HISTORY OF ANTENNAS

19th Century Wire Antennas

1842 - Joseph Henry-Princeton-inventor of wire telegraphy upper room to cellar 30 ft. below magnetize needles

1875 - Thomas Edison - discovered telegraphy key-clicks radiated at a distance used vertical, top-loaded, grounded antenna

1888 - Heinrich Hertz - verified Maxwell's theory dipole-antenna; loop antenna; grating of wires; fundamentals of polarization

1897 - Oliver J. Lodge - Liverpool - bi-conical dipole; central loading; tunable LC circuit

1889 - Sydney G. Brown - Chicago - proposed two-element phased array

19th Century Microwave Antennas

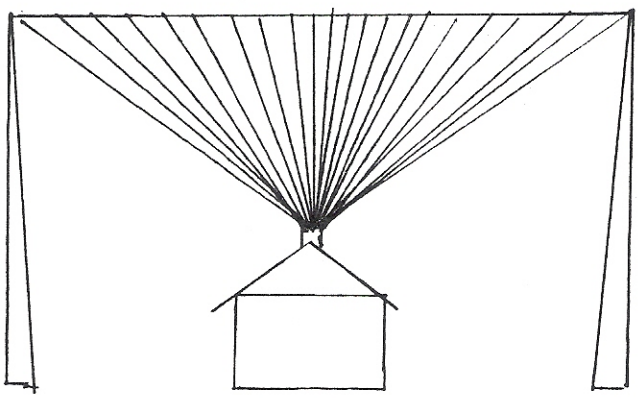
1888 Hertz - cylindrical parabolic antennas

1895 Bose - horn antenna; open-ended w/g

Radiotelegraphy - 1900-1910

1901 - Marconi - signal received across the Atlantic

Fan Monopole



"bent" antenna over ground
(first directive antenna)
(first radiation pattern)

World War I - Low frequency, high power

1917 - Marconi station, N.J. (22 KHz)	5000 ft by 600ft on top of 13 masts each 400 ft high

1919 - aircraft and dirigible antennas - communicate over trans-Atlantic crossings

Vacuum tube of De Forest - led to broadcasts: 1910 Caruso; 1916 election results; 1919 music

Broadcasting in the 1920's

Entertainment broadcasts to masses (dismay of Marconi)

planar array of loaded wires

development of coaxial transmission lines

1923 - H.H. Beverage - wave tilt antenna

1922 - Taylor and Young (Navy Research) detected moving objects by radio

1928 - Yagi and Uda in Japan - endfire array with parasitic elements

VHF & Microwaves in the 1930's

1931 - Microwave link between France and England (17cm)

1935 - VHF radar (NRL)

1935 - FM broadcast at 2.5 m

1936 - TV broadcast at 45 MHz
Hollow W/G developed at Bell Labs

1938 - Waveguide radiators (20 cm)

1939 - Horn antennas (2-30 cm)
A.D. Blumlein-slot antenna (resonant)

CM-Wave Antennas, 1940-45

1940 - Cavity magnetron (400 W at 10 cm)
(for long range radar)

rectangular W/G W/2:1 ratio

reflectors, horns, slots, dielectric antennas

flush mounted cavity-backed slots

annular slot, folded dipole

Advanced Developments-1950's & 1960's

Artificial dielectric lenses

retrodirective array - Van Atta

Equiangular spiral - 1955 - Dyson

Conical spiral - 1959 - Dyson

Log-periodic - 1957- Duhamel & Isbell

Arrays

Ruby rod laser - 1960

Synchronous satellites - 1965

Log periodic dipole array

phased arrays