwaffe and, in May of that year, the construction of a flying field was begun under the codename Schafheide (sheep pasture) Ober Olm. By April of 1940, when the RAF began its nighttime bombing of German cities, the sheep pasture was operational and known to Allied intelligence as Ober Olm A/D, Mainz-Wackernheim, or simply Y-64. Throughout the war a succession of nightfighter units including IINJG3 (the second Gruppe of Nachtjagergeschwader Three), IVNJG4, INJG6, IINJG5, and possibly IIINJG4 was based at the field. Most flew the Messerschmitt Bf 110-G4, sometimes with devastating results, as on the night of March 30, 1944 when Mainz-Finthen’s CO, Oberlt. Martin Becker, shot down seven RAF bombers. Such success did not go unrewarded and, before long, Mainz-Finthen began receiving visits from both the RAF and the 8th Air Force. In September, the Layenhof farmhouse became an Außenkommando (roughly, branch office) of an SS Sonderlager (special camp) provid-

ing slave labor for the filling of bomb craters and other work.

By February 1945 only a few Luftwaffe planes were left on the base. The base was bombed, but none of the planes was hit because they had been camouflaged in the nearby Ober Olm forest road. The Germans withdrew from the base on March 16, 1945. Patton's Third Army rolled in four days later and soon Mainz-Finthen was a forward base for several 9th Air Force fighter squadrons. After the war the base was in the French Zone and, in 1949 and 1950, the Armée de l'Air leased the Layenhof farmhouse. The base next became a U.S. Army airfield and remained so until returned to German civilian control in 1994.

**A**lthough the presence of underground hangars was "common knowledge" among U.S. Army personnel based at Mainz-Finthen in the 1970s, a more objective examination of the possibility is less encouraging. The planning and construction of such facilities would have necessarily involved the Organization Todt (the state heavy construction group) or the Reichsministerium für Rüstung- und Kriegsproduktion (Reich Ministry for Munitions and War Production). Both of these organizations kept meticulous records which, for the most part, survived the war. An archival search has produced no evidence of plans or intentions to build underground aircraft facilities at Mainz-Finthen, let alone their actual construction. However, an underground barracks for 200 men of the Wachmannschaft (guard regiment) was built there by the Organization Todt in 1943, and in 1944 slave labor was used to build an extensive underground drainage system for the airfield.

One of those laborers, Klaas Harman, attests that during his stay at Mainz-Finthen as a guest of the SS he was forced to dig trenches for sheltering personnel during air raids. He also chopped trees to clear hiding places for aircraft in the woods, but he had no knowledge of underground facilities.

After the war the USAAF did an evaluation of Luftwaffe airfields in this section

of Germany. An excerpt from that report is reproduced below.

#### *"Introduction.*

"It is very clear that in their peace-time construction activities, the Germans did not appreciate or anticipate the possibility of attack from the air. The principle of dispersal of hangars and buildings was not practiced. Hangars were grouped close together in neat rows, with barracks and other buildings in near proximity, presenting a concentrated target.

"The investigation of the defenses of Frankfurt and the vicinity was made during the periods 16 Apr to 27 Apr 1945, and 28-29 June 1945. The investigation included aerial reconnaissance and ground inspections of air defense installations covering the area bordered by Wiesbaden and Mainz, Geissen, Hanau and Frankfurt. Throughout this area installations were found thoroughly destroyed or demolished.

"In airfield defenses the predominance of fire power was placed on the runways and reliance was placed on extensive dispersal areas and concealment offered by wooded areas to provide protection to parked aircraft.

"It is important to appreciate that G[erman] A[ir] F[orce] operations were not in any way restricted by the numbers of airfields available, which were sufficient for a force with a greater frontline strength than that of the GAF at any time.

#### *"Fuel Storage.*

"Fuel storage tanks were placed underground at the edge of the landing ground. The storage tanks were usually found in pairs about 20-50 yards apart, well insulated to remove all chance of sparks from static electricity. *[Note: In the 1970s, two U.S. Army soldiers searching for the underground hangar found a trap door with stairs leading down into the darkness. Starting down the steps, they lit a match to illuminate the area. It was a fuel tank. When it blew it spit them out some distance and opened up three tanks with 18" walls of concrete. They both survived, but this does illustrate the dangers of uninformed searches. TP.]*

### *“Dispersals.*

“Many dispersals were constructed by cutting gaps in hedges of neighboring fields or along the edges of roads. At some fighter fields, aircraft would taxi down roads three and a half miles to dispersal areas in woods. This was particularly true at jet airfields.

“During the spring of 1944, new types of revetments for fighter planes were devised. These were circular in plan, with a circular roof of reinforced concrete supported by a central pillar. The roof was designed to be fifteen feet thick, but owing to a lack of material, it was made only nine feet thick. The roof was at ground level, and aircraft entered down an inclined ramp.

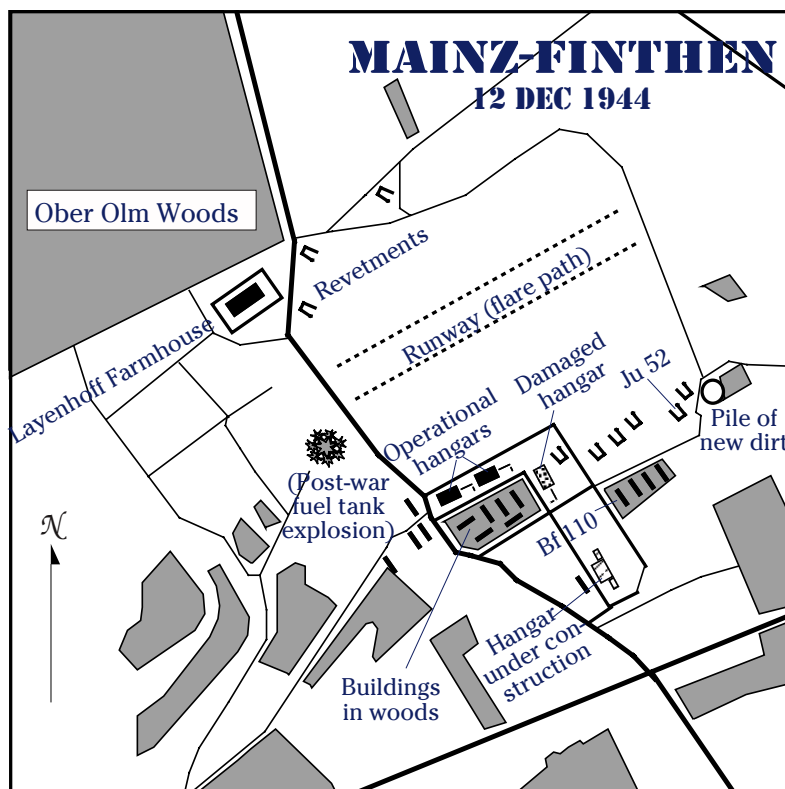
“The defense of airfields located at ... Wackernheim, co-ordinate M-290518, all followed the practice of providing the runway with maximum protection. Very little protection was allotted the dispersal areas of these fields. However, it was noted the plane parks and weapons were frequently sited close together.”

**T**he mushroom-shaped underground shelters described in the USAAF report are referenced in Nazi documents as a design developed by Xaver Dorsch of the Organization Todt and known as *Pilse für Jäger* (mushrooms for fighters). The question, of course, is whether any were built at Mainz-Finthen. To investigate that possibility TIGHAR researchers compared two sets of Allied aerial reconnaissance photos. The first set, taken by an RAF Mosquito on 27 May 1944, shows hangars, revetments and thirteen twin-engined fighters parked in the open. The second set (upon which the diagram at right is based) was taken on 12 December 1944 by the US 9th Air Force 31st Photo Recon Sqdr., a unit which would coincidentally be based at Mainz-Finthen the following April.

The effects of Allied attacks during the intervening seven months is evidenced by bomb craters and hangar damage, but is most apparent in the fact that the only aircraft visible at this active home-defense airfield are a disabled Ju 52 transport in a revetment and a Bf 110 parked in the woods. Where are the night-fighters? Hidden in the woods? Or is a huge and inexplicable pile of fresh dirt at the southeast corner of the field evidence of another way to protect the aircraft? Whatever the answer, a computer analysis of the photo failed to show any sign of an underground hangar.

### **SUMMARY**

It is clear from TIGHAR’s research that the Luftwaffe had no advance plans for secure, hidden shelters at Mainz-Finthen and, as late as May of 1944, was not actively camouflaging the aircraft based there. Seven months later, virtually all of the airplanes were out of sight. With the thick Ober Olm woods nearby, and a cement shortage throughout Germany, what would have been the motivation to build an expensive, labor intensive underground hangar?





## ROTHWESTEN

The spring 1995 issue of the magazine *American Heritage Invention & Technology* carried an article about TIGHAR which prompted Dr. William Gore to write to us about his experiences at a former Luftwaffe airfield near Kassel, Germany. At the time he wrote the letter (reproduced below) he had no idea that we had already become suspicious that Rothwesten might be where the Kassel rumors originated.

**D**uring 1960-1962 I was stationed at an ex-Luftwaffe airbase on the top of a hill near the villages of Rothwesten and Knickhagen to the east of Kassel, Germany. The airfield was no

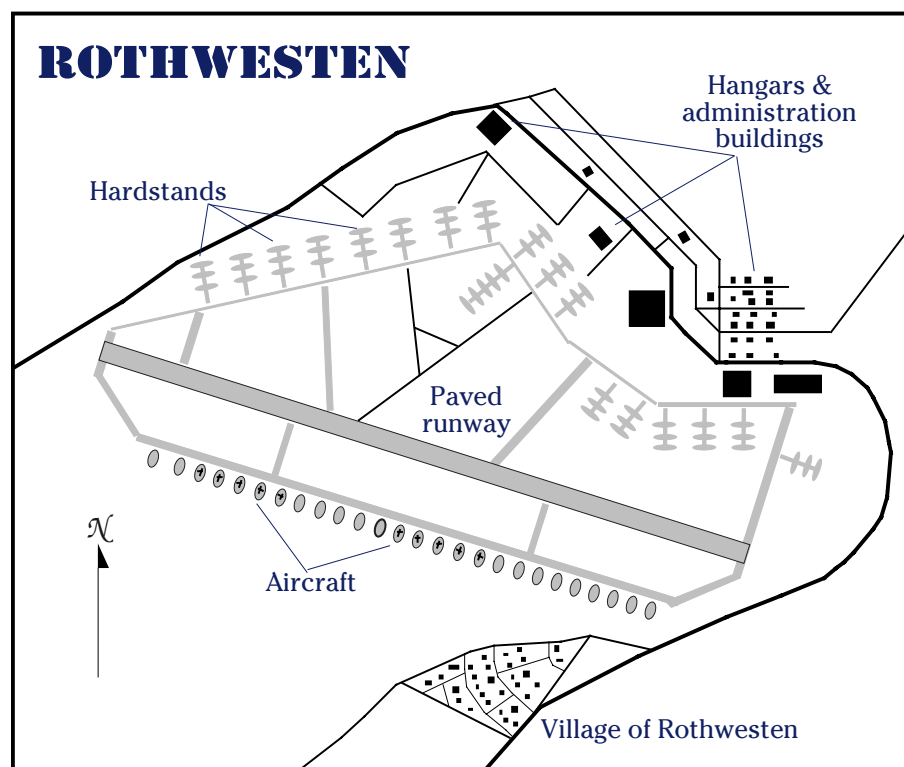
Warning Squadron (AC&W) also stationed at Rothwesten.

**O**ne of the legends that newly arriving ASA and AC&W personnel heard was that although the airbase was now defunct, hidden deep inside the hillside were several Luftwaffe airplanes (“fighters”). But during the war, when the airbase had been overrun by General George Patton’s troops, the Nazis had booby-trapped the subterranean compounds. After the death of several U.S. Army Engineers by these booby traps (so the story went) orders were given by the U.S. command to seal the underground hangars by welding the steel access doors shut, thus entombing the planes and other equipment forever.

The main above-ground barracks area of the Rothwesten airbase consisted of a series of very attractive three-story, Tudor-style native stone buildings built around individual courtyards. Every building had a basement, but some buildings had what appeared to be sub-basements which were reachable by stone stairwells. Each of these terminated at the bottom in a solid steel door from which the door handle had been removed. The doors themselves had been welded to the surrounding metal frames. Behind those doors, we were told, lay some of the remnants of the Luftwaffe, so the legend

went. Embellishment even went so far as to intimate darkly that dead German aviators lay within, killed by Patton’s troops. No one was ever given access, however.

Local German citizens in the immediately nearby villages of Rothwesten and Knickhagen (farmers, shopkeepers, Gasthaus owners)



The undated aerial photo upon which this TIGHAR diagram is based shows the airfield at Rothwesten to be a full-blown *Fliegerhorst* (literally *flyer's nest*) with hardstands for over 100 aircraft, even though only about ten airplanes are visible.

longer operated, or operable as such, owing to the establishment of a large antenna field that had been erected on it. The antennae served the communication operations of the 184th United States Army Security Agency Company (USASA), at that time attached to Fifth Corps, United States Army Europe (USAREUR), and a US Air Force Aircraft Control and

either confirmed or embroidered upon, depending on one's outlook, this hidden subterranean airdrome (without the associated melodrama). This, remember, was 1960-62, and many of the people voicing this belief also retained vivid memories of the war, including the daylight and nighttime fire-bombing of the city of Kassel that they watched from their hillside viewpoint, and the scramble of the German air force planes from Rothwesten to intercept the Allied bombers.

How much of this legend was truth and how much fiction I never determined. Pointed questions to U.S. officers on the base usually produced evasive or obviously unknowing or indifferent answers. Nobody with any rank seemed really to care inasmuch as nothing could be done about it even if it were true. In those days of the cold war their concerns were directed toward the East German and Russian military.

To supplement my Army paycheck I tended bar during my off-duty hours on the weekends in the Enlisted Men's club at Rothwesten. The head bartender, a forty-something German ex-soldier or airman whose name I have regrettably forgotten, was either 1) a disabled ex-Luftwaffe pilot; or 2) served at the airbase during the War; or 3) had been discharged from the eastern front because of his wounds and returned to his home in the area where he learned about the legend. Take your pick. He informed me on several occasions that the underground air force story was true, insofar as he was able to confirm it, because he, too, had been forbidden to pass through the steel doors into the concrete bunkers beyond during the war. I mention this because he was, to my assessment, not the kind of guy who would bullshit about something like that – he had seen too much of the war to have to make anything up. Some of his other war stories would permanently curl your hair.

So there you have it. My recollections, such as they are, have been greatly blunted by some three decades of passed time, and were to all intents and purposes forgotten until I read the brief article in *Invention & Technol-*

ogy on TIGHAR. I do know this. At the time I was stationed there, there were stairwells to nowhere in some of the buildings, leading down to handle-less steel doors. There were above-ground structures that (to my impressionable mind at least) resembled air-vents at different places on the post. The motor-pool building was an old airplane hangar. And the German locals, who would (seemingly) have nothing to gain in fabricating the story, made some very convincing statements. If it is just a legend, it's a damned good one, and one that I'll always remember as a curious and intriguing part of my military service.

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## QUESTIONS

Do Dr. Gore's sealed doors still exist? If so, can permission be obtained to open them? If the tales of booby traps are true, is that such a swift idea? Obviously, more research is needed. What is the present ownership and administration of the Rothwesten facility? Can German wartime records be found to document an underground facility there? Do U.S. Army archives include an account describing what happened when the airfield was captured?

## ANSWERS

TIGHARs who would like to help with this research should contact Executive Director Richard Gillespie for additional information.



# Rates & Measures

## TIGHAR LOOKS AT AVIATION HISTORY PERIODICALS

The review and rating of a magazine is necessarily a subjective process. As editors and writers of *TIGHAR Tracks*, we (that's the editorial "we") did not feel it was appropriate to simply give our opinions on other publications. So we asked for help from some of our members, and publish the results here in two formats: a brief text review, and a table of check marks à la *Consumer Reports*. We (still the editorial "we") hope you (the reader "you") will find this compilation as useful and interesting as we did.

*American Aviation Historical Society Journal and Newsletter*. Reviewed by Capt. W. E. Scarborough, USN (Ret.), TIGHAR #0075, Atlantic Beach, Florida.

MY ASSOCIATION WITH THE AAHS AND ITS *JOURNAL* and *Newsletter* began in the 1960s and, to the best of my knowledge, has been a mutually satisfactory one since then. With few exceptions, the publications have been delivered on schedule. The entire operation is staffed by volunteers, but the appearance and content of both publications is thoroughly professional.

The focus of the publications is American aviation. Articles are accepted on American aircraft and personnel in foreign service. Most articles are written by member/enthusiasts, with excellent bios given at the end of each article. The *Newsletter* is 16 pages, and contains letters to the editor, air show and air race reviews, book reviews, and membership information. The *Journal* is focussed on scholarly articles, biographies, photos, and short pieces by members. No payment is made for submissions, but credit is scrupulously given. The *Journal* and *Newsletter* are available only with membership in the AAHS.

[Editor's Note: The rating table covers only the *Journal*.]

*Bill Scarborough is a nationally-renowned authority on the PBY and has written extensively for publication in the AAHS Journal and elsewhere.*

*Air & Space Smithsonian*. Reviewed by Geoffrey S. Hurlbut, TIGHAR #0242CEB, Bloomfield, New Jersey.

EACH ISSUE OF A&S OFFERS THE READER a hefty and well-rounded selection of topics from balloons to ballistic missiles. Through the several years I have subscribed to the magazine, I have found no particular era receiving more attention than any other. As the publication of the National Air & Space Museum, the articles can be expected to examine the socio-political forces affecting aircraft and aerospace equipment development (or vice-versa) more than other publications. The magazine is well-staffed with contributing editors including Freeman Dyson, Stephan Jay Gould and other notables.

The writing is always top-notch, and the illustrations are primarily color and black and white photographs, with a scattering of paintings or illustrations. Occasionally the treatment (colorizing or sepia toning) of photographs for artistic effect detracts from their clarity and value. A wide program of editorial columns provides a forum for both the staff and subscribers to voice their opinions. Not every article in every issue appeals to me, but one or two always do. I can also count on the other articles to be of sufficient interest and quality to ensure my reading most of them as well.

*Geoff Hurlbut is a marketing executive with Analysts International Corporation. His logos grace every issue of TIGHAR Tracks.*

*Air Classics*. Reviewed by George Kastner, TIGHAR #0862C, Los Osos, California.

*AIR CLASSICS* IS THE AIRCRAFT FLAGSHIP OF THE CHALLENGE PUBLICATIONS FLEET—*AIR PROGRESS*, *Warbirds International*, *Air Combat*, as well as *Rail Classics*, *Sea Classics*, and many others, plus uncounted specials and quarterlies. These magazines are all—except for their specialized themes—indistinguishable from each other, having the same physical look and editorial approach.

Typographic errors and technical problems abound in *Air Classics*. Names are frequently misspelled, terminology is garbled, and editing omissions make it clear that little actual editing is done. While not affecting content, this carelessness makes the magazine much more difficult to read. However, the content causes some problems of its own.

Bookstores always make a clear distinction between “Fiction” and “Nonfiction”: authors so distinguish when they write, and readers expect the separation—they want to know what they are buying. *Air Classics* fogs these boundaries. Unsubstantiated text along with uncaptioned and uncredited photos leave readers with no way to evaluate material independently, and thus Challenge Publications’ own editorial policy removes any mechanism for readers to determine if the article and illustrations are fact or fiction, or, charitably, “mythology.” *Air Classics* always upholds the good-ol’-flyboy tradition, accepting all received opinion handed down in hangar bull sessions. No New Ideas Need Apply—nothing will ever be challenged in a Challenge publication.



Editor’s note: While many writers and photographers have been promised fees by *Air Classics*, we have yet to find anyone who has actually received money. Challenge Publications did not return telephone calls requesting clarification of their submission guidelines or payment schedules. Several people have also reported that *Air Classics* failed to return photographs sent with submissions. These complaints span at least twenty years.

## Legend:

- ◆ = Check mark for yes/no questions
- ◎ = Check mark with note; see text.
- ✎ = Excellent
- 😊 = Above Average
- ☺ = Average
- ☹ = Below Average
- ☹☹ = Poor

George Kastner owns a bookstore specializing in militaria, and is also known as Daddy Warbooks.

	Focus				Quality				Photos		Written by			Pays for submissions?		Complaints (from writers)				
	General	Period	Warbirds	Airshow	Overall	Photo	Writing	Credit	B & W	Color	Pro Writers	Staff	Enthusiasts	Scholars	Yes	No	None	Some	Lots	Liberal
AAHS Journal	◆				✍️	✍️	😊	✍️	◆				◆			◆		◆		
Air & Space Smithsonian	◆				😊	😊	✍️	😊	◆	◆	◆	◆			◆		◆			◆
Air Classics	◆		◆	◆	😞	✍️	😊	🌩️	◆	◆		◆	◆		🎯				🎯	
Air Power	◆				😊	😊	😊	😊	◆	◆	◆	◆			◆		◆			
Aviation History	◆				😊	😊	😊	😊	◆	◆	◆		◆		◆		◆			
Skyways		◆			😊	😊	😊	✍️	◆				◆			◆	◆			
Wings	◆				😊	😊	😊	😊	◆	◆	◆	◆			◆		◆			
World War I Aero		◆			😊	😊	😊	✍️	◆				◆			◆	◆			



*Aviation History*. Reviewed by Geoffrey S. Hurlbut.

AVIATION HISTORY OFFERS AN ENJOYABLE READ FOR the enthusiast who is not looking for the publication to provide a wealth of detail or coverage of unusual topics. In the half dozen or so issues I have read I found the articles weighted more to military aircraft and personalities with WWI, WWII, and Korea getting the bulk of attention.

AH relies on outside sources for its articles and the writing is serviceable if not outstanding, though perhaps a bit histrionic in spots. Illustrations are a mix of paintings and black and white and color photographs. Photographs tend to be familiar, but the occasional unseen snap appears. Most of the paintings are details from works by the growing band of well-known aviation artists, though again a number are of more amateurish quality. A regular column called "The Art of Flight" details a particular work including the history behind the subject and the techniques the artist used in painting the work.

AH does not have the depth of research or specificity of topic to earn a subscription from me, but I have found something of interest in it often enough to frequently purchase a copy off the local news stand.

*Air Power and Wings*. reviewed by James Tierney, TIGHAR #0821, Pasadena, California.

THESE TWO MAGAZINES ARE COMPLEMENTARY publications produced by Sentry Books. They are under the same management and have pretty much the same staff of production artists and writers. They focus primarily on military aviation, but do have some very good insights and articles on commercial aircraft. One of their excellent commercial articles was on the Boeing Model 314 Clipper. I am a Clipper era fanatic and thoroughly enjoyed the articles on both the Clipper and Martin aircraft. They do not do airline studies or history.

I consider them to be above average, bordering on excellent, publications, with good writing, in-depth analysis, and good research. The photos are above average.

They specialize in long articles, usually two, three, or four per issue; and although they have devoted complete issues to one subject, normally they will break very long articles into two or three sections and bridge them over as many issues. Their standards of



Editorial stance			Advertising?		Publ. sched.				Pages	Annual Subscription (U.S.)	How to subscribe
Real	Neutral	Cons.	Yes	No	Monthly	Bi-monthly	Quarterly	Other			
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layout, editing, copywriting and proofreading are very high. They are well worth the price of admission, and I would recommend them highly for anyone looking for information.

*Jim Tierney is soon to retire from the world of aviation parts manufacturing. He has been helping us proof-read TIGHAR Tracks for several years.*

*Skyways and World War I Aero. Reviewed with the help of William W. Alexander, TIGHAR #0403E, Grand Rapids, Michigan.*

SKYWAYS AND WORLD WAR I AERO ARE SISTER publications of World War I Aeroplanes, Inc., a non-profit service organization devoted to the early airplane. *Skyways* covers the years 1920-1940; *WWI Aero* covers 1900-1919.

These publications are for the serious enthusiast. Almost entirely member-written, both magazines are chock-a-block with technical details, three-view drawings, photographs (both current and archival), and minutely

focussed articles on all types of aircraft. Commercial, military, and private types are given equal billing; articles in a single issue may cover modern reproductions, models, restorations, purely historical designs, and personalities of the periods covered.

As research tools these magazines cannot be beaten. Articles consistently have good bibliographies, photographs and drawings are sourced, and each article is headed by the name and full address of the author. Layout is utilitarian – these are not glitzy publications. Photograph quality varies widely; given that many of the originals are between fifty and seventy years old, that is hardly surprising. A fine resource for the serious scholar, and an organization well worth supporting.

*Bill Alexander is retired from a career in advertising and public relations. He is a master modeller, and a veteran of Project Midnight Ghost Maine expeditions. Due to a sudden illness, he was not able to complete his review by our deadline; however, we are indebted to him for the information he supplied about these magazines.*

We would like to run additional magazine reviews in *TIGHAR Tracks*, particularly of European and Australian publications. Members who would like to work with us on such reviews please get in touch with TIGHAR.



## Updates from the last *TIGHAR Tracks* (Vol. 11, No. 1)

In “The Penguin Swings” Richard Gillespie predicted some personnel changes at the National Air & Space Museum in the wake of the Enola Gay debacle. On May 2, 1995 Martin Harwit resigned as NASM’s director citing “continuing controversy” despite the Smithsonian’s cancellation of all but a bare bones exhibit of the world’s first atomic bomber. Harwit said he felt that he had “no choice but to resign.”

In “Lockheeds, Logos, and Legs” Frank Lombardo (TIGHAR #1806) proved that a photo, touted in *Air Classics* magazine as showing a Lockheed 12 wrecked by Amelia Earhart, was actually taken sometime after she disappeared. Frank has now established just when that sometime was. Bureau of Air Commerce records confirm that the mishap shown in the photo occurred on March 30, 1940.



# Whatever Became Of ...

## The Los Padres Wreck Survey

In the September, 1992 issue of *TIGHAR Tracks* (Vol. 8, No. 4) we described TIGHAR's role in assisting the U.S. Forest Service to comply with federal laws concerning over one hundred aircraft wreck sites in the Los Padres National Forest in southern California. A scheme to allow a salvage firm known as Wreckfinders to "clean up" the sites was halted and a plan was drafted in cooperation with the Advisory Council for Historic Preservation for an inventory and evaluation of the wrecks to determine appropriate management or disposition. TIGHAR has offered to conduct the survey using member volunteers supervised by trained archaeologists. What we need at this point is the funding to cover the administrative and logistical costs of assembling and fielding a team of qualified TIGHARs (about \$15,000). Interested sponsors should contact TIGHAR Executive Director Richard Gillespie.

## The Lady In Waiting

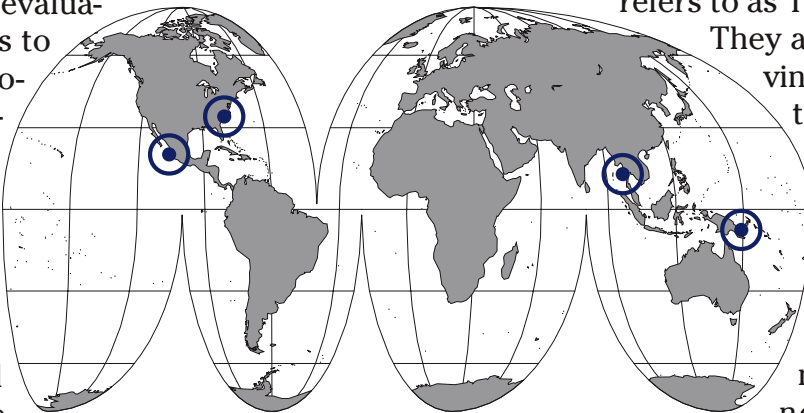
The very first issue of *TIGHAR Tracks* (Vol. 1, No. 1), published in February 1985, described the most historic, intact, unrecovered aircraft known to exist. More than ten years later, Boeing B-17E 41-2446 still reigns as queen of New Guinea's Agaiambo Swamp where she landed undamaged and

out of fuel on February 23, 1942. Her crew survived a harrowing six week odyssey back to civilization. The airplane was written off and forgotten until rediscovered by the RAAF in 1972. In 1986 a major recovery effort by TIGHAR, in cooperation with the Travis AFB Historical Society, was thwarted by the government of Papua New Guinea's decision to put a moratorium on all removals of World War Two relics, declaring them to be "war memorials and tourist attractions."

Since then, a spin-off faction from the Travis group has continually agitated for permission to recover the airplane, which it refers to as The Swamp Ghost.

They are trying "to convince the PNG people that the B-17E is an American historical artifact and should be back in the United States." Although the moratorium has now been lifted,

PNG's National Museum has not approved the recovery of the bomber. In TIGHAR's opinion, the airplane will stay where it is until an air museum facility can be built in Papua New Guinea where the B-17 and other historic aircraft can be conserved and displayed to preserve and honor the country's rich aviation heritage.



B-17E  
41-2446 at  
rest in the  
Agaiambo  
Swamp.  
TIGHAR  
photo by R.  
Gillespie.

## The Search For Kingsford-Smith

The January 1993 issue of *TIGHAR Tracks* (Vol. 9, No. 1) carried an article entitled “Another Lockheed, Another Island” suggesting that the lost Lockheed Altair of legendary Australian aviator Sir Charles Kingsford-Smith and his copilot J. Thomas Pethybridge might have crashed into the sea near Aye Island off the coast of Burma. For a while we contemplated a TIGHAR project which would seek to find the remains of the airplane but a subsequent letter from New Zealand author Ian Mackersey changed our minds. Mackersey offered additional evidence which argued for a crash near the Moscos Islands several hundred miles south of Aye. He also presented opinions from experts that there would be virtually nothing left to find anyway. For the moment, it looks like Smithy’s fate will remain a mystery.

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## The Columbia Project

The June 1991 issue of *TIGHAR Tracks* (Vol. 7, No. 3) launched a project to excavate the foundation of a Delaware barn that burned in 1934 in the hope that relics of the transatlantic Wright-Bellanca WB-2 Columbia might be recovered. The record-setting Bellanca was the machine Lindbergh had hoped to buy for his New York to Paris flight and, in fact, Clarence Chamberlin flew Columbia nonstop to Germany (carrying a passenger) just days after the Spirit of St. Louis arrived in France. The little monoplane went on to make several more Atlantic crossings and set other endurance records before being relegated to storage at Bellanca Field in New Castle, Delaware (not far from TIGHAR’s offices). On January 25, 1934 a brush fire got out of hand and burned the barn in which Columbia and at least four other aircraft were stored. Neither Bellanca company records nor former Bellanca employees can attest to whether any attempt was made to salvage aircraft wreckage after the fire.

Today, Bellanca Field is entirely grown over with trees and dense underbrush. TIGHAR has located the old barn foundation but, so far, the current landowner (a commercial real estate development company) has refused permission for a

site survey to determine whether historic artifacts are present. If clearance can be obtained, TIGHAR will use the Columbia site as a testing ground for remote sensing technology to be used on the Earhart Project’s NIKU III expedition now scheduled for 1996.



*Wright-Bellanca WB-2 Columbia. Is this historic aircraft in the foundation of a burned out barn in Delaware? Photo courtesy Frank Strand Collection.*







# The Earhart Electra

## Part One:

### *A Star is Born*

*The Way It Was*

*The known history of the world's most famous missing airplane spans almost exactly one year. First registered with the Bureau of Air Commerce on July 19, 1936, Amelia Earhart's Lockheed Electra vanished along with its owner and her navigator Fred Noonan on the morning of July 2, 1937. Solving the mystery of what happened requires an accurate understanding of the machine's fuel, navigational, and radio capabilities at the time it disappeared. The only way to acquire that understanding is to track the many modifications, equipment additions and deletions, and external marking changes which the airplane underwent during its brief but busy career. Fortunately, sufficient photographic and written documentation has survived to permit a reliable, if not yet complete, reconstruction of the airplane's evolution.*

*This first installment of TIGHAR's three-part history of the Earhart Electra traces the airplane from its initial construction through November, 1936. Part Two will chronicle the changes made for the first world flight attempt, the repairs and alterations made after the Luke Field crash, and the configuration of the Electra at the time of its disappearance. Part Three will trace the evolution of the airplane's cockpit instrumentation and radio equipment.*

TIGHAR Collection

ON MARCH 16, 1936 GEORGE PUTNAM sent a "financial arrangements just completed..." telegram to Lockheed Aircraft Corporation's president Robert Gross and construction of airframe #1055 (the 55th example of the Model 10) as a "special 10E" soon commenced. Lockheed had introduced the Model 10A Electra in 1934. Powered by two Pratt & Whitney Wasp Jr. SB engines of 450 h.p., the type enjoyed widespread success as a ten-passenger airliner. Deliveries of the 10E variant, featuring the more powerful 550 h.p. Wasp S3H1, began in January 1936. Earhart's was the fifth airframe so equipped. The performance of the "big engine" version of the Electra, far from being secret, was widely

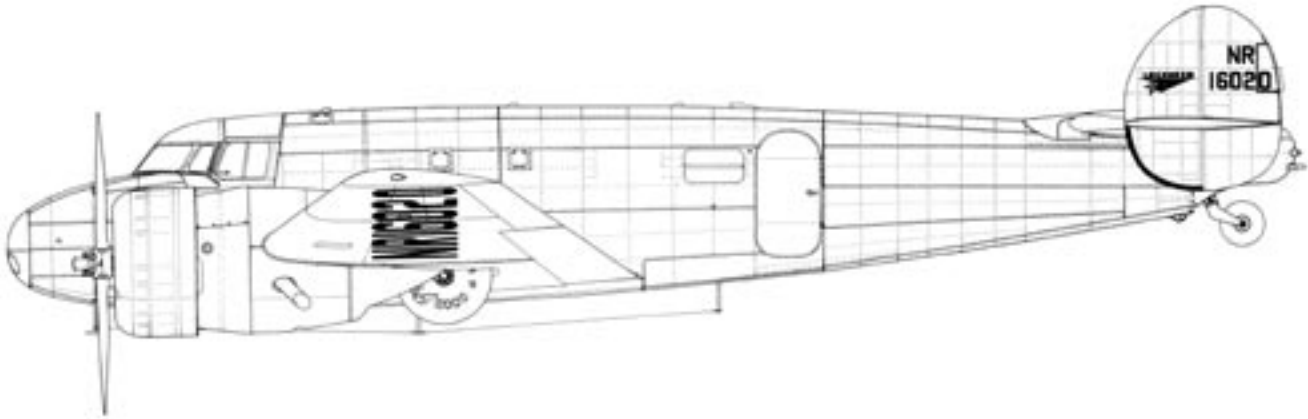
*Airframe # 1055, April/May 1936*



touted in Lockheed sales literature. Earhart's airplane was the first of two 10E Specials built specifically for long-range flying rather than passenger carrying, and it was the fuel system, rather than the engines, which made

it "special." The other 10E Special was airframe #1065. Delivered to Harold S. Vanderbilt on August 26, 1936, that airplane made the first transatlantic commercial flight in May 1937.

*"... the realization of a dream"--July/August 1936*



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**WHEN THE PHOTO ON PAGE 17 WAS TAKEN IN** April or May of 1936, #1055 already exhibited some of the features which set it apart from the standard Model 10. Most obvious is the absence of four of the usual five passenger windows on each side of the cabin. Note that the one aftmost window is bisected by a bar. Other features are standard, such as the pilot's hatchway in which Amelia is standing and the lightening holes in the aft bulkhead visible through the open cabin doorway. Also standard was the small round plate installed low on the nose. It covers the mouth of the tube for an "Elgin 3-Minute Electrically Operated Parachute Flare" (there's an identical installation on the other side of the nose) for use in night landing emergencies.

"This new Lockheed is the realization of a dream. It comes to me through Purdue University and is a real flying laboratory." That was how AE described her new airplane to the newsreel cameras shortly after

its official delivery on July 24, 1936 (AE's 39th birthday) but, aside from the window arrangement and fuel system, the machine at this time was little different from the standard Model 10E. Like most Electras, #1055 was delivered with a trailing wire radio antenna which was reeled out in flight, emerging from the extreme tip of the empennage. On the ground, its end is clearly visible as a white protrusion just below the tail navigation light. (This, by the way, was not the fabled trailing wire antenna removed just prior to the second world flight attempt. Patience.) On Earhart's airplane a fixed wire antenna also stretched from the starboard side pitot mast under the chin at Fuselage Station 37.5, to a ventral mast amidships at Sta. 147, and ending at a ventral mast just forward of the cabin door at Sta. 253.75.

Although clearly showing the airplane as it was originally delivered, a discrepancy concerning the registration number makes the exact date of the photograph above a



on August 6, 1936 asking only for the “R” designation. It was approved the next day.

As originally delivered, #1055 featured three non-standard fueling points on the fuselage: two on the port side of the cabin and one on the top just behind the pilot’s

puzzle. At no time when the airplane looked like this was it licensed to wear NR16020. The initial registration granted to Lockheed was X16020, an “experimental license” for “factory test work.” On July 27, 1936, three days after delivery, Earhart signed an application for the airplane to be licensed as NR16020, the “N” signifying approval for international flight and “R” meaning that the airplane was licensed in the Restricted category. The application states that the airplane was so painted at that time, but photos taken during a visit Earhart made to San Francisco on August 3rd show the Electra still (or perhaps again) wearing X16020. In any event, the “NR” was not approved and the application was cancelled. A new application was submitted

hatch. The photo below, apparently taken during the same session as the picture above (note AE’s outfit), provides an interior view of the cabin looking forward. Partially visible is the manifold system of filler necks for the seven fuselage tanks. Three additional tanks in each wing brought the total to thirteen with a combined capacity of 1198 gallons.





*Bendix Race -- September 1936*

**MODIFICATIONS TO THE AIRPLANE BEGAN** immediately, and it soon became a flying laboratory in fact as well as in name. The seven fuselage tanks were removed on July 28, 1936 but only six went back in, dropping the total gallorage to 1148. The manifold refueling system was abandoned in favor of each tank having its own filler neck. This caused three additional fueling points (two on the side and one on the top) to appear on the fuselage. On September 4, 1936 the Electra, now marked R16020, participated in the New York to Los Angeles Bendix Race. At this time, and for the only time in its career, the engine cowls are painted. This photograph appears to show a two-tone scheme but the actual colors are not known.

A good guess might be Purdue University's "old gold" and black. Otherwise, the aircraft featured a plain, bare metal finish from the time of its delivery until shortly before the first world flight attempt in March 1937. On September 21, 1936 the Bureau of Air Commerce finally approved

the "NR" registration, but the airplane continued to display R16020.

**IN OCTOBER THE ELECTRA RECEIVED ONE OF FIVE** prototype radio direction finders developed and patented by Frederick J. Hooven, Vice President and Chief Engineer of the newly formed Radio Products Division of the Bendix corporation. Hooven's device, also known as a radio compass, provided simplified, and yet superior performance compared to existing RDFs. The exterior components of this advanced system included a small loop mounted in a streamlined bubble on top of the fuselage and centered at Sta. 147. There was also a sepa-

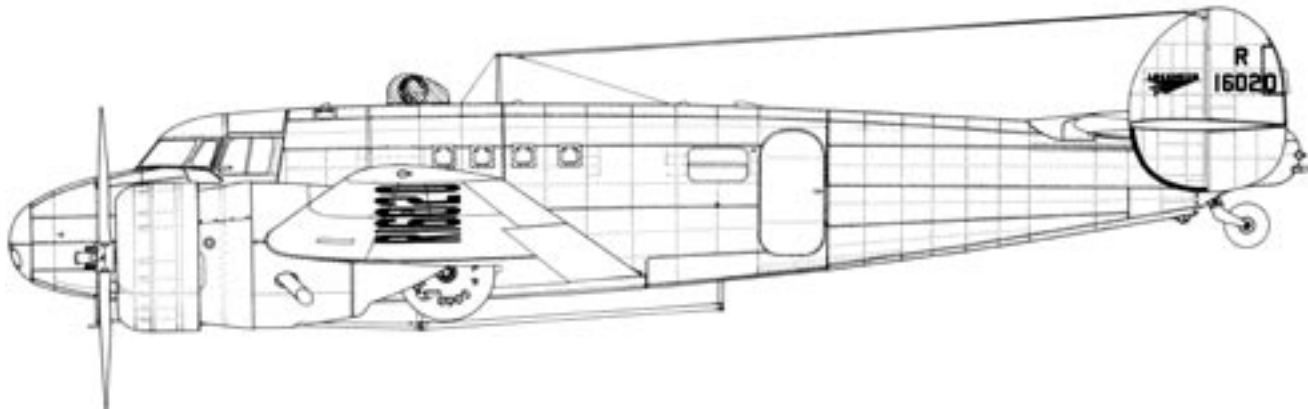


*William F. Harney Collection.*



rate “sense” antenna running along the belly parallel to the Electra’s other ventral wire. In November yet another antenna appeared on the airplane in the form of a dorsal mast

at Sta. 176.75 from which wires extended to the tip of each vertical fin forming a vee.



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## *"The Flying Laboratory" -- November 1936*

### Acknowledgements

Robert Dean (TIGHAR #1774), Frank Lombardo (TIGHAR #1806), Kenton Spading (TIGHAR #1382CE), Ray Stratton (TIGHAR #0793), and Thomas Thevenin provided important help in the compiling of this history. The meticulous profile views of the Earhart Electra were drawn by William Harney (TIGHAR #1309) who also contributed his extensive collection of photographs. Special funding for this project has been provided by Lockheed Aircraft Service Company, a division of Lockheed Martin Corporation. 🐾

For Part Two of “The Earhart Electra” we’re trying to pin down the nomenclature for the open loop antenna that was mounted over the cockpit in early March 1937, replacing the enclosed housing of the Hooven/Bendix Radio Compass antenna. Several authors have referred to it as an RCA RD2093D, and that would seem to agree with Fred Hooven’s contention that a more primitive but lighter RDF was substituted for his advanced system due to “bad advice from a competitor.” What we need is documentation in the form of paperwork relating to the equipment’s purchase and installation, or at least a contemporaneous advertisement or magazine article with sufficiently detailed photos.

There are also some unanswered questions about the fuel system. Particularly unclear is the role, if any, of Clarence M. Belinn, variously described as supervising or chief engineer for National Airways in Boston. Apparently Paul Mantz’s biographer Don Dwiggins (*Hollywood Pilot*, 1967) interviewed Belinn

who claimed to have designed the airplane’s original cross-feed system with “one master valve in the floor of the cockpit.” Other authors repeat the story as gospel, even though it has a central flaw. Belinn’s expertise supposedly derived from his experience with the Electras operated by National Airways. It is difficult to understand how he would have that expertise at the time Earhart’s airplane was being completed in July of 1936 considering that the airline’s two 10As (NC16055 & NC16056) were not delivered until the following October. Did Belinn modify Earhart’s fuel system later? Perhaps, but Lockheed blueprints of the system dated as late as March 10, 1937 (one week before the first world flight attempt) show no fewer than five fuel valves in the cockpit.

If anyone can shed further light on either point please contact TIGHAR’s Executive Director Richard Gillespie.

*Research In Progress*

# FULLY RESTORED

by Richard E.  
Gillespie  
Executive  
Director of  
TIGHAR



KNOWING MY INTEREST IN THE philosophical as well as the practical aspects of historic preservation, Jim Raisbeck of Raisbeck Engineering, TIGHAR #1592, recently sent me an editorial and a short article which appeared in the Winter 1995 issue of *Rusty Rudder*, an antique boat magazine. In each piece the author wrestled with the conflicts inherent in owning and operating historic watercraft, suggesting guidelines for what to replace, what to fix, and how to fix it. Jim asked for my response.

Although I deal with these issues in the context of aeronautical rather than maritime artifacts, the philosophical principles are exactly the same, and the practical factors differ only in the types of materials over which enthusiasts agonize. The debates which regularly rage over what to do with old boats, old planes, old cars, old carriages, old trains, etc., are all manifestations of the same human dilemma: how do we preserve the machines of the past and, at the same time, keep the experience alive? The answer, of course, is—we can't.

HISTORIC PRESERVATION IS THE SAFEGUARDING OF the physical stuff that was there then and is

here now. When that stuff is gone, whether from natural deterioration or by the human hand, it is gone—no matter how authentic the replacement. To decide to preserve a vessel, or an aircraft, or an automobile is to decide that its utility as a means of transporting people on the water, through the air, or over the ground has been superseded by its utility as an historic object. That means the boat comes out of the water, the airplane stays on the ground, and the car stays put. Obviously, relatively few machines exhibit a balance of importance (historical significance) and condition (historical integrity) sufficient to merit this kind of treatment.

For most old machines “restoration” is the chosen treatment. It's a misleading term. When, in 1846, John Ruskin said, “It is impossible, as impossible as to raise the dead, to restore anything that has ever been great or beautiful...” he recognized the awful truth that has governed artifact conservation ever since. The product of restoration is illusion; the more faithful our mimicry of the original workmanship, the more convincing the illusion. Naturally, we want to believe that our creations, through their beauty or performance can, like Pinocchio, become real or, as we like to say, “fully restored.” But, of course, our machines can not really become young again any more than we can.

A machine which has been “restored” (the correct term is “rehabilitated”) to operating condition has been returned to service through a specialized type of repair. Likewise, the service it gives is a specialized type of use which places value upon the fact that the machine is of an old type; but its fundamental function as a means of



*“Fully Restored”—Air show perfection at the New England Air Show, Manchester, New Hampshire, in 1990. TIGHAR photo by P. Thrasher.*

conveyance has not changed. A greater or lesser number of its component parts will date from its earlier years, and the longer it is maintained in service, the more parts we will replace, whether for reasons of safety or aesthetics. In so doing we may be preserving archaic construction and repair techniques, and our operation of the machine may preserve physical skills that would otherwise be lost, but such recreation of experience can only be accomplished at the expense of physical preservation. It is a zero-sum equation.

AS WAS POINTED OUT IN THE EDITORIAL JIM SENT, everything we do to the machine becomes part of its history. It is, however, important to recognize that the on-going process of maintenance and repair so necessary to any machine's continued serviceability, no matter how faithful to original materials and techniques it may be, is not historic preservation but rather, its anti-thesis. When the day comes—if it ever comes—that we, or some later owner, decide that the preservation of the machine is more important than its continued use, this amalgam of old, not-so-old, and new but old-style material may be retired to a museum. Sadly, at most aviation and automobile museums (much less so at nautical museums) the “restoration” process will begin all over again, with worn, missing, or undesirable components being replaced in an effort to create a more attractive exhibit. Such non-preservation is often rationalized by placing the museum's desire to educate above its mandate to conserve, or by noting that the machine, while in service, was routinely repaired—thus entirely missing the point of historic preservation. Sometimes a machine's individual history and identity is sacrificed so that it can masquerade as some other machine

of the same type which is judged to be of greater historical importance (and a better draw for the museum). The simple recognition of what is genuine and what is not is avoided by dismissing those who point out the difference as “purists.”

ALTHOUGH REPAIRING AND OPERATING OLD BOATS, planes and cars is not historic preservation, it does serve an important purpose by putting us in touch with the experiences of the past. The sense of connection communicated by the sight, the sound, the smell, and the feel of a vehicle alive in its natural element provides a very different, and no less important, historical link than the information and inspiration embodied in a preserved original. If we are to truly learn from the past we need both. More important, we need to understand the difference between them so that we can make intelligent choices about what to save and what to use. 🐾



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Blue Side Up

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