North Shore Amateur Radio Club

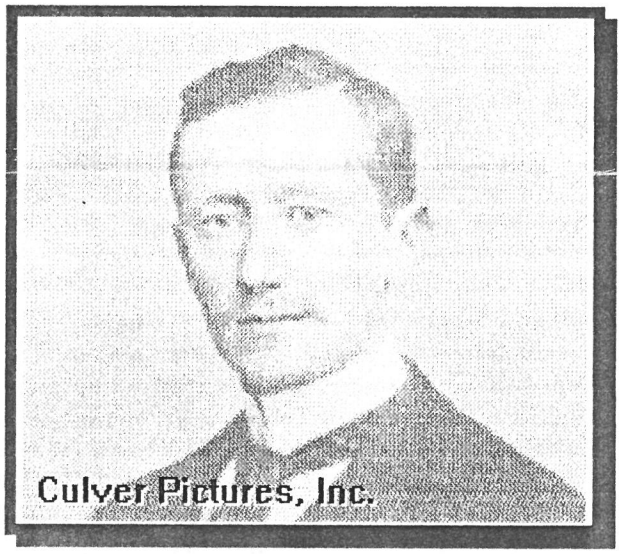
~ SPARKS ~

November, 1994

Guglielmo Marconi

Inventor of the radio-signaling system, Guglielmo Marconi was the first to send wireless signals across the ocean. Prior to his invention, there was no way to communicate over long distances without telegraph wires to carry electric signals. His equipment played a vital role in rescuing survivors of sea disasters such as the sinking of the Titanic. He won the Nobel Prize in physics in 1909 for his work in wireless telegraphy.

Culver Pictures, Inc. "Guglielmo Marconi," Microsoft (R) Encarta. Copyright (c) 1993 Microsoft Corporation. Copyright (c) 1993 Funk & Wagnall's Corporation



HISTORY OF RADIO

Although many discoveries in the field of electricity were necessary to the development of radio, the history of radio really began in 1873, with the publication by the British physicist James Clerk Maxwell of his theory of electromagnetic waves.

Late 19th Century

Maxwell's theory applied primarily to light waves. About 15 years later the German physicist Heinrich Hertz actually generated such waves electrically. He supplied an electric charge to a capacitor, and then short-circuited the capacitor through a spark gap. In the resulting electric discharge the current surged past the neutral point, building up an opposite charge on the capacitor, and then continued to surge back and forth, creating an oscillating electric discharge in the form of a spark. Some of the energy of this oscillation was radiated from the spark gap in the form of electromagnetic waves. Hertz measured several of the properties of these so-called Hertzian waves, including their wavelength and velocity.

The concept of using electromagnetic waves for the transmission of messages from one point to another was not new; the heliograph, for example, successfully transmitted messages via a beam of light rays, which could be modulated by means of a shutter to carry signals in the form of the dots and dashes of the Morse code (see Morse Code, International). Radio has many advantages over light for this purpose, but these advantages were not immediately apparent. Radio waves, for example, can travel enormous distances; but microwaves (which Hertz used) cannot. Radio waves can be enormously attenuated and still be

received, amplified, and detected; but good amplifiers were not available until the development of electron tubes. Although considerable progress was made in radiotelegraphy (for example, transatlantic communication was established in 1901), radiotelephony might never have become practical without the development of electronics. Historically, developments in radio and in electronics have been interdependent.

To detect the presence of electromagnetic radiation, Hertz used a loop of wire somewhat similar to a wire antenna. At about the same time the Anglo-American inventor David Edward Hughes (1831-1900) discovered that a loose contact between a steel point and a carbon block would not conduct current, but that if electromagnetic waves were passed through the junction point, it conducted well. In 1879 Hughes demonstrated the reception of radio signals from a spark transmitter located some hundreds of meters away. In these experiments he conducted a current from a voltaic cell through a glass tube filled loosely with zinc and silver filings, which cohered when radio waves impinged on it. The principle was used by the British physicist Sir Oliver Joseph Lodge, in a device called the coherer, to detect the presence of radio waves. The coherer, after becoming conductive, could again be made resistant by tapping it, causing the metal particles to separate. Although far more sensitive than a wire loop in the absence of an amplifier, the coherer gave only a single response to sufficiently strong radio waves of varying intensities, and could thus be used for telegraphy but not for telephony.

The Italian electrical engineer and inventor Guglielmo Marconi is generally credited with being the inventor of radio. Starting in 1895 he developed an improved coherer and connected it to a rudimentary form of antenna, with its lower end grounded. He also developed improved spark oscillators, connected to crude antennas. The transmitter was modulated with an ordinary telegraph key. The coherer at the receiver actuated a telegraphic instrument through a relay, which functioned as a crude amplifier. In 1896 he transmitted signals for a distance exceeding 1.6 km (more than 1 mi), and applied for his first British patent. In 1897 he transmitted signals from shore to a ship at sea 29 km (18 mi) away. In 1899 he established commercial communication between England and France that operated in all types of weather; early in 1901 he sent signals 322 km (200 mi), and later in the same year succeeded in sending a single letter across the Atlantic Ocean. In 1902 messages were regularly sent across the Atlantic, and by 1905 many ships were using radio for communications with shore stations. For his pioneer work in the field of wireless telegraphy, Marconi shared the 1909 Nobel Prize in physics with the German physicist Karl Ferdinand Braun (1850-1918).

During this time various technical improvements were being made. Tank circuits, containing inductance and capacitance, were used for tuning. Antennas were improved, and their directional properties were discovered and used. Transformers were used to increase the voltage sent to the antenna. Other detectors were developed to supplement the coherer with its clumsy tapper; among these were a magnetic detector that depended on the ability of radio waves to demagnetize steel wires; a bolometer that measured the rise in temperature of a fine wire when radio waves are passed through the wire; and the so-called Fleming valve, the forerunner of the thermionic tube, or vacuum tube.

20th Century

The modern vacuum tube traces its development to the discovery made by the American inventor Thomas Alva Edison that a current will flow between the hot filament of an incandescent lamp and another electrode placed in the same lamp, and that this current will flow in only one direction. The Fleming valve was not essentially different from Edison's tube. It was developed by the British physicist and electrical engineer John Ambrose Fleming (1849-1945) in 1904 and was the first of the

diodes, or two-element tubes, used in radios. This tube was then used as a detector, rectifier, and limiter. A revolutionary advance, which made possible the science of electronics, occurred in 1906 when the American inventor Lee De Forest mounted a third element, the grid, between the filament and cathode of a vacuum tube. De Forest's tube, which he called an audion but which is now called a triode (three-element tube), was first used only as a detector, but its potentialities as an amplifier and oscillator were soon developed, and by 1915 wireless telephony had developed to such a point that communication was established between Virginia and Hawaii and between Virginia and Paris.

The rectifying properties of crystals were discovered in 1912 by the American electrical engineer and inventor Greenleaf Whittier Pickard (1877-1956), who pointed out that crystals can be used as detectors. This discovery gave rise to the so-called crystal sets popular about 1920. In 1912 the American electrical engineer Edwin Howard Armstrong discovered the regenerative circuit, by which part of the output of a tube is fed back to the same tube. This and certain other discoveries by Armstrong form the basis of many circuits in modern radio sets.

In 1902 the American electrical engineer Arthur Edwin Kennelly (1861-1939) and the British physicist and electrician Oliver Heaviside, independently and almost simultaneously, announced the probable existence of a layer of ionized gas high in the atmosphere that affects the propagation of radio waves. This layer, formerly called the Heaviside or Kennelly-Heaviside layer, is one of several layers in the ionosphere. Although the ionosphere is transparent to the shortest radio wavelengths, it bends or reflects the longer waves. Because of this reflection, radio waves can be propagated far beyond the horizon. Propagation of radio waves in the ionosphere is strongly affected by time of day, season, and sunspot activity. Slight variations in the nature and altitude of the ionosphere, which can occur rapidly, can affect the quality of long-distance reception. The ionosphere is also responsible for skip, the reception at a considerable distance of a signal that cannot be received at a closer point. This phenomenon occurs when the ground ray has been absorbed by the intervening ground and the ionospherically propagated ray is not reflected at an angle sufficientlysteep to be received at short distances from the antenna.

Short-wave Radio

Although parts of the various radio bands—short-wave, long-wave, medium-wave, very-high frequency, and ultrahigh frequency—are allocated for a variety of purposes, the term short-wave radio generally refers to radiobroadcasts in the high-frequency range (3 to 30 MHz) beamed for long distances, especially in international communication. Microwave communication via satellite, however, provides signals with superior reliability and freedom from error.

Amateur, or "ham," radio is also commonly thought of as short-wave, although amateur operators have been allotted frequencies in the medium-wave band, the very-high-frequency band, and the ultrahigh-frequency band as well as the short-wave band. Certain of these frequencies have restrictions designed to make them available to maximum numbers of users.

During the rapid development of radio after World War I, amateur operators executed such spectacular feats as the first transatlantic radio contact (1921). They have also provided valuable voluntary assistance during emergencies when normal communications are disrupted.

Amateur radio organizations have launched a number of satellites piggyback with regular launches by the United States, the former Soviet Union, and the European Space Agency. These satellites are usually called Oscar, for Orbiting Satellites Carrying Amateur Radio. The first, Oscar 1, orbited in 1961, was also the first nongovernmental satellite; the fourth, in 1965, provided the

first direct-satellite communications between the U.S. and the Soviet Union. More than 1.5 million people worldwide were licensed amateur radio operators in the early 1980s. ■ Article from Microsoft *Encarta* CD-ROM encyclopedia.

SWAP SHOP

By **Walter Beach, VE3FJC**
tel. 263-2338

Please direct all Swap Shop business to Walter by landline or repeater.

For Sale: Joe, VE3FVH
2-m antennas (2 units) KLM long-boomers, 13 LBA. $100 each.
70 cm J-beam antenna, MBM 88 element, $100.

For Sale: Len (SWL), 723-6970
RS scanner 2022 -- 200 memories, clean with manual, $150
Active antenna for above, $50

For Sale: Mike (905) 686-9894 (after 5 PM)
Yaesu FT7479x all band HF transceiver c/w pyramid 35a power supply. Purchased in Oct. 89, hasn't been used in 3 years. $950
Icom IC-245 2m transceiver with 3a power supply. Also has IC rm2 digital keypad. 10w output. $125
Daiwa IA-2065 2m linear amplifier 10w to 50w. $150
Oskerblock all band SWR meter. $50
MFJ 901 manual antenna tuner. $50
Heathkit micromatic keyer/sender. $65
Heathkit IO-103 oscilloscope (old model) $50

For Sale: Peter, VA3XTL (905) 655-5180

Yaesu 2-m handheld, FT208R, with PA3 car charger, NC-9B wall charger, YM24 spkr-mike, 2 batteries, Immaculate for $200
Realistic 200 channel scanner, Model Pro 2022, with 800 chip installed, $200
Archer Discone Scanner Antenna with handbook
$50Marine Radio, Uniden President MC520 , $100

For Sale: Walter, VE3FJC (905) 263-2338
Realistic ham radio receiver, AX190. Solid state, analog dial, 10m to 80 m, "brand new". $150
Commodore 64, keyboard, disk drive, green monitor. P/S and cables. $100 or trade.

Exerpts from October NSARC Minutes

FINANCE: Laird, VE3LKS, reported a balance of $6,918, with $1,500 dedicated to the fleamarket.

JOTA: Riis. VE3UEA, reminded the membership that this year's event will be on a weekend (Oct 15-16). With 31 groups in the area, a strong turnout is expected.

REPEATER COMMITTEE. Ralph, VE3CRK, notified the membership that the repeater had be relocated the previous weekend, and indicated vast improvements to the north and east, but not as succesful to the south, including Oshawa. The repeater committee intends to continue working to correct the situation. Members should note areas of improvement or deterioration and let the repeater committee know the findings.

OTHER BUSINESS: Casey, VA3KC, intends to sell his VE3USH **digipeater** and would like it to be offered to NSARC before anyone else. He is asking for $1,500 -- $500 now, and the balance from the fleamarket revenue. A show of hands indicated 40% wanted to be able to continue to access VE3USH. Following discussion, a motion was proposed by Jim Sr., VE3SVM, and seconded by Len VE3SVD, that the executive be given authority to act in the best interest of the club. CARRIED.

Laird, VE3LKS, reported that **Bill Lishman** would be departing with his **Canada Geese** between 07:00 and 07:30 the following morning, and would be operating a beacon at 146.550 MHz using 50 mW power.

General discussion took place on how to thank **George, VE3INB**, for all his years of dedication to the club. A motion was proposed by Rick, VE3ASH, and seconded by Len VE3SVD, to award George a **Life Membership**. CARRIED.

Winston, VE3WFS, is asking more experienced hams to **open their shacks** to the newly licensed hams and SWLs in coordination with John, VE3SII, to help in developing skills related to the hobby. Winston also suggestd organizing **coffee mornings** to better get to know each other. General discussion indicated that it is a popular idea.

GUEST SPEAKER: Laird, VE3LKS, gave an interesting talk on personal computers, giving advice, and demonstrating modifications and repairs that can be done easily by the layman.

DURHAM REGIONAL
AMATEUR RADIO
EMERGENCY ORGANIZATION
19:00 hours, Thurs. Nov. 24th
St. Paul's United Church
65 Kings Crescent, Ajax, Ont.

North Shore ARC

Membership Request Form

Please Print!

Name: _____ Callsign: _____

Address: _____ City: _____

Prov/State: _____ Postal: _____ Phone: _____

Membership Required: ❑ Full $20 ❑ Family $5 ❑ Associate $15

Full	Full member privileges including monthly newsletter.
Family	Full member privileges but no monthly newsletter. One member of the household must have a "Full" membership.
Associate	Monthly newsletter and a warm hearty welcome to all our meetings/events.

Donations: General Use $_____ Repeater $_____

I am interested in helping or leading out in the following:

Help	Lead	Activity	Help	Lead	Activity
❑	❑	Sermon on the Mount	❑	❑	Jamboree On The Air (JOTA)
❑	❑	Corn Roast	❑	❑	Guides On The Air (GOTA)
❑	❑	Christmas Party	❑	❑	EMO
❑	❑	Field Day	❑	❑	Dxpeditions
❑	❑	Net Controller	❑	❑	Canoe the Nonquon
❑	❑	Code Sender	❑	❑	CNE Station (Air Show Saturday)
❑	❑	Sysop a packet node/BBS	❑	❑	Kit building
❑	❑	Hamfest security/setup/take down	❑	❑	Newsletter articles
❑	❑	Executive - President/Vice/Treasurer/Secretary/Program Director			
❑	❑	Other _____			

✎ **Please list any topics you would like to see presented at our monthly meetings:**

_____

_____

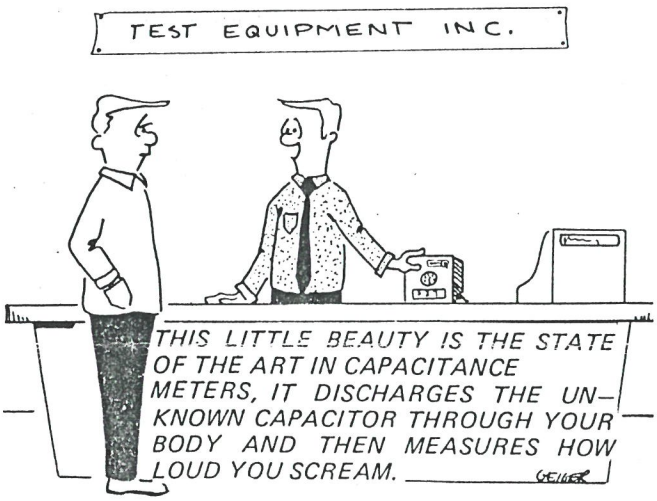
❑ **I am willing to make a presentation on one or more of the topics listed above!**

Please send cheque payable to:

North Shore ARC

c/o Keith Wyard-Scott, 298 Dover Ct., Oshawa, ON, L1G 6G6

THE BACK PAGE



Club Meetings

NSARC meetings are the **second Monday** of each month. We meet at the Arts and Resource Centre in Oshawa on Queen Street (except during July and August.) Meetings begin promply at 19:30 hours local time. SWLs, visitors and guests are always most welcome to attend!

Net and Code Practice

Club net every **Thursday** at **19:30** hours local time, with CW practice (starting slow and working up) at 20:30. More net for the nightowls starting at 21:30.

North Shore Amateur Radio Club, Inc.
P.O. Box 171
Oshawa, Ontario, L1H 7L1

Club Events Station: VE3NSR
Repeaters: 2 m **VE3OSH** 147.120 MHz (+)
70 cm **VE3NAA** 443.000 MHz (+)

Executive

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Vice President
Casey Coley, VA3KC 623-0264
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