QUINTE AMATEUR RADIO CLUB
P. O. Box 292, Belleville ON K8N 5A2

Q. R. M.

M E E T I N G

DATE: February 17, 1993
TIME: 7:00 p.m.

LOCATION: Northern Telecom
Rear Entrance

PROGRAM: Tour of Surface Mount
Technology Lab

ANTENNAS THREATENED BY POLICY PROBLEMS (reprint from CARF)

CARF and CRRL are working behind the scenes attempting to stop some antenna structures. DOC's procedures circular CPC-2-0-03 (Provisional) governing antenna installations and environmental acerous is not working. It is generally misunderstood and even rejected by some municipal officials. Some challenged and overridden thereby allowing an air of threat and uncertainty to prevail. In some cases local DOC seem unfamiliar with the distribution of powers under the Radiocommunication Act causing further confusion and difficulties. Your national organizations are talking to DOC at the national and regional levels in an attempt to resolve this serious threat to amateur radio and other licensed radio services. CRRL and CARF, as members of the Radio Advisory Board of Canada, are seeking RABC support in this mutually threatening situation.

People like Rene Poitras VE1CB, Bill Wilson VE3NR, Tim Ray VE3XV, Ralph Cameron VE3BBM, Jim Munsey VE6BKW, Tim Ellam VE6SH, Earle Smith VE6NM, Dave Fancy VE7EWI and others across the country are helping amateurs who are dealing with restrictive bylaws and unsympathetic officials. Places such as Calgary, Edmonton, Kamloops, Vancouver, New Westminster and Madawaska, NB have instituted bylaws or procedures to control the erection of antenna structures. Antenna heights are limited: Edmonton to 32 feet, Madawaska to 13 feet, Vancouver "to

1.9 metres above the existing grade". New Westminster defines antenna structures as "accessory buildings" subject to local land use restrictions. Calgary wants a "Development Review Permit" ($142.00) and Madawaska demands an amateur must follow a "variance" procedure ($55.00). These are serious challenges to federal jurisdiction over radiocommunication matters.

The federal Radiocommunications Act clearly states under Section 5, (f) the Minister...may "approve each site on which radio apparatus, including antenna systems, may be located, and approve the erection of all masts, towers and other antenna supporting structures;...". The 1987 federal government commissioned Townsend Report, on the constitutionality of the various powers in this matter, backs up federal authority over free standing antenna structures. It is challenged by some municipal officials!

"Calgary city official stated in a letter to CRRL counsel Tim Ellam VE6SH that, "I'm not prepared to concede, as you are, that support structures are the exclusive domain of the Federal Government. Clearly, this issue would be dependant on the facts of the case (eg. whether what was of prime importance was the impact of the structure on the neighbourhood versus its suitability to transmit or receive radio signals)." New Westminster ignored the pleas of amateurs at a council meetings and renamed antennas and support structures as buildings to get around federal control. There are other examples. Such opinions and actions seriously threaten federal control over amateur and licensed radio services in Canada. Jurisdiction and policy are openly undermined!

Some Regional and local DOC people seem out of step with the national policy coming out of Ottawa. Vancouver DOC state in a letter to city officials that, "Municipalities make by-laws concerning safety, aesthetics and similar issues pertaining to antenna towers". Saint John DOC instructs an amateur that "... it is my recommendation that you make application ... for a variance to the municipality of Clair's by-law pertaining to accessory structures." Unfortunately, both statements unwittingly support "ultra-vires" actions which undermine federal jurisdiction and control of radiocommunication matters. It is unclear at this time as to what DOC intends to do about all of this!

Other matters seem to be working against DOC's Client Procedures Circular CPC-2-0-03 as an effective process in the management of the issues. Firstly, it is not well written! DOC officials wish to keep the procedural language general in nature, however the lack of specifics leaves details of obligation and procedure too much to chance. This causes costly misunderstandings for all concerned. There is confusion over the distinction between commercial and amateur licensees in the process. It also groups antenna appearance and the concern with the proximity of electromagnetic fields as similar issues. Secondly, some DOC Regions appear to have neglected to work more closely with city officials and municipal associations to ensure federal jurisdiction, policy and procedures are clearly understood and accepted. We are told that Ottawa DOC cannot always influence the operational actions of Regional managers over such matters.

Both CRRL and CARF take the position that municipalities should not be able to enact bylaws or legislation wherein individual amateurs have to ask permission to site antenna structures. While DOC has stated that amateurs have to ask permission to site antenna structures. While DOC has stated that amateurs are not obliged to request permission, we advise amateurs to follow DOC policy and consult with neighbours and municipal officials. Let those concerned know your intention! Be open, courteous and co-operative! Follow siting practices which protect you and your neighbour's property. Err on the side of caution over matters of structural integrity and safety. Keep structure and apparatus appearance consistent with current practice, e.g. a regular tower

(Delhi, Hy-Gain, Rohn, Trylon, etc.) and tri-bander will function adequately in an urban setting and is not out of step with the use of similar structures around the world.

We recommend that club executives engage in meetings and friendly discussions with municipal planners and elected officials pointing out the many ways amateur radio enhances life in a community. Your national organizations are working on a "communication package" of a video tape and an explanatory paper on antennas and amateur radio which we can all use to communicate our story to our neighbours and community officials. in the meantime, we will work in co-operation with DOC, RABC and with provincial and local governments to ensure the law and reasonable policies are clearly understood and that effective procedures are followed. We will keep you informed on this disruptive and threatening matter as actions and issues unfold.

Dana Shtun, VE3DSS,
President - CRRL
Farrell Hopwood, VE7RD,
President - CARF

2 METER STRIP FILTER BYPASS

By Ron Hovinga VE3UGU

If you have built the strip line filter, from last month's newsletter and find on duplex operation it will not tune to both receive and transmit. This circuit is the solution. A small inexpensive project for a winter weekend.

Circuit operation

RF voltage from your transceiver is applied to diode 1 & 2 and is rectified. This DC voltage supplies bias to the 2N2222 transistor switch, energizing the relay coil.

Construction

1- Mount all components including the relay on a small circuit board.
2- Solder RG58 coax to board also the 12 vdc supply wires.
3- Mount aluminum bracket including connectors to the filter box.
4- fasten the circuit board to the bracket.
5- Connect all cabling.

PARTS REQUIRED

2 1N914 diodes
1 2N2222 transistor
2 10K resistors
2 SO231 Connectors or 2 BNC chassis mount connectors
2 PL259 connectors or 2 BNC line connectors
1 12vdc Relay
1 Small circuit board
1 Aluminum bracket

HAVE FUN RON

Leo VE3LAX and Audrey wish to thank the Radio Club for flowers sent on the occasion of their 50th Wedding Anniversary.

TAKE NOTE

The annual Dayton Hamvention is being held April 23rd and 24th, 1993 - plan ahead.

The Fleamarket in Marmora will be held on June 12th, 1993.

The annual Fleamarket in Pickering will be held on April 3rd, 1993. Hope to see you all there.

How Radio Acquired its Voice

By Philip Duncan KD7EB/9
Reprint CQ Jan. 1988

In terms of excitement, wonder, and sheer unlikelihood, the events of the days of radio make a tale that's hard to beat. On many thunder and lightning filled evening (my antennas grounded out and useless) I've spent hours happily absorbed in ancient QST's or mouldy Radio magazines, sometimes coming across a surprising new piece of the story. Like any story, some of the characters have giant reputations and easily recognized names: Maxwell, Hertz, Lodge, Marconi, deForest, Armstrong, and the lot. Others never received the fame that was their due. What about Frank Conrad? He was the amateur whose pre-Radio Act Broadcasts of music evolved into the first full-blown commercial radio station--KDKA in Pitsburg. Or, take the story of Art Collins. Everyone knows of the excellent equipment that has worn his name, but few today know that as a teenage ham he homebrewed such a superior rig that he was the

sole contact with Robert Byrd's Antarctic expedition. (Byrd was so impressed that he paid Collins a visit and commissioned the youngster to build the radio gear for his next expedition!) One little-known piece of the story concerns the man who spanned the gap between spark transmitters and the modern radio, who invented the terms continuous wave and heterodyne, who made the first two-way transatlantic radiotelegraph exchange, and who, in fact,
was the first to succeed in modulating a transmitter with the human voice. He was the quarrelsome, temperamental Canadian genius, Reginald Aubrey Fessenden.

Fessenden grew up in the exhilarating atmosphere of the latter half of the nineteenth century, a period characterized by rapid technolological advances, and the heyday of the serious amateur scientist.

He was fortunate to have been the favourite nephew of a broad minded physics teacher who encouraged the boy to follow his interests in the electrical sciences. Fessenden received an adequate education, but only began to build his reputation as an intuitive electrical genius after he went to work for Thomas Edison at Menlo Park. There he gained a solid background in practical electrical theory, a subject not taught in many schools of the day. He later parleyed these credentials into various teaching and consulting positions that left him time for his own experiments, which produced an impressive string of patents but not much income. What he was investigating (and what Edison and others considered a foolish endeavour) was the possibility of using Hertzian radiation to convey the human voice.

Fessenden was, of course, not the only experimenter working in the field of radio communication. In 1892 Sir William Crookes, English chemist and physicist, published a paper exhorting his fellow scientists to work on the task of perfecting wireless signalling. Crookes' paper on the promise of wireless telegraphy was read by many, including young Gugliemo Marconi, who with the help of his family's considerable fortune, found plenty of time and money to devote to this research. By the late 1890s he was working a vertical radiator against the ground, the "Marconi Antenna," and steadily improving the range of his equipment.

With the aid of Britain's preeminent physicist, Sir Oliver Lodge, the young Italian formed the British Marconi Company, which nailed down several contracts with various governments to install ship-to-shore wireless installations. Soon he was making plans for the famous transatlantic wireless tests between Newfoundland and England, and though most scientists were sceptical, interest in the experiment ran high. Marconi's rapidfire successes were not lost on Reginald Fessenden; the scant attention his own work received was usually derisive. Lodge went so far as to dismiss Fessenden's speculations on wireless telephony as nonsense, and though Fessenden would later stand him on his academic ear for this rashness, Lodge's word was law at the time.

To fully understand what a radical departure Fessenden's work represented, it is necessary to first understand the established wisdom as promulgated by the Lodge-Marconi camp. Physicists then commonly held that electromagnetic radiation was generated by some severe disturbance, such as a high-power electric arc, which caused waves to be set up in a mysterious, invisible, all-pervading fluid called the "ether." To detect these ethereal disturbances, a device such as the Branley Coherer was used, which actuated an ordinary land-line telegraph sounder. Fessenden, however, believed that Hertzian radiation could be generated as continuous waves. He thought, in fact, that RF emissions were nothing more than alternating electric currents of extremely high frequency and were propagated because of their inherent high-frequency energy and not because of the so-called "whipcrack" effect of an electric arc in the mysterious ether.

This was an imaginative leap of tremendous significance, and though it would finally require both

Einstein and quantum mechanics to "dispel the ether" from physics textbooks, Fessenden's intuition was right on track. His early experiments with wireless telephony had used spark transmitters, and though he actually achieved a recognizable but highly distorted transmission of human speech as early as 1900, he could not improve the quality.

It's not hard to understand why: a spark transmitter is a horrendously noisy device. It generates a rough, raw, broadband signal that hopelessly drowns the subtle variations of the audio waveform. Audible vibrations lie in the frequency spectrum from perhaps 20 to 20,000 Hz and will not radiate efficiently even when converted by a microphone to electrical vibrations. Fessenden guessed correctly that he must generate Hertzian waves at some frequency much higher than 20,000 cycles per second for hid signals to radiate efficiently and for there to be sufficient room to allow the audio signal to be tacked onto this carrier wave. Thoroughly disgusted, Fessenden gave up trying to modulate the raspy spark transmitter and began seeking a way to generate a clean sine-wave (single frequency) oscillation to act as a quiet carrier for the audio. With the help of an electrical engineer, Ernst Alexanderson, he found it.

Alexanderson had been working on experimental high-frequency AC generators and the task fell to him to fill Fessenden's order for a machine capable of generating alternating current at the unheard of frequency of 100,000 Hz. An alternator was finally produced at General Electric that would run at 50,000 Hz without either flying apart or melting its bearings, as its predecessors had done. Initial tests vindicated Fessenden's theory that Hertzian radiation was simply high frequency AC electricity. The tests also suggested that the alternator was capable of producing a quiet, narrow-band carrier for his audio experiments. That the alternator transmitter attracted little commercial interest bothered Fessenden hardly at all, but his financial backers were growing a bit uneasy.

Fessenden, not having Marconi's private means, had acquired the support of a pair of millionaires and formed the National Electric Signalling Company (N.E.S.C). With the success of Marconi's one-way transatlantic radiotelegraphy tests in 1901, the British Marconi Company had expanded into a multinational corporation with a stranglehold on the lucrative maritime radio market, and thus most shipboard installations used Marconi spark equipment. Fessenden was able to secure only one commercial wireless contract, with the United Fruit Company to equip some of its Caribbean fleet with Fessenden apparatus. N.E.S.C. had constructed a pair of experimental facilities for Fessenden (with 400 foot vertical antennas)--one at Brant Rock on the coast of Massachusetts and one at Machrihanish on the western shore of Scotland--to run against Marconi in the transatlantic race. On January 10, 1905 Fessenden's team made the first two-way transatlantic radiotelegraph exchange.

Fessenden's company still wasn't selling much equipment, but his research was doing much better than his finances. Prelinary test results with Alexanderson alternator as a speech transmitter exceeded even Fessenden's high expectations: the received audio was clear and relatively undistorted. Fessenden was jubilant in the 1906 when he was advised by the Scotish station that the Brant Rock to Plymouth, Massachusetts, radiotelephony tests had been received in Scotland with perfect clarity and comprehension! The receiving operator had recognized the voice of Chief Engineer Stine, and though understandably shaken, the operator managed to copy a verbatim transcript of the test and sent along a copy for proof. An eager Fessenden prepared a press release and scheduled a public transatlantic demonstration, but it was not to be. In early December 1906 the Scottish station was destroyed by a freakish storm. He brooded for a few days, but brightened when an alternate plan came to mind: he signalled from Brant

Rock to his shipboard operators in the Caribbean that they should pay special attention to a transmission on Christmas Eve, and should they have no luck then repeat transmission on New Year's Eve.

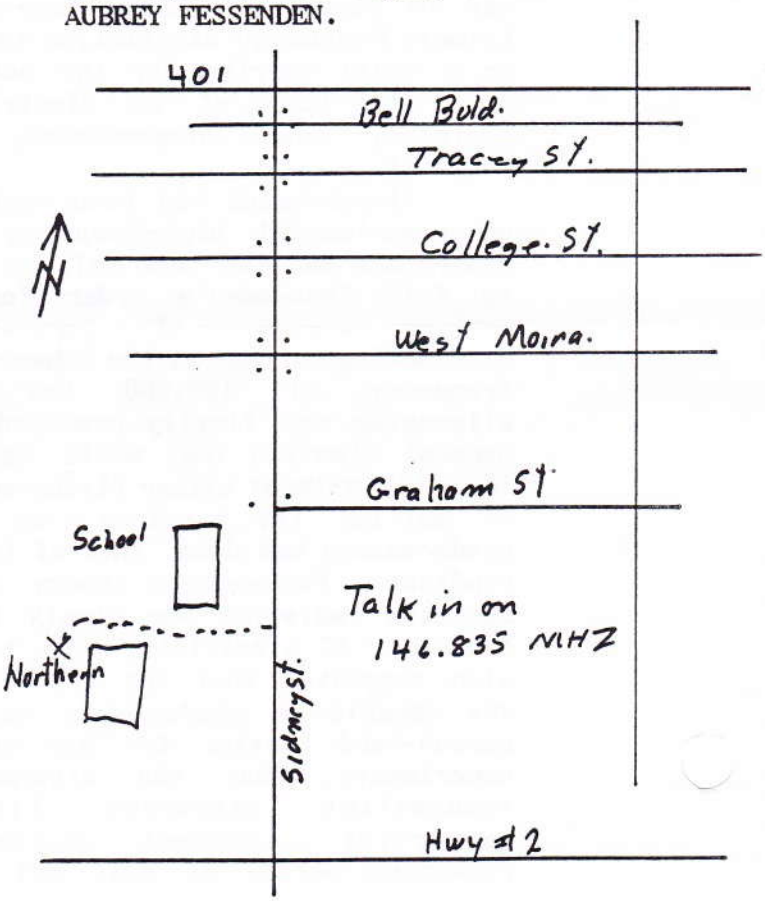
On Christmas Eve 1906 Fessenden himself began the first broadcast speaking into a water-cooled, asbestos-covered microphone. He read verse and Scripture. He played an Edison phonograph. His wife sang. He accompanied his wife on the violin. His chief engineer tried to sing but developed radio's first case of mike fright. Finally Fessenden asked that anyone hearing the transmission write to him at Brant Rock with reports. He was overwhelmed by mail from the North Atlantic to the Caribbean. They were amazed.

Unfortunately, this triumph brought Fessenden little notoriety and even less money. Quite soon after his successful broadcasts Fessenden fell out with his backers, who then confiscated his notes and equipment,turned him out of Brant Rock, and declared that they owned the rights to his patents.

During the first three decades of the twentieth century the story of radio seems like a never-ending succession of legal dogfights, with cries of fraud and infringement on every hand. Fessenden fought more than his share of these, subsisting on small engineering contracts with every spare cent going to finance the fight to regain control of his patents. He finally won. In 1912 he was awarded the largest court settlement in history (to that date) for a patent infringement claim -- $400,000. However, he was only able to collect in 1928, after the defunct N.E.S.C. had been acquired by Westinghouse. In 1932 he was honoured by the Institute of Radio Engineers for his many valuable contributions to the art, and that same year he died--quietly and obscurely--in New York.

Though he is practically unknown today, most (if not all) modern communication technique descends directly from Fessenden's innovative work on continuous-wave radiation and from his obsession with wireless telephony. The development of Armstrong's regenerative triode amplifier made the reception of the weaker, narrow-band CW signals easy, and when it was discovered later that vacuum tubes could also be used to generate RF signals, the use of spark transmitters waned until, finally, they were legislated out of existence when the crowded radio spectrum could no longer tolerate their wide band interference. When regular broadcasts of news, music and special events programs began in the 1920s, Fessenden's greatest contribution to radio was finally put to use.

Though he does not have a unit of measurement named for him, like Hertz, or a name synonymous with radio like Marconi, perhaps he has an even more fitting memorial--all these old amateur transmitters marked "PHONE-CW".It's hard to believe that more amateurs don't know of the stubborn Canadian who, for all practical purposes, invented both modes. After all, where are Marconi's spark transmitters? Gathering dust in museums. And Telsa,s induction coils? Mostly firing spark plugs these days. But every time we tune up, be it on CW, AM, SSB, or FM for that matter we are enjoying the legacy of REGINALD AUBREY FESSENDEN.



2 METER STRIPLINE FILTER TRANSMIT BYPASS