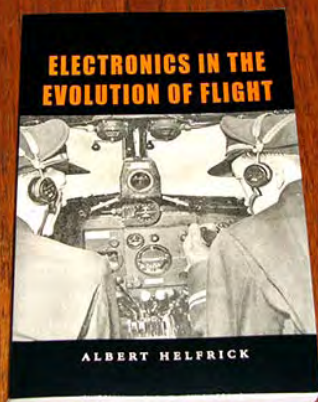


K9YA Telegraph

Robert F. Heytow Memorial Radio Club

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“Electronics in the Evolution of Flight”

Book Review

Philip Cala-Lazar, K9PL

Reading the first few pages in Albert D. Helfrick's book, *Electronics in the Evolution of Flight*, I knew he *had* to be a ham. Why? Witness the ham spirit inked here: “Much of the early development of the two industries [radio and aviation] was the result of the

efforts of amateurs, working with little or no money. Amateurs were a dedicated and inspired group. They made up for what they lacked in funding with enthusiasm.” Looking further, the FCC database confirms the author is licensed as K2BLA.

Helfrick's book covers the ascendance of flight and its complement in electronics from spruce and fabric jobs to the exploration of space and “glass cockpit” aircraft. Early on the author credits amateur radio operators and amateur aircraft builders as the foundation upon which the two revolutionary technologies of the 20th century were made. Advances in one technology impelling changes in the other; communications, navigation, weather reporting, air traffic control and military applications.

A glance at the acronyms and abbreviations in *Electronics in the Evolution of Flight's* glossary, from ACARS (“airborne communications, addressing and reporting system”) to GPWS (“ground proximity warning system”) to UHF (“ultra high frequencies, 300 to 3000 MHz, 30 to 300 MHz before WWII”) exemplifies its breadth of coverage.

Radio and aviation were born of anarchy. Thanks to madmen and geniuses, both technologies experienced rapid advancements during that early period of unfettered ferment. Eventually, government regulation

caught up—amateur radio in 1912 and aviation, more than a decade later, in 1926 with the implementation of the Air Commerce Act and the creation of the aeronautics branch of the Department of Commerce.

Chapter one introduces the book's subject with brief histories of radio and aviation. Pioneering inventors Hertz, Marconi, Tesla and Armstrong are included in an abbreviated narrative of early ham radio. Along the way, old friends Collins, Hammarlund, National, Hallicrafters, James Millen and the roles they played are woven into the avionics story.

Better known for his many later inventions, Captain Edwin Armstrong's WWI-era experiments included fitting radiotelephone transmitter/receiver sets to Sopwith Camel pursuit biplanes. The sets weighed 52 pounds, excluding their 300-foot long trailing wire antennas. The Armstrong system, operating on a frequency “of about 400 meters,” was

designed to provide communications between aircraft. WWI artillery spotter aircraft, too, were radio equipped—transmitters only—no receivers.

In 1928 the U.S. National Bureau of Standards, introduced the AN range navigation system (aka,

“Witness the
ham spirit...”

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Sam, the Piano Player

Casablanca. It is The Movie we love to watch over and over, again and again. It is a movie with many stories woven into its fabric. Rick, Ilsa, Laszlo, Louis and Sam. The World War II era story could not have been told in nearly the same way without Sam.

Sam was the piano player.

In World War II, there were two kinds of piano players. Sam was one. If he had also been able to key a transmitter somewhere every time he hit

“E” over the middle “C,” then he would have been doing double duty. But Sam didn’t do that. Virginia Hall, and countless others, were the other kind because “piano players” was the name given to radio operators of the clandestine military and paramilitary forces behind the Axis lines. Many assisted the Resistance and espionage agents engaged in the effort Winston Churchill hoped would “set Europe ablaze” when he approved the creation of the SOE, the Special Operations Executive.

Telegraphy

Radiotelegraphy played a critically important role in the secret war. It was the tool agents used to inform their leaders and handlers about what they were learning and experiencing on the ground, and by which they learned of the missions assigned them. But, it was a link fraught with risk. Radio direction finding had evolved into a sophisticated weapon on both sides of the war; the Allies used it to tremendous advantage in fighting the Battle of the Atlantic, tracking the movements of U-boat wolf packs and, as a consequence, adjusting the courses of Allied shipping. On the Axis side it was used to locate spies and cells of the Resistance. Piano players of the second sort suffered a very high casualty rate.

In addition, manual radiotelegraphy not only permitted your enemies to locate you with some high degree of precision, it also permitted them to isolate and

identify the individual operators, whose fists were not disguised as modern digitized communication equipment might permit. In the UK, the Voluntary Interceptors, together with all the other members of the Y services, learned to identify the fists of the operators they were monitoring. They thus discovered networks and movements that might not otherwise have been identified. In an effort to elude identification, it was not unusual for operators to change call signs on a random or regular basis. It was a diversionary tactic that was quite often not successful. In fact, it could be turned against the enemy; the Japanese successfully deluded the Allies into thinking their fleet was moving in another direction by reassigning radio operators before the attack on Pearl Harbor.

Signature

The operator’s fist was a giveaway that could not easily be disguised. Realizing this, captured Allied agents were instructed to use certain coded means to identify whether their communications were being controlled by the enemy.

“Sam was the piano player.”

So, each piano player had a signature style. In “QRP To the Field, Without the Fun,”¹ we reviewed a tribute to the clandestine radio services and their operators. In it were vignettes of some of the performers and their equipment. That tribute was a very well done overview of the personnel and the ingenuity

that went into the designs that required multiple voltages to operate the tube equipment of the era.

The literature also contains quite a number of fine, readable chronologies of clandestine operations, including Colin Beavan’s, *Operation Jedburgh*, Penguin Books, 2006, and many others. Nigel West’s treatments of Garbo and Snow, and other works dealing more directly with SOE and OSS operations provide fascinating reading, much of which will feed any insomniac’s lust for something to occupy and divert attention during the sleepless hours. These are books that will keep you awake wanting to find out just what happens on the next page.

But, these are not the fascinations that grow out of fiction, in which you want to find out what the



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author's imagination and ingenuity created; these are the fascinations of history, in which you want to find out what actually happened as the result of bitter ideological clashes that had turned into ghastly, horrible warfare between sovereign states. Some of these are the stories of seemingly ordinary people whose extraordinary circumstances evoked actions and evidenced qualities of character of such extraordinary magnitude that they are truly as awesome and heroic as those words intend.

Special Operations

One such story is that of Virginia Hall, who had been a child of a very comfortable family. But a hunting accident while on an adventure with her brothers set her on a course that would actually have a very dramatic effect on history. Cuthbert was the name she eventually gave to the prosthetic leg she acquired as a result of the accident. And having Cuthbert was what eventually disqualified her from advancement beyond the job of clerk in the US Foreign Service, despite her facility with a number of languages. It was her proficiency in French and her insightful views derived from experience in Europe as a clerk that attracted attention from an otherwise seemingly anonymous British civil servant who perceived Hall was just what the newly formed Special Operations Executive were seeking.

I won't divulge too much more of the story, because the book is just too good. Judith Pearson, the author, never met Virginia Hall, but was obviously fascinated by the outline of the story she learned, and her research has resulted in justly deserved public attention, which was something that Hall herself had vigorously avoided and eschewed during her lifetime.

Where it had been the practice to send out teams which included only one piano player, Hall came to the view that each operative had to be sufficiently trained and capable of being a piano player because of gaps created and suffered when a team's piano player was captured or killed; the loss of a piano player could cripple, maim, or even kill significant operations.

Pearson's study of Hall, *The Wolves At the Door*,² while focusing on the exploits of one operative, is a tribute to all who served and sacrificed. In *The Clandestine Radio Operators*,³ Jean-Louis Perquin displayed one picture of an operator that stands out from others. All other depictions of operators

in his book are from original, period photographs. The one on page 43 is a full page photograph of a painting, however, showing Virginia Hall seated in a barn with headphones on, keying her paraset, with another agent handcranking a generator attached to an overturned bicycle frame. The painting hangs in the CIA Museum, Washington, DC. Perquin gives us a brief resume; Pearson tells us the full story of the painting.

A Ham?

As I read Pearson's book and got past the point at which I knew she had survived the war, I had one question: "Did she ever get on the air as a radio amateur?" Pearson doesn't address the question directly, but one reason she might not have pursued our pastime in the post-war years is clear from the story. Virginia received the US "Distinguished Service Cross" in a private ceremony in the office of William Donovan, the Chief of the OSS, which later "morphed" into the CIA. Only her mother was present. She had politely declined the opportunity to have the medal presented to her by President Truman because it would have "outed" her, and she could not then have returned to the field. Clearly, to have taken up amateur radio would have also "outed" her fist. She was a field operative; for her, radio was not a hobby. When she retired, she did so to a very private life.

Pearson's book is subtitled: "The True Story of America's Greatest Female Spy." After finishing the book, I wondered whether the use of the term "Female" was superfluous, but, then again, I'm not a marketing expert. In the real world of espionage and clandestine operations, however, it would not have been an exaggeration to say, "Nobody does it better." ■

1 "QRP To the Field, Without the Fun," *K9YA Telegraph*, Vol. 9, Issue 10, October 2012, p.2.

2 Judith L. Pearson, *The Wolves At The Door*, The Lyons Press, 2005, 2008. ISBN 978-1-59921-072-8

3 Jean-Louis Perquin, *The Clandestine Radio Operators*, Histoire & Collections, 2011. ISBN 978-2-35250-183-1



Virginia Hall Receiving the US Distinguished Service Cross

Image: U.S. National Archives

"Cuthbert"



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The Rockmite][QRP Transceiver

Paul Ross, W3FIS



If there is a QRP kit out there, I think I have tried almost all of them. However, up until now, I have been avoiding the RockMite, originally kitted by Small Wonder Laboratories and designed by Dave Benson, K1SWL. Much to my dismay, I found they had recently gone out of business, and turned the rights on the RockMite over to Rex Harper, W1REX, at www.QRPme.com.

The main reason I had been avoiding the RockMite was that it involved soldering a surface mount mixer, something I was loath to tackle. My soldering skills are pretty good, but I have to admit I have avoided SMT stuff with great diligence. Well, to my delight, the version released by QRPme is now fitted with a conventional through-hole mixer. The major impediment to a pain-free build for me has nicely been removed. I should also note that those pesky toroids often found in QRP kits that have to be wound with multiple turns of “frog hair” have been replaced with little inductors that look like chubby resistors.

As fast as you can say “PayPal,” I ordered up a kit for 20-meters. I had considered the 20-meter DC20A from QRP Kits, but I already had one of those for 40-meters. I wanted to explore the design of the QRP RockMite implementation. In addition, to avoid the hassle of scrounging up the off-board parts and fabricating a case, I ordered the accessory parts and the pre-drilled painted case as well.

Well, not too many days later a *very* small package arrived in the mail. I opened it up, and inside were lots of bags with lots of parts. In my case, the accessory box was going to be shipped later, as mine was in the paint shop getting a nice coat of red paint.

The instructions said to download the manuals from www.QRPme.com. I did so, and printed them out. In addition, I snatched a photo of the complete board and blew it up to full-page size. To make things even easier, I photocopied the component side of the board and blew it up to full-page size as well. These two sheets gave me a “crib” sheet set to mark and check parts placement as I went along.

The first order of business was to read the downloaded instruction manuals—*twice*. You know the old saw—RTFM—read the friendly manual! The next move was to start inventorying the parts. My experience has been that a parts inventory is crucial—make sure that not only you have what you should have, but to familiarize yourself with what they look like. It is distressingly easy to mistake an inductor for a resistor. A good magnifying glass (I like a jeweler’s loupe) and strong light are important. I borrowed the XYL’s OTT-LITE® she uses for needlework. Some

people prefer an illuminated magnifier, but the light and loupe seem to work nicely for me.

Now with the parts inventory and manual reading (you *did* read the manual?) done, on to putting it together. The usual tools suffice—soldering iron (15 or 30 watts), good quality solder, nippers, tweezers and needle-nose pliers. I also find that a set of small

surgical forceps do wonders when you need an extra set of hands. Also, there is a tool with a magnifying glass and a couple of alligator clips on swivels that is helpful.

Some small plastic food bins (do *not* tell the XYL about this either) are nice for the small parts. During the inventorying process, I tacked most of them to a sheet of paper with a piece of transparent tape and noted the value and designator: R1, R2, etc. This helps in quickly finding the right part, and making sure you haven’t inadvertently put something in the wrong hole.

“...do not tell
the XYL”



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You're Never Too Old

Part 1

5

Scott B. Laughlin, N7NET

Charlie had worked forty years operating a log peeler making veneer for plywood at an Oregon coast mill. While he was aware his mistakes were becoming more frequent, he knew management would understand, considering his four decades of dedication. Still, he was sixty-eight and getting on thin ice, so to speak. Once, someone offered him advice he'd never forgotten. His friend told him corporations don't have feelings; they only have interests.

He shouldn't have been surprised when the foreman informed him that in sixty days he would be retiring. Charlie was worried, but when he got home and consulted a calendar he realized April first was April Fool's Day. It was a joke. The foreman was yanking him around. He laughed it off and continued with the routine he'd developed during those many years of operating the giant, twenty-four foot lathe, Bertha. He and the machine had grown old together and during that period of time they had become best buds. It was almost as though the two of them depended on each other.

The days became weeks and the weeks soon became months. Before Charlie knew it April Fool's Day arrived. He was mildly concerned that he couldn't find his time card, but it was probably part of the joke. He'd have a time card by the end of the day. He knew that for certain. Then he was distracted finding George at the time clock.

"Ah, you finally got off nights, huh?" he said to George.

George ignored the question, "I thought you were retiring today," he said, as he slid his time card into the slot and listened for the heavy click as the machine stamped the time and date.

"It was a joke, George. The foreman was just having some fun at my expense. He knows no one in this company understands Bertha's quirks better than I. Maybe you've forgotten this is April Fool's Day?"

George didn't know what to say. He knew he was scheduled to operate Bertha today, but didn't know how to respond. Rather than start an argument he

simply followed Charlie up the walkway to the small operating room. The foreman obviously suspected there might be a problem, so he was waiting there when Charlie and George arrived.

"Charlie, George is taking over on Bertha this morning. This is his job now," the foreman stated.

"But --."

"There are no buts about it, Charlie," interrupted the foreman. "I told you a couple of months ago you were being retired. You don't work here anymore."

"I thought it was a joke."

"It's not a joke, Charlie. You've put in your time and you now have a monthly pension check in your mailbox every month. Use it. Go buy a fishing pole, or get some golf clubs or find a motor home. It's time you started enjoying life."

"You mean it's time I was let out to pasture," Charlie objected.

"Charlie, I have a mill to run and sixty men to oversee. The whistle will sound in less than two minutes. I don't have time to argue with you. Take it up with the personnel manager. This is a hardhat area and I want you out of here now."

"They are a hardnosed bunch," he told his wife, Sandra. "In the hundreds of times I've spoken or nodded to the general manager at the mill I never once suspected he was such a narrow-minded old cuss. He was unreasonable. He was as cold as fish, like I'd never set foot in the mill until this morning."



"Bertha"

*"They are a
hardnosed
bunch..."*



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Too Much Time on My Hands

Bob Cashdollar, NR8U

The United States Postal Service at the end of every year requires a magazine that is mailed through the postal system to file a Statement of Ownership, Management, and Circulation. (United States Postal Service, Statement of Ownership, Management, and Circulation, Form 3526, Amended March 14, 2010) Form 3526 requests details on the publication's stockholders, publisher, editor, managing editor's name, and additional details on the magazine's distribution. It should be noted that form 3526 also lists vendor sales, free distribution and distribution by first class mail of each magazine.

In addition, the form requires an accounting of the single issue mailing figures closest to the date the form was filed with the USPS.

I assumed the mailed magazines reflected the subscription or membership of the following magazines or organizations.

CQ MAGAZINE

As of October 8, 2013, *CQ* in the preceding twelve-month period mailed, on average, 21,851 magazines. On the date closest to the filing, October 8, 2013, it was 31,727 issues. (*CQ* December 2013, pg.10)

It should be noted that for *CQ* magazine, on average, for the past twelve months, its over the counter sales were around 9,403 magazines. (*CQ* December 2013, pg.10)

QST MAGAZINE

As of September 26, 2013 the American Radio Relay League mailed, on average, in the preceding twelve-month period, 119,831 *QST* magazines to their membership. The September date was also the filing date with the Postal Service and the ARRL reported a total of 119,045 *QST* magazines mailed to its membership. (*QST* December 2013, pg.148)

Vendor sales of *QST* for the last twelve months averaged over 8,012 for the period. (*QST* December 2013, pg.148)

QCWA JOURNAL

For comparison, I am also a member of Quarter Century Wireless Association and get their *QCWA Journal*, which is now a monthly e-journal with no print version. Going back a number of years in the old print *Journals* that were published quarterly, I couldn't find any form 3526 information. I have heard various membership numbers tossed around and about 4,000+/- current members seems to be most noted. The *Journal* is supposed to be limited to members only, so I assume that is the circulation at this time. (April 2014)

There are no over the counter sales of *QCWA Journal*. ■

Two VIP's Offspring *By Bob Ballantine, W8SU*

I'm glad the news media has left certain offspring of VIP's alone over time. Two of those offspring are Admiral Hyman G. Rickover's son Bob, W4OKA, and General Schwarzkopf's son, Christian, KK4MRO. You will find very little information on Bob and much less on Christian Schwarzkopf.

Christian N. Schwarzkopf, KK4MRO, born 20 June 1977 in Florida, to General H. Norman (1934-2012) and Brenda Holsinger Schwarzkopf. He has two sisters, Cynthia and Jessica.

Christian and his sisters were not without the problems we military types face, missing parents on duty. So hurtful, but hopefully when or if they return home there is joy for a season. It appears Christian attended private schools in Florida in his early years.

Somehow along the way Christian found time for amateur radio and our wish is one day to make a radio contact and exchange QSL cards. He resides in Midlothian, Virginia.

I found a few short statements General Schwarzkopf made that hit home with this older author and to which I totally agree and admire his candid phrasing.

On retirement and old age! "I feel that general officers should never miss an opportunity to remain silent concerning matters for which they are no longer responsible." Another statement that echoes my infirmities of old age, "I've got all of the problems that old men have."

None of us will escape those issues. ■

Obviously, make a second check when you select the part, and a final check after you inserted it in the board, before soldering. I find it better to do one part at a time, solder it, examine the solder joints with a magnifying glass, cut off the excess leads, and go to the next part. In one case, I should have checked a third time! There are handy instructions about how to remove a part from the board if you mess up. Also, there is a complete and very useful set of troubleshooting suggestions, which quickly pointed me to the errant resistor!

There are some construction choices to be made. If you aren't going to change frequencies (two sets of crystals were shipped with my kit), or use the accessory alternate final transistor, just solder everything in. I decided to opt only for plug-in final transistor (in case I fried something). Header pins to serve as sockets for the crystals and final transistor were included with the kit.

Construction went well, probably taking about four hours total, spread over a couple of evenings. Next move was to do a "bench test" with the various connectors attached through pigtails. Make sure to feed the power through the supplied reverse polarity protection diode, which keeps you from inadvertently doing damage by hooking up the power supply backwards. I have a small 1.4 AH SLA gel cell that makes a very convenient bench supply.

An initial test into a dummy load (after I fixed the errant resistor) showed I could get 250 milliwatts out of it. Not bad for a 2N2222! Connection to an antenna and tuner brought up all sorts of CW traffic on 14.060 MHz. A closer check showed me at 14.058 with a shift up 800 Hz when I hit the frequency shift button.

Having convinced myself that all was working right, the final task is it to put the board and off-board components into the case. With the exception of the BNC connector, all have their mounting nuts on the outside, so I could trim wires to final length, solder them to the off-board components, and insert them in their respective holes. I tied down some of the wire with zip ties for neatness, and fired up the RockMite][. Lots of signals here in "Slower Lower" Delaware on an end-fed wire in the attic! Now for some QSOs! ■



Sandra was not overjoyed about this situation either. For the past forty years she had planned her day around the hours Charlie was at work. And now, almost without warning, he was going to be underfoot everyday. But Sandra, being a kind, understanding person, didn't complain. Instead, she encouraged him to get his eyes checked and fitted with some new glasses.

"Maybe we can make some trips to the library, even join a literally discussion group," she suggested. But he was still in shock from being let go, so he seldom ventured far from the phone. He knew they would call him back.

Eventually, however, he found a sporting channel on the television that focused on fishing. After watching two Saturday morning episodes, he bought a fishing pole and tackle box and headed out to Newport's north jetty.

"I don't know about this fishing thing, Sandra. It's cold and windy out there on the jetty and the rocks are slick." He never went back.

Another week passed. Charlie walked part way down their lane to meet Sandra who was returning from the mailbox. She was so engrossed in a letter that she hadn't noticed him beside her.

"What's so interesting?" he finally asked.

"Oh! It's a letter from Mike."

"Our Mike? Our son, Mike?"

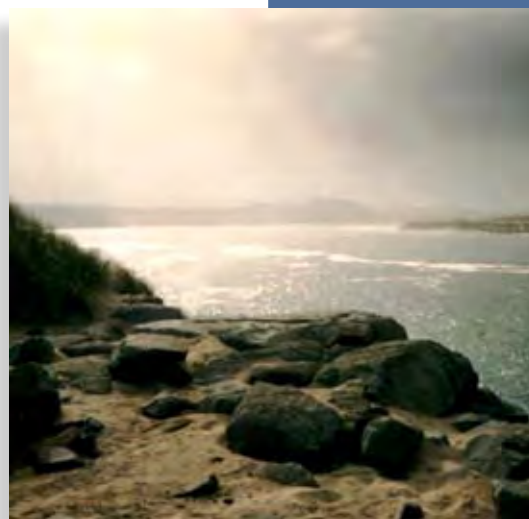
"Yes."

"Well, there must be a blue moon coming. How do we rate getting a letter from him, I wonder. What's he doing?"

"The Navy is transferring him from Newport News, Virginia to San Diego this coming August," she said, glancing at Charlie and smiling, then adding, "that's next month."

"What is it he does in the Navy?"

"Avionic. Whatever that is," Sandra answered. ■



Newport, Oregon
North Jetty



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low-frequency radio range [LFR]). This was the familiar “flying on the beam” system. Simply stated, pilots maintained their course while listening to automatically transmitted Morse characters “A” and “N” representing pairs of “A” and “N” quadrants. Upon hearing one or the other of the characters, the pilot would vary his heading until the letter became a steady tone. The signals were interrupted every 30 seconds by a two-letter station identifier.

The late 1920s into the 1930s saw the rapid growth of commercial air travel in the U.S. and abroad with the introduction of a new generation of larger, faster, more comfortable and safer airliners. Of necessity, safety for the passengers and crews of the big silver birds included improved, more reliable radio communications and navigation. Growing fleets from a myriad of carriers demanded improved air traffic control and weather conditions dissemination.

With WWII, electronics, spurred by the exigencies of combat, came the rapid advancement of RADAR, IFF, the proximity fuze, precision bombing, long distance navigation, landing systems and signals intelligence.

Great Britain’s massive Chain Home land-based early warning system, operated at 22-25 Mc and 200 Mc. Thanks to Britain’s magnetron and MIT’s Rad Lab, RADAR, now operating at 10 cm, was at a size to go mobile. In 1941 it found an airborne interceptor role aboard the specifically designed to carry RADAR Northrop P-61 Black Widow night fighter. Prototype P-61s were fitted with Western Electric’s SCR-520 set;

production model P-61s were supplied with the SCR-720 set. Of course, it is in the nature of things that for every new measure there will be counter-measures, thus stretching the frontiers of knowledge ever forward. Such is the evolution of technology whether driven by military, scientific or commercial applications.

The tail end of WWII birthed the ballistic missile, an invention that postwar to this very day would drive worldwide military, scientific and communications competition. And, with normalization, despite the Cold War, commercial air travel soon rebounded past its pre-war levels of passengers carried; destinations, distances flown and aircraft speed necessitating ever more sophisticated electronic devices.

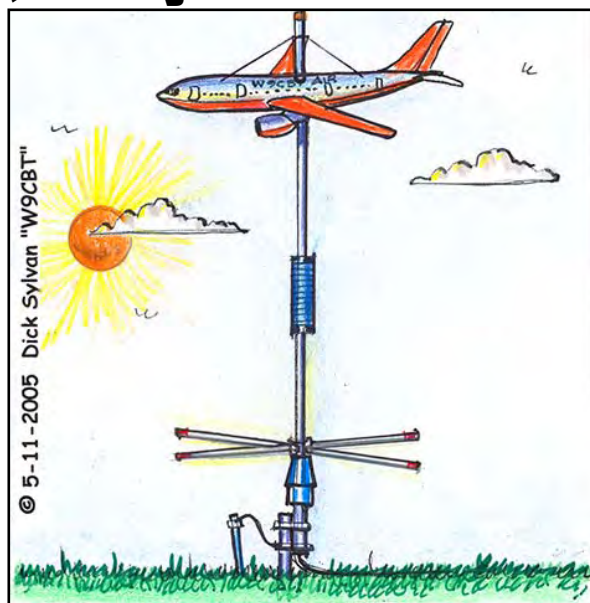
Electronics in the Evolution of Flight offers readers a concise history of avionics during its first century. In its 224 pages we read how aviation and electronics, in tandem, grew, matured and spawned the numerous devices that took aviation from its halting first flights to a massive industry that, in its turn, fostered the world we now live in.

The book’s cover blurb states author Albert D. Helfrick, “a professor of avionics at Embry-Riddle Aeronautical University, has spent twenty-five years designing avionics.” In addition, he has written 16 articles and items published in *QST* dating from December 1969 and a number of articles in *Ham Radio* and 73 magazines. ■

Electronics in the Evolution of Flight, Albert D. Helfrick, Number Nine: Centennial of Flight Series, Texas A&M University Press, College Station, Texas, 2004, ISBN 1-58544-413-8

Ham Lingo

DICK SYLVAN, W9CBT



GROUND PLANE ANTENNA

A Winning Formula...

Like what you’re reading in this month’s *K9YA Telegraph*? If so, you’re in good company, as amateur radio operators in more than 100 countries agree with you. Know what else? Hams just like you write the *K9YA Telegraph*. Really!

Evidenced by your feedback and our expanding worldwide subscriber base, we know we’ve hit on a winning formula:

YOU + *K9YA Telegraph* = A Great Read.

Without your side of the equation, it just doesn’t add up.

Not sure of your writing skills? No problem, the *Telegraph*’s staff will edit your manuscript. The important thing is to share your story. Remember: “A good story is a terrible thing to go untold.”

http://www.k9ya.org/write_for_us.htm