PREFACE

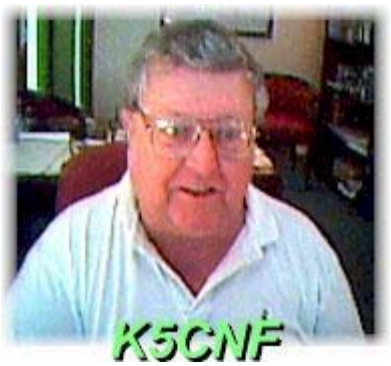
Ham WorkShop, series of books is derived from a choice selection of the archives of a regular monthly column of *antenneX* Online Magazine. This collection of articles is filled with a variety of "RADIO-STUFF" of value to almost everyone in amateur radio from Novice to Extra and those just beginning to take up this special hobby. This includes subjects, but not limited to: VHF, choosing the right antenna, coax cable, small to mid-scale construction projects in a practical manner, use of test equipment and clever methods of ways to build some of your own, etc. It is also meant to help readers become more familiar with the technical jargon *and* the fun side of this exciting and most rewarding hobby.

In this Volume 3, the very special issue of lightning protection is discussed in a 3-part series. This is a highly important subject of interest to almost everyone with an exposed outside antenna.

In addition to the various and wide variety of "how-to" articles, you will find a pile of useful "Tech Tips" for a quickie reference of ways and means to do things in the workshop.

We are pleased to now publish Volume 3 of this series packed with more interesting ideas for projects in your workshop or ways to enhance your antenna system.

ABOUT THE AUTHORS



Richard Morrow, K5CNF has an Associate Degree In Electronic Engineering, attended many classes and seminars conducted by *Motorola, RCA, General Electric, Furuno*. Has been a licensed radio amateur since September 1955 and holds an Advanced Class. Held license as a 2nd Class Commercial Radio Telephone operator w/shipboard Radar endorsement since 1957, upgraded to 1st Class radiotelephone operator in 1960. Has been a broadcast engineer for AM, FM and TV. Was a electronics instructor for *United Electronic Institute* in Dallas, Texas, Over 100 published articles in *73 Amateur Radio, Radioscan*, and of course, *antenneX* where he has been an editor and author since its creation in 1988.

Spent three years as a radio operator (1962-1965) in the US Army, assigned to Headquarters Company, 1st Battalion, 23rd Infantry, 2nd Inf. Div., Ft. Benning, Georgia. Worked in two-way radio industry as field technician for years. Previous jobs include *Texas Instruments, Collins, Dresser Atlas, S.W. Bell Telephone*, and several broadcast stations as chief engineer.

Richard has three patents issued on electronic devices and is an eternal experimenter. Built many transmitters, amplifiers, and numerous other ham devices as needed. Work DX when it shows up. Best DX, Pitcarin Island on 10 meters with the HTX-100 and a converted Cushcraft 1/2 wave

CB vertical propped up against the garage. Other DX includes ZL on 75 meter SSB with 60 watts, Senegal on 75 meters SSB, 60 watts again, antenna was a dipole at 35 ft. Current activity is on 160 meters sometimes, 40 meters, two meters and 440 MHz. Favorite antennas are: Phased arrays, magnetic antennas, directional arrays, and anything that radiates well.

Current rigs are TS-430S, TS-700 multi-mode, Kenwood two FM meter rig, Icom 440 ht. Radio Shack HTX-100, Radio Shack 440 ht, 2 Atlas 210x, Johnson 275 watt Matchbox, Johnson Thunderbolt, several older SGC SSB marine rigs, three Heathkits.

Interests include; antennas, astronomy, music, both radio and optical, reading, photography, motorcycles, archeology, cars, Cosmology, Science in general, Nature, animals and aviation.

L. B. Cebik, W4RNL, has written extensively about antennas and antenna modeling (as well as other electronics subjects) in most of the U.S. ham journals, including QST, CQ, Communications Quarterly, QEX, Ham Radio, 73, QRP Quarterly, Radio-Electronics, and QRPp.

Besides the continuing series of antenna modeling columns he does for *antenneX*, he also writes a column for 10-10 News (An-Ten-Ten-nas) and another for Low Down (Antennas From the Ground Up). A life member of ARRL, he serves as both Technical and Educational Advisor.

He has been a Ham since 1954 and is also a life member of QCWA and of 10-10 International, for which he maintained an extensive web site. He also maintains a web site of his own (http://www.cebik.com) on which he has placed a large collection of entries from his notebooks. A educator for over 30 years, he is retired and professor emeritus of philosophy at the University of Tennessee, Knoxville. *antenneX* is very fortunate, indeed, to have LB as a member of its writing team.

Robert Wilson, AL7KK is a physicist, engineer, and senior member of IEEE. He spent his career designing and supervising the installation of such antennas. Now retired, he shares with you the wisdom of hard-earned experience as an engineer with hundreds of low and medium frequency antennas to his credit and explains how to build good, effective, simple, low cost, long range antennas. he has been employed by the FAA, Voice of America, Martin-Marietta, Comsat, RCA, and DoD working in 21 countries.

He has handled government and civilian antenna projects in North, Central, and South America. His radio station projects have included Europe, Africa, and Asia. He

personally built some of the first U.S. satellites. Mr. Wilson has been on the staff of the University of Colorado and Wyoming. Robert also attended the University of Alaska, Allegheny College, University of Colorado, University of Iowa, Lake Forest College, University of Maryland, and Rockford College. In addition he is a helicopter pilot, a ship radio officer, and a long time radio amateur with the call AL7KK.

Tom Cox, KT9OM, is assistant director of the information technology department of a 10,000-student, 7,000-computer public school corporation. His most recent project is replacing the corporation's leased digital telephone lines with high-speed wireless connections. On his own time, Tom plays with antennas, reads fiction and non-fiction, and gardens or removes snow and splits firewood, depending on the season, and rides about 250 miles a summer on a bicycle.

He was born to generous and patient parents, Jim and Jeannette Cox (both deceased), in 1949, and has been a Ham since 1982. He shares his Muncie, Indiana home with his lovely and indulgent wife, Sherry, and three dogs. He shares his neighborhood with his brother, KA9PBO, with whom he plays radio and attends hamfests. Tom is an active member of the GARDS.

Dan Richardson, K6MHE was first licensed in 1955 and has been enjoying amateur radio ever since. Dan was an electronic technician in the late 50s' and early 60s' and served in the US Coast Guard. He returned to the family Foundry business upon completion of military service.

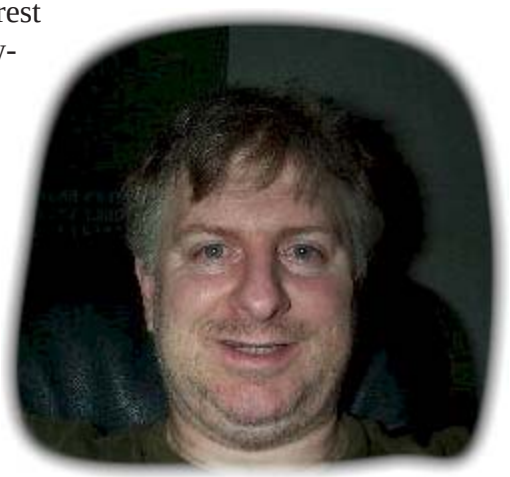
Dan later sold the Foundry business and retired a few years ago. He moved up to the North Coast of California, USA and has been playing with antennas and computers ever since. There, in a rural area, among the tall trees and without any CC&R limits he pursues his favorite pastime of stringing up and experimenting with antennas.

He has also authored several articles on this favorite subject of antennas. Dan enjoys working with computers and spends a great deal of time testing and evaluating antenna design software.

George Sharp, KC5MU has been a Ham since the age 16 (now 88 in 2004). He has experimented with antennas, especially small ones for 80 and 160 meters for the last 20 years. There have been a few successes and many failures, George says! Although he likes J-Poles, his best successes have been with 10-foot diameter loops made of 3/4-inch hardline using their internal capacitance for resonance on 80 and 160.

George is a retired Navy Captain (Submarines) and graduate of the US Naval Academy Class of 1939 with some extra electronics courses back in the tube days. He has the usual Ham gear, some powered by Solar charged batteries. He says one of his favorite and well-used pieces of test equipment is an MFJ Analyzer.

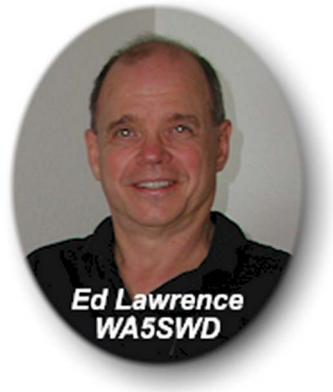
Peter Woodland, VK3KCG (previouslyVK3ZPW) is active on 160 meters, 80 meters, 40 meters, 30 meters, 20 meters, 17 meters, 15 meters, 12 meters, 10 meters, 6 meters, 2 meters, 23 cm, 430/440 MHz / 70cm, HF, VHF, UHF. Areas of interest are Hamfests, Kit building, Mountain topping, Rag chewing, Recreational vehicles



Peter enjoys operating: AM, Amateur satellites, ATV, Digital modes, DX, DXPeditioning, and Microwave

Some favorite hobbies is that of homebrewed equipment, Linear amplifiers, Power supplies, Repeaters, Restoring equipment, Station accessories, Toroids, Transceivers, Vacuum tubes.

Antennas/Propagation: Antenna tuners, Baluns, Beam antennas, Coaxial cable, Dipole antennas, Dish antennas, Duplexers, Loop antennas, Meteor scatter, MININEC, Mobile antennas, Multi-band antennas, Quad antennas, Rotators, Sun spots, Vertical antennas, Wattmeters, Wire antennas, Yagi antennas.



Ed Lawrence, WA5SWD started working as an Electronic Technician in 1958. He has been active in Amateur Radio since 1964 and presently holds an Extra Class License. Over the years his writing credits include articles in 73 magazine, QCWA, various club newsletters and www.antennex.com.

Ed has worked at a lot of interesting places, including North American Aviation, Lear Stereo Division and Texas Instruments, from which he retired in 1991. Since then Ed has worked mostly as a Contract IC Mask Designer on microprocessor and cell phone chips for many of the major players.

Work locations have varied but include Switzerland, Ireland, Pennsylvania, Texas, Arizona, Washington and Oregon. Ed also has his Certified Flight Instructors rating, but is not presently a very active pilot due to his nomadic life style. Presently Ed works at RFSAW, Inc in the Dallas, Texas, USA area. There he assists in test and development for RFID Passive Microtags.

Fred M. Griffee, N4FG, (EE Ret) After graduating from the Orono, Maine High School, Fred joined the Navy for a three-year tour which was extended one year due to the Korean situation near the end of his three-year tour of duty. His service duty time was nearly four years from 1948 to 1952. Fred served as a Radio Operator for the Navy during the entire tour of duty.

After leaving the Navy, Fred went back to school at the University of Maine and received an engineering degree in Electrical Engineering in 1956 with a minor in power distribution and mathematics. From that point on, he worked with various companies as an electronics engineer, specializing in navigational aids, communications and computer systems at various levels of responsibility until retiring in 1988.

Fred's amateur radio interests started in 1945 and got his first license in 1948 as W1QWV. At that time, the FCC required issuance of a new call sign when moving to new districts. So he received K2UUU when moving to New Jersey in 1956 and then W4IYB when moving to Virginia in 1965. His present call was issued after application in 1968. Fred's interests in amateur radio have been mostly experimental projects but more specifically in the antenna and transmission systems. However, he designed and built a complete amateur radio station in 1967, which Fred found as a very interesting project, especially regarding the receiver and transmitter.

To date, his interests are still primarily antenna systems, which include antenna tuners (imped-

ance matching networks), antennas, and transmission line characteristics. Fred's amateur radio mode of interest remains CW.

Doug Flory, WB6BCN is employed as a Communications Technician and has been at that position since 1979. Prior to this position he was a Chief Engineer for two radio stations. Doug also did broadcasts of early morning news weather and sports. During his early years of 1964 to 1979, he was employed as a TV technician and perhaps has installed more than 500 antennas in that role.

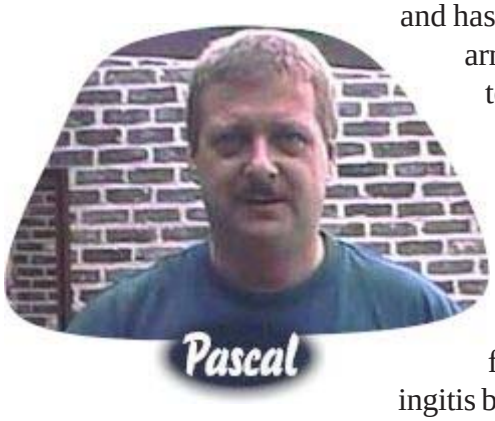
Doug was born in Columbus, Ohio USA and then lived in Paulding, Ohio until 1960 when entering the Army. With the Army he was in the Signal Corps of the 24th Infantry/Artillery stationed in Munich Germany. After an honorable discharge from the service in April 1964, he settled in California.

Sajid Rahim, H5ANX (Bophuthatswana), ZS6EW and A22EW grew up in Africa's remote heartland where television did not exist. Shortwave was the sole means of getting news of the world. He started to develop an interest in antennas to find ways to get better reception for his father's shortwave receiver, which was a simple 4-band shortwave radio from National.

In 1991 while at Rhodes University, situated in Grahamstown, Eastern Cape, South Africa, Sajid and a group laid the foundation for AstroSoc (Amateur Radio and Astronomy Society). The society, amongst its early accomplishments, put up a large astronomical observatory and amateur radio station. To date, this society continues to actively further its work and objectives amongst the students and community alike. Sajid obtained an advanced grade licence in 1994 with callsigns of H5ANX (Bophuthatswana), ZS6EW and A22EW.

His interests remain in Astronomy, Amateur radio, and current affairs. Academic interests are in computer sciences, specifically compiler theory, cryptography, and operating system design. Work interests are in Financial Systems related designs and implementation. He is accredited with a Bachelor of Science (Information Processing), a Bachelor of Commerce (Honours) in Information Systems, and a Master of Science in Information System.

The Belgium Team - Pascal (as Author) Jef Verborgt (as Translator)



Pascal Veeckmans was born on January 13, 1965 in Tienen Belgium. He is married to Marleen and has a ten-year-old son, Glenn. Pascal, employed by the Belgian army, and is a member of the BAFARA Belgian Air Force Amateur Radio Association. He got his first license in 1996 and passed the Morse code in 1997. That earned him the call sign ON4CFC. Pascal can be heard frequently on the HF band.

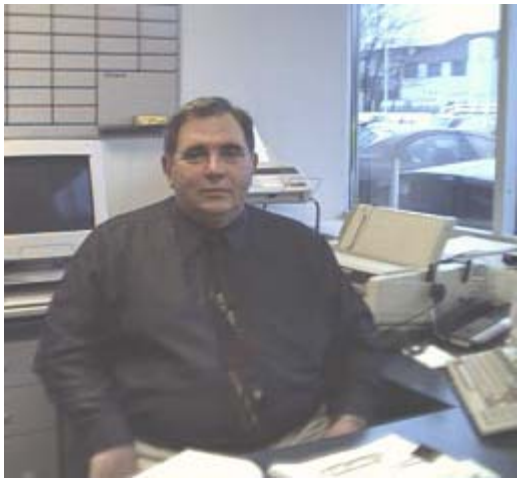
Jef Verborgt was born in 1944 in Belgium. Jef was saved from a certain early death by meningitis by the American soldiers having the first penicillin for which he is still grateful. He went on to obtain a Ph.D. degree in Polymer Chemistry in 1970 at Louvain Belgium followed by a postdoctoral Fellowship with Dr. C.S. Marvel at the University of Tucson, Arizona. Jef has been Director of Research for Sigma Coatings for 15 years after which he became Director of the International Business Operations for Marine and Protective Coatings. Jef further held the position as President of Sigma Coatings USA in New Orleans, Louisiana. He is married to Marijke from Holland where Jef had lived for some 20 years. He is the father of one daughter and two grandchildren who live in Belgium. Jef says he enjoys fishing, Louisiana food, experimenting with antennas and living in the USA.


Martin Hedman, SMODTK

Martin Hedman, SM0DTK works as an engineer in the telecommunication business area. He has been a HAM for 39 years and only needs BS7H to complete his DXCC.

Martin's ordinary QTH is Haninge, downtown Stockholm, but often operates portable from his summer home on Gotland Island in the Baltic sea (IOTA EU-020). He enjoys testing different antennas both from Stockholm and from the island. Martin is 60 (July 2003).

John P Callaghan, KB1JGK - Back in the early 1950's while attending a technical high school in Bloomfield, NJ USA, I got the HAM radio operator bug and concurrently soloed my first airplane. The more electronic theory I learned in the classroom, the more hooked I became. Completed school, then off to the USCG, Radioman School in Groton, Connecticut, University Courses, advanced Pilot Training, obtained my first HAM ticket and more.



Soon the children started to come along and HAM radio was put aside as I took graduate courses ending in degrees and working as hard as I could. I traveled extensively during my career and am proud to say I was a team member on many cutting edge technologies including visual digital communications, satellite based digital automatic location systems, Ion generators for health care uses (never approved by the FDA) multiplexing over coaxial lines and standardization of ground potential in the health care delivery system.

Finally retirement came and I was able to take up HAM radio again, step back into a laboratory environment (mine) and start developing. Each morning when I arise I find challenging things await me.

My passion comes with making antennas smaller so that everyone has the opportunity of getting on the air regardless of restrictions where they live.