

Amateur Radio in Disaster Relief - An Illustrated albeit Episodic History

A Presentation to ARRL Pacificon,
San Ramon, California, 2010 by

Bart Lee, K6VK,

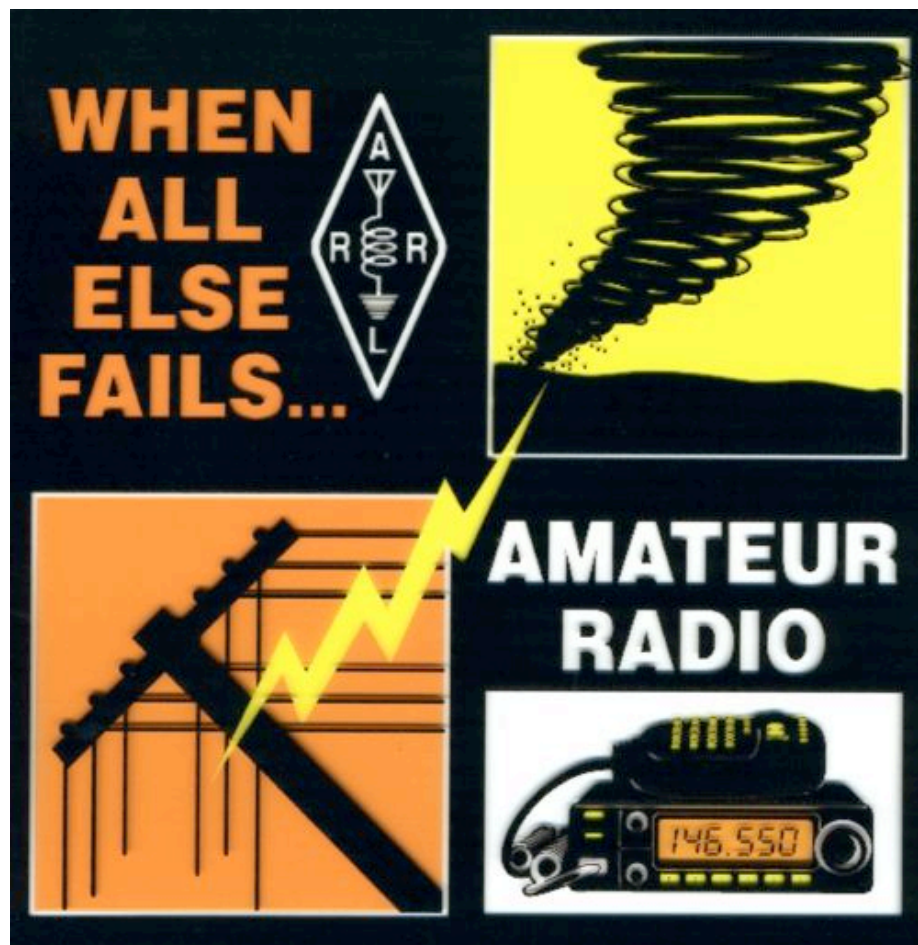
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Lecturer, Antique Wireless Association

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this presentation in furtherance of amateur radio,
crediting its authorship and respecting its integrity.

Venue:



Since 1906



1906 San Francisco Amateur Barney Osborne, later W6US



W6QBU Endorses A.R.D.A. With His Membership

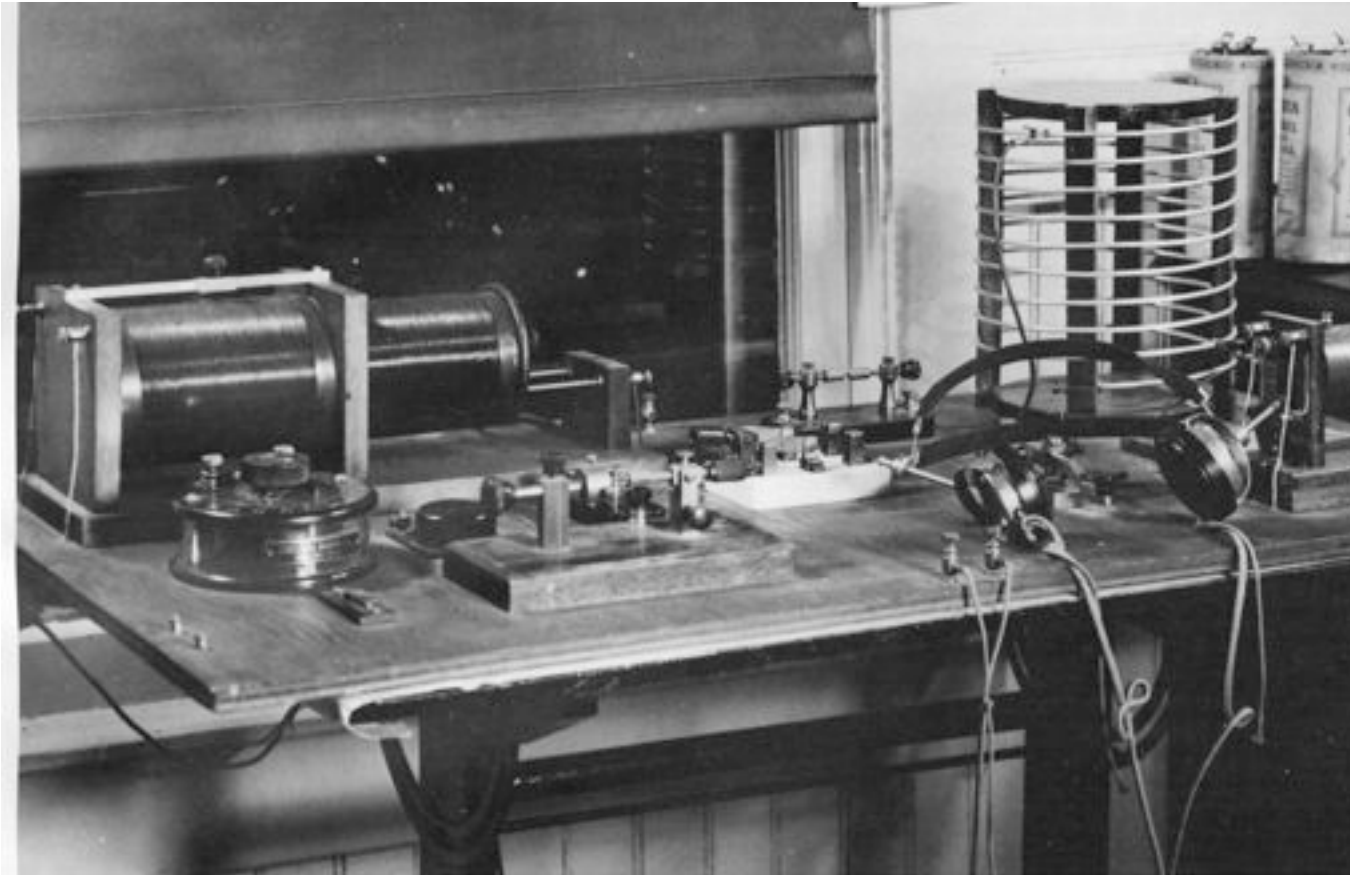
As a very young man in 1905, he set up an operating amateur wireless station which he used to pass emergency traffic in the 1906 Earthquake and Fire, according to family lore.

Photo from Amateur Radio Defense, Feb., 1941, p. 8.

U.S Navy Disaster Relief, 1906

- The U.S Navy had several ships in port in San Francisco at the time of the Earthquake and Fire.
- They used their new wireless gear to communicate with Oakland and Mare Island to convey essential elements of information about the disaster.
- Surviving landlines in the East Bay got the news out.
- Early San Francisco Wireless Experimenters such as Francis J. McCarty offered their Services.

1913 Saw Amateurs Handling Emergency Traffic in Mid-West Floods and Storms



A state-of-the-art spark gap amateur radio station in 1914. (Tnx Bruce Kelley, W2ICE, and the Antique Wireless Association.)

Until after World War One and 1919, almost all Amateur Rigs were Spark Gap Transmitters and Crystal Receivers, without any new-fangled Vacuum Tubes like the DeForest Audion.

American Radio **Relay** League

- The American Radio **Relay** League (ARRL) came to be in 1915.
- Before and after that the limited range of amateur spark wireless sets on low frequencies gave rise to informal relays from station to station.
- The **National Traffic System** formalized long distance and disaster communications by relay – cross-country in an hour in tests.
- In the first test in 1916, amateur radio station 9XE in Illinois originated a message received in California in 55 minutes and on the East Coast an hour after that.

Source: “FIFTY YEARS OF ARRL” (1965), p. 16; ARRL now has about 160,000 members.

Communicating for the Railroads (QRR) when the Wires are Down



AMATEURS GIVE EMERGENCY SERVICE FOR RAILROADS WHEN WIRES ARE DOWN.

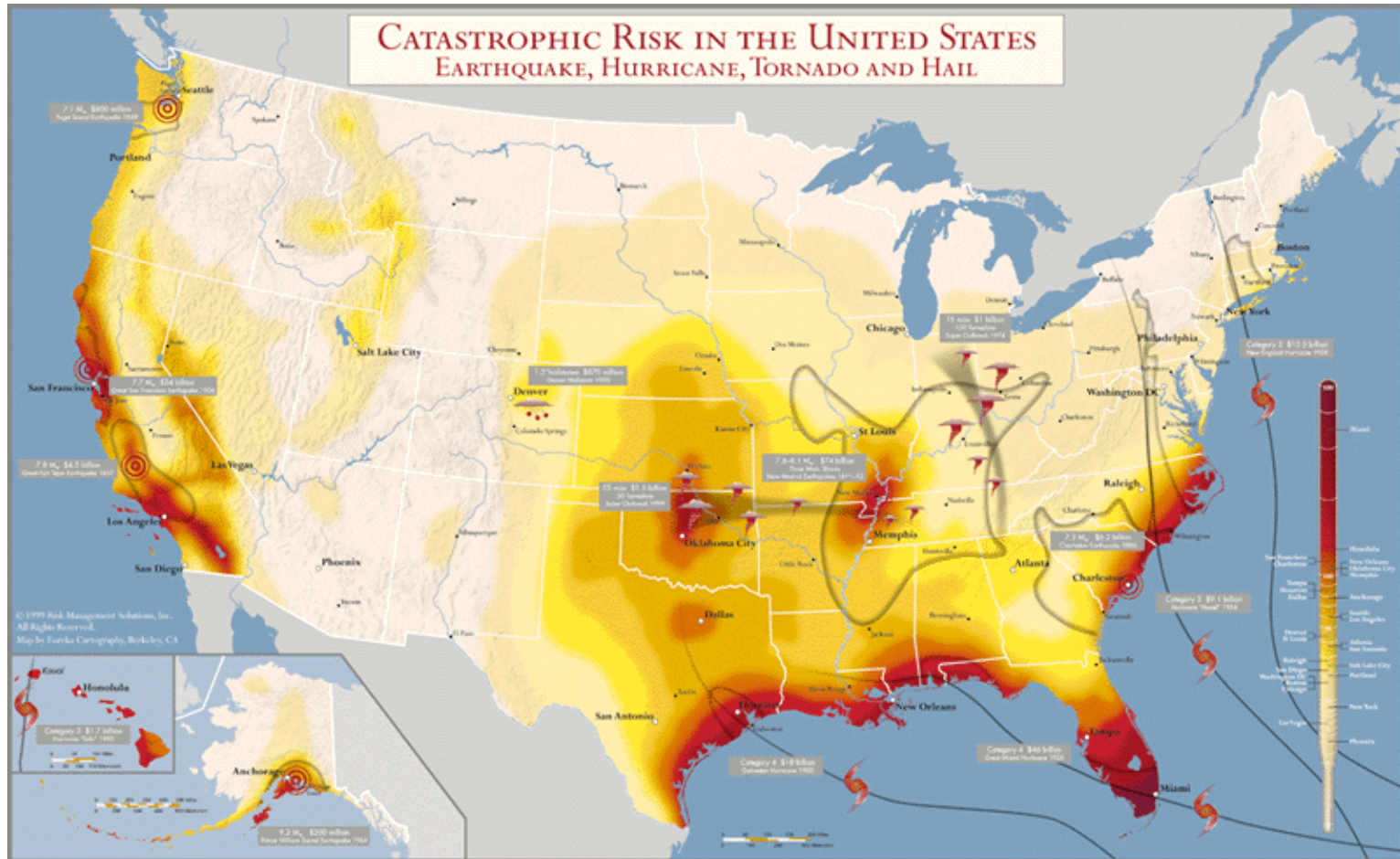
QST, cover, May, 1926

QST's Vision of Disaster Communications, 1928



QST, cover, April, 1928

Where Disasters Lurk --Where's next?



What's Happened & What to Expect

Epidemics

Storms

Floods

Hurricanes

Earthquakes

Fires, Urban and Rural

Tidal Waves

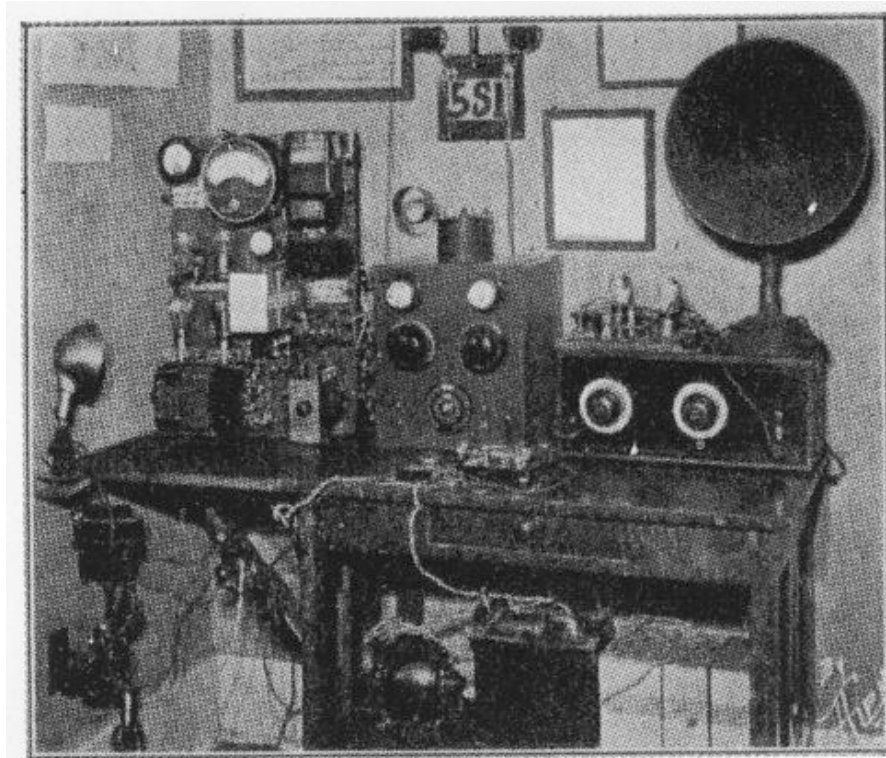
Volcanoes

Insurrections

War

Terrorism

1920s Flood Relief Station



5SI—A REAL RM LAYOUT

Note dynamotor at bottom, which furnished emergency plate supply during the Mississippi flood.

“RM” means
“Radio Man.”

Vacuum Tubes have Arrived on the Scene.

Amateur Radio provided the only Communications in the Failed Rescue of Caver Floyd Collins, 1925

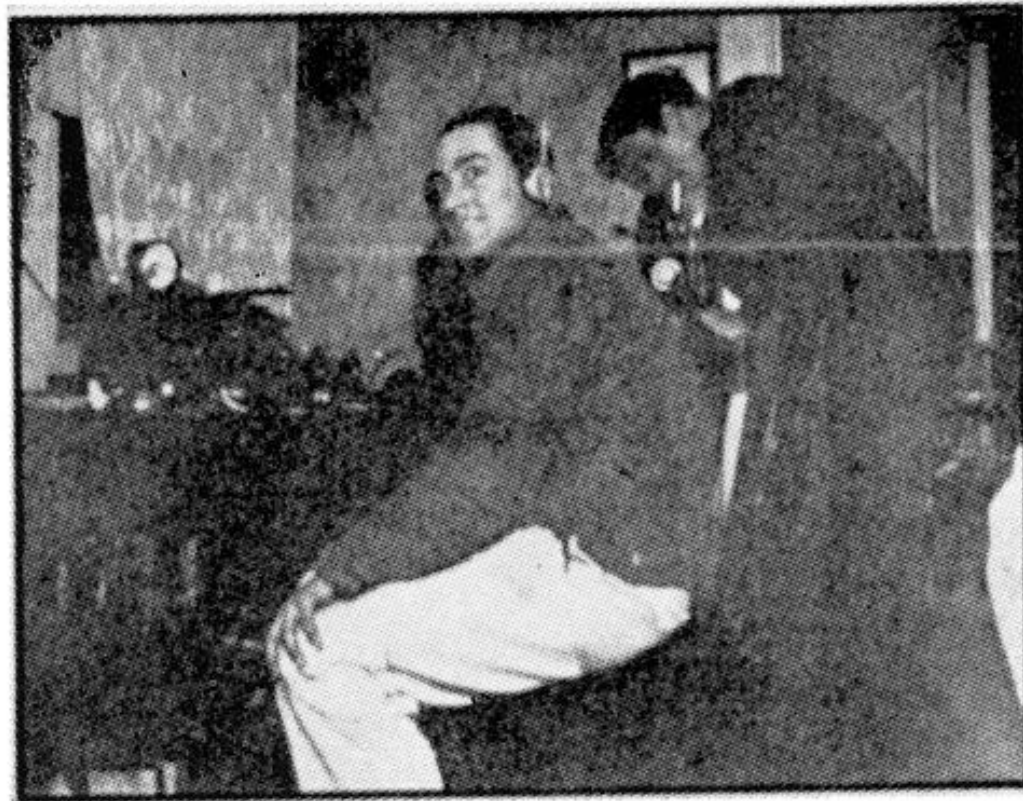


Five Watts CW

Field Operation 1933



The 1933 Long Beach Quake



A big job was done by amateurs like these operators of W6BYF in the 1933 California earthquake.

W6AM, Don Wallace, Provides a Main Link in the 1933 Long Beach Quake

Photo from
Jan David Perkins,
Don Wallace, W6AM,
Amateur
Radio's Pioneer,
(Vestal, 1991)



Don's portable transmitter set up in the field after the 1933 earthquake. Don's family stayed in the tent in the background.

Don Wallace later
became the biggest of
the DX Big Guns
with his Press Wireless
Field of Rhombic
Antennas at
Palos Verdes

Although his house was demolished, his extensive antennas stayed up, so he connected his portable rig and operated for many days with the help of the Navy.

QRR – The Distress Traffic Call, into the 1930s, from Railroad Traffic

**“QRR—FLOOD WATERS CUT
OFF ALL WIRE LINES!”**



(B&W image from a 1930s Amateur Radio Advertisement)

ARRL Emergency Corps - QRR



From: Gil McElroy, VE3PKD "QRR: The Beginnings of Amateur Radio Emergency Communications" QST, Sept. 2007, p. 48.

ARES Predecessors Established 1935



ARRL anticipated a Volunteer Radio Corps of Amateur Radio Operators in 1917.

The ARRL HQ Station Flooded 1936



"The A.R.R.L. HQ's station was completely inundated by the flood waters. As though a thick coating of silt over the shack and everything in it were not enough, several tanks of heavy road or fuel oil broke and got into the shack. When the waters receded the well known W1MK, familiar to all as shown in the [left] picture, turned into the sad sight you may be able to recognize in the [right] photo!" From *QST*, May 1936, page 20.

From: Gil McElroy, VE3PKD; this W1MK is the predecessor station to W1AW.

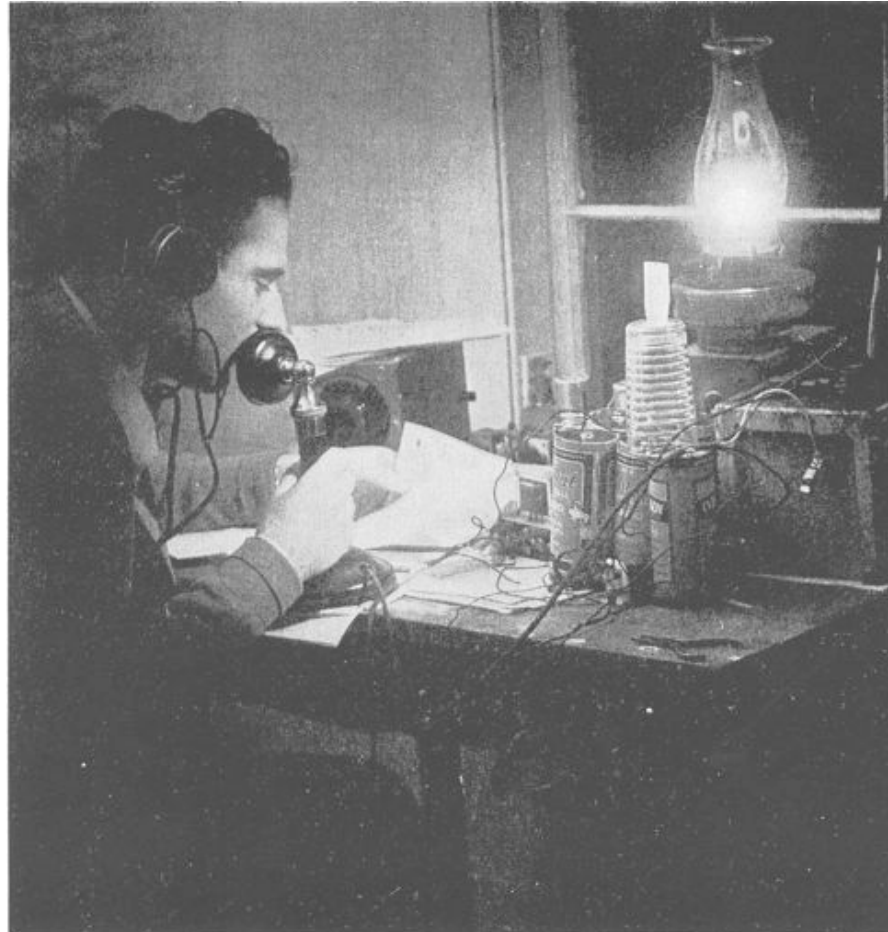
The 1936 Catastrophic North East Floods, from Maine down the Ohio River Valley



“Ed. Tilton, W1HDQ, and Mrs. Tilton carried through a back-breaking program of emergency work in Springfield, Mass.” This photo is from Clint DeSoto’s, W1CBD, article, “Amateur Radio Rises to Greatest Emergency Need of All Time” in the May 1936 issue of *QST*.

From: Gil McElroy, VE3PKD

Emergency Communication in the the next year's 1937 Flooding



Detail from a 1930s QST Cover

1937 Johnstown Flood



Main Street near Clinton Street during the 1937 flood. The white arrow in the lower left of the photograph indicates the flood's high-water mark.

1937 Johnstown Flood



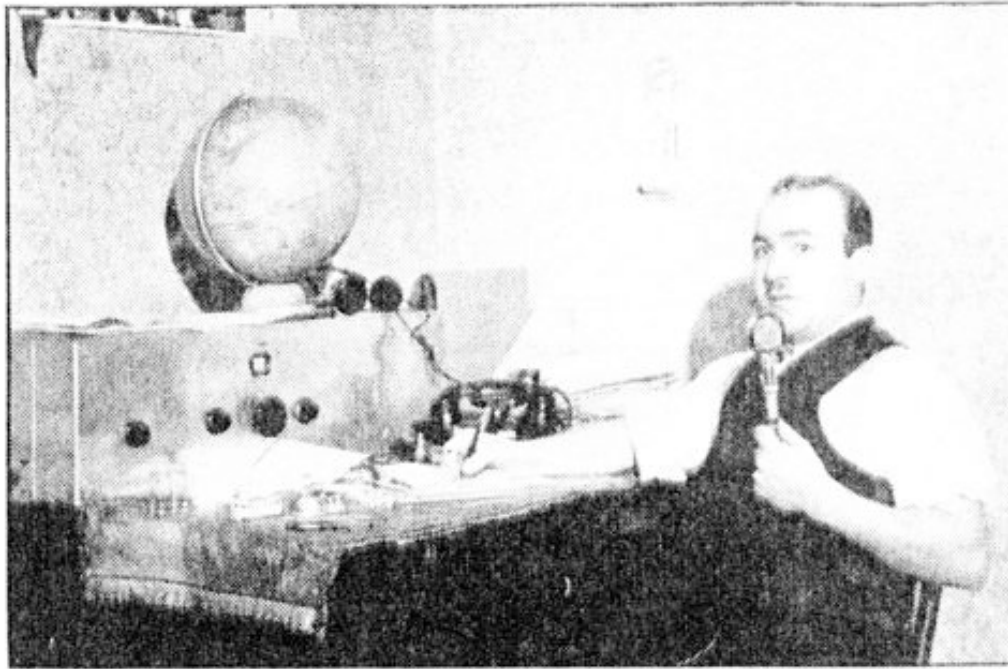
Johnstown's City Hall. The three sets of double markers bracketing the building's corner show the high water marks for the 1889, 1936 and 1977 floods (from top).

1937 Johnstown Flood



The Franklin Street Methodist Church,
located downtown, during the 1936 flood

W8BWH, a Mainstay of Relief Communications in the 1937 Flooding

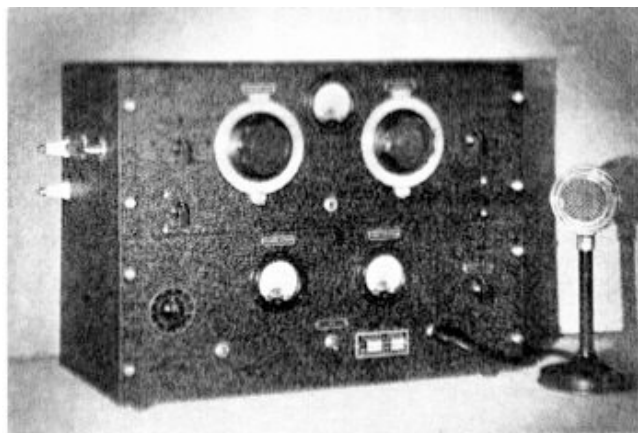


W8BWH IN ACTION!

With a kilowatt to a pair of '04As, Class-B modulated by another pair of '04As, Dr. Joseph A. Vancheri brought aid to refugees in Johnstown and vicinity, dramatized the flood for b.c.l.'s.

This and similar images from "FIFTY YEARS OF ARRL" (1965)

Commercial Emergency Ham Gear, Appears in the late 1930s



50-S TRANSMITTER

BATTERY OPERATED

designed for

- EMERGENCY USE
- FIELD COMMUNICATION
- BOAT SERVICES
- PORTABLE — MOBILE

Write for Full Details

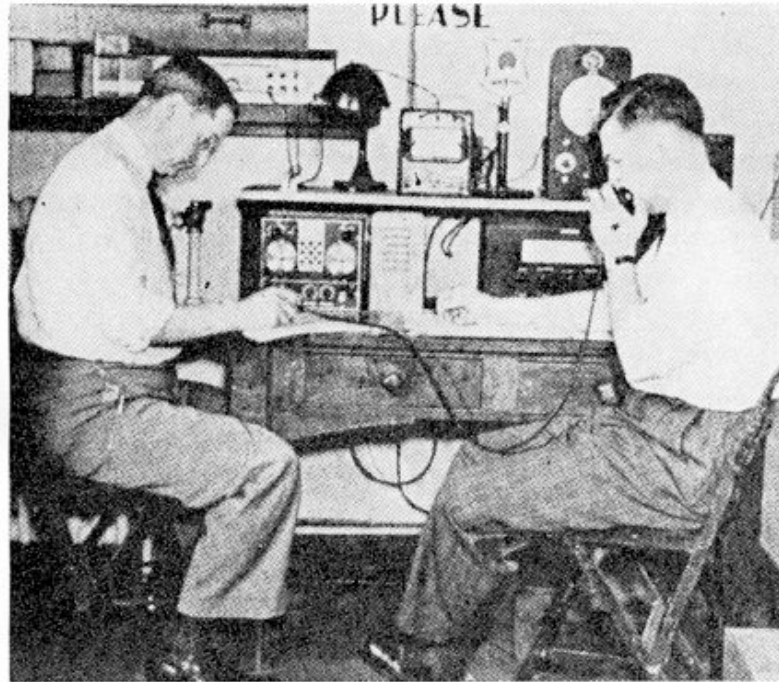
HARVEY RADIO LABORATORIES, INC.

12 Boylston Street

Brookline, Mass.

(From a 1930s Amateur Radio Advertisement)

War Time WERS 1943



WERS was a poor substitute for amateur radio in emergency work, but they did their best. Here's the Granite City, Ill., control station in operation during a Mississippi River flood in 1943. That's Radio Aide W9THB at left, with W9GFF at the microphone. Note the ubiquitous TR4, a fixture in most WERS station units.

The War Emergency Radio Service on 2&1/2 meters, 112 Mhz.

WERS 1943 on 2&1/2 Meters –Abbott TR-4



TR-4 Interior with HY-75 Power Tube



WERS Gear Construction 1944



ARES at Work: During Flooding in Washington, 1948



A broken dike on the Columbia River flooded Vanport, Wash., enabled a well-prepared ARRL Emergency Corps under EC W7DIS to render effective assistance. Here is W7AEF, transmitting by walkie-talkie from the dike.

Related Communications

- In addition to **ARES** and **Red Cross**, Volunteer Emergency Communicators Staff:
 - **RACES** – since 1952
 - **SATERN** – since 1988
 - **MARS** – since 1925
 - **CAP** – since 1941
 - **REACT** – since 1962
 - **SKYWARN** – since early 1970s

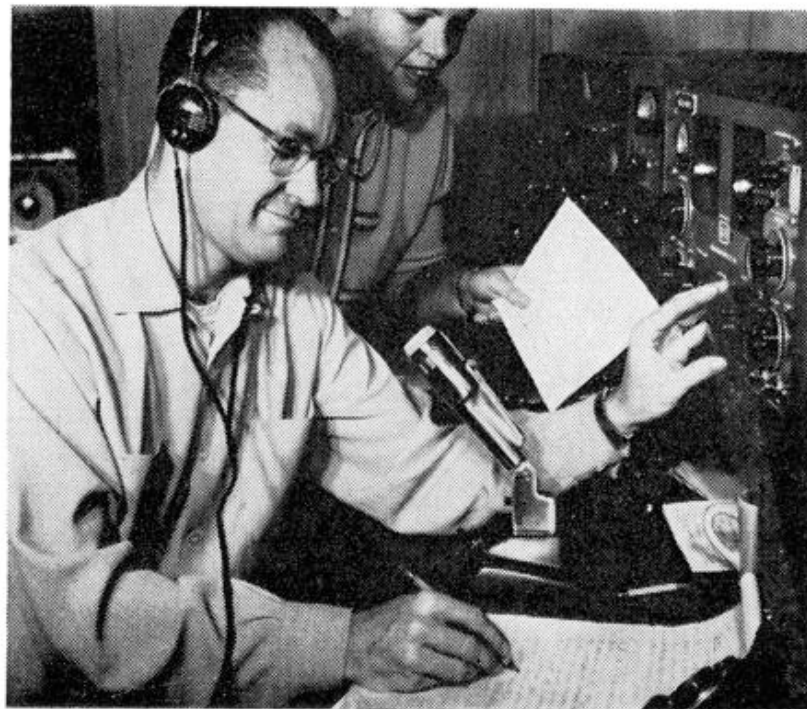
Capability

- Amateur radio “Gets it Right” in Disasters because of its Nationwide **Capability**:
- Distributed Architecture, not Centralized
- Portable Equipment as well as Base and repeater Stations with High Antennas
- Emergency Power Operation and High Power Operation
- Frequency Agility and Multiple Modes from CW to Digital E-Mail

Readiness + Capability = Preparedness

- Amateur Radio “Gets it Right” in Disasters because of its Nationwide **Readiness**:
- Thousands of Available Technically Adept Operators
- Thousands of Available Trained and Seasoned Operators
- Many Real-World Activations and Constant Drills
- Membership in National and Local Disaster Relief Organizations, especially the **Red Cross**.

Fires in Malibu, 1957 -- RACES



In the Malibu-Topanga Canyon (Calif.) fires in December, '57, Deputy Chief Radio Officer W6QJW, operating under RACES tactical call of CPT19, controlled a net on 3995 kc.

RACES – Radio Amateur Civil Emergency Service

Regulated by the FCC, Managed by FEMA; To operate in RACES, a station must be registered with its local Civil Defense organization.



RACES is also known in California as the Auxiliary Communications Service (ACS) using more than amateur radio alone. If amateur radio is suspended, as it was in WW I & WW II, RACES may continue to operate.

Established in 1952.

Gonset Six Meter “Communicator”

CIVIL DEFENSE RECEIVER / TRANSMITTER



1950s

GONSET COMMUNICATOR II

From Cold War / Civil defense ... Heroes of the Cold War National Memorial,
at <http://communitylink.reviewjournal.com>

Gonset Ten Meter “Communicator”



From the California Historical Radio Society Collection; photo Bart Lee 2010.

ARES: Hurricane AUDREY 1957



It isn't often that an ARRL director is involved in an emergency operation, but Delta Director Division W5BSR was in the Hurricane Audrey operation right up to his ears. That's Vic standing, while Lake Charles EC W5SKW (wearing earphones) directed the operation and W5KHC operated this rig at Lake Charles City Hall.

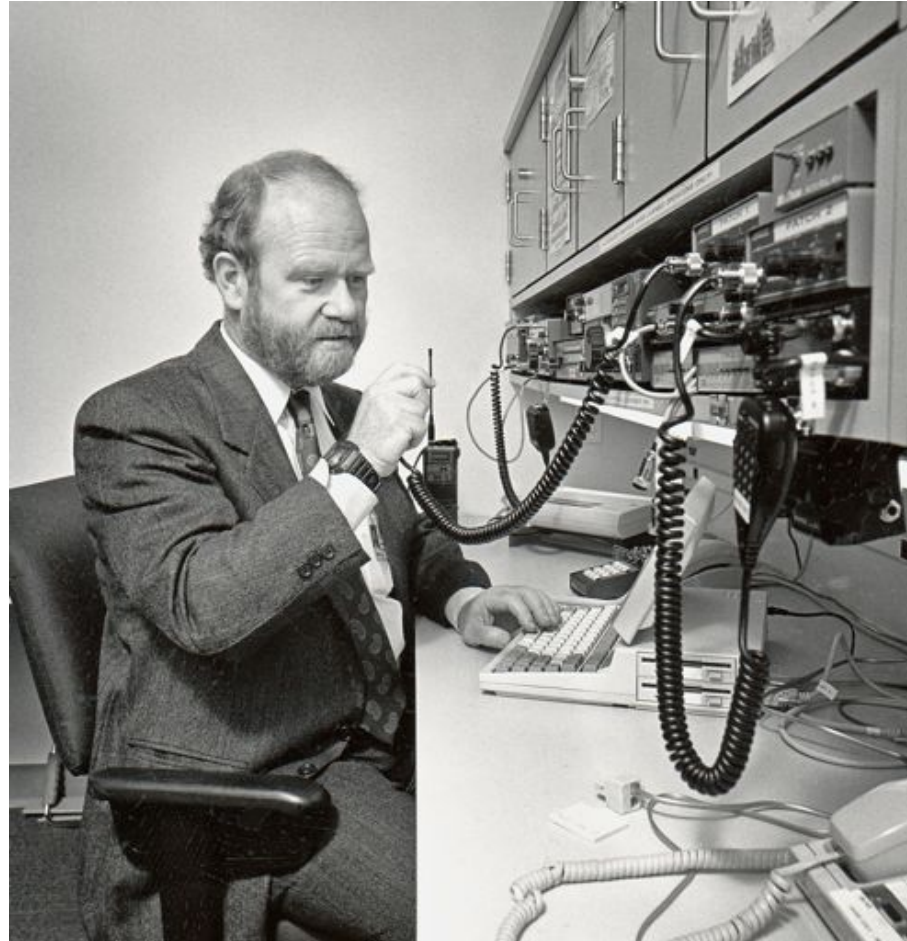
Hurricane Agnes Operations 1972



Hurricane Agnes Operations 1972

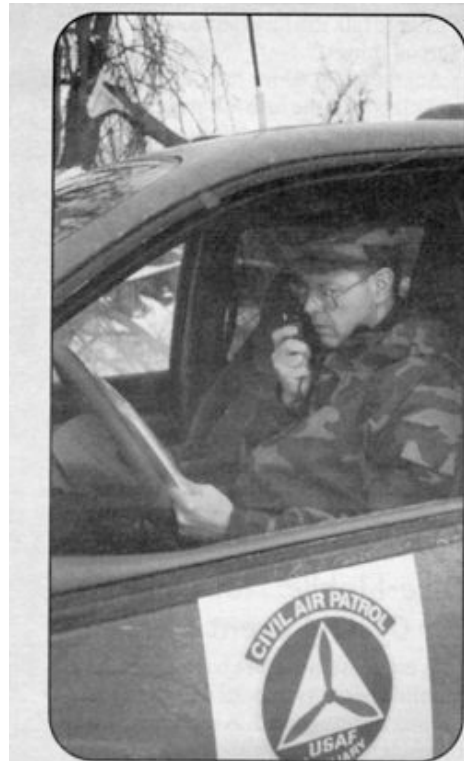


1989 Loma Prieta Earthquake – David Otey, WB6NER, at a Kaiser Facility



David Pioneered the Use of Amateur Radio in Aid of Disaster Recovery for Hospitals and Public and Private Institutions, now part of the FCC Regulations, in the Spirit of “QRR.”

Ham & CAP Operations 1998, New York State Storms



Ham and Civil Air Patrol member Jim Edmonds, WA1KPG, works with the Red Cross doing "route reconnaissance" in the Watertown, New York, area. Jim came in to help from Liverpool, New York, near Syracuse. (N2GNN photo, courtesy ARRL)

CAP – a Civilian Aviation and Communications Auxiliary



CAP was established December 1, 1941, and it sank two U-Boats and spotted 173 in WW II; a CAP plane took the first aerial photographs of 9/11 Ground Zero on 14 Sept 2001.

Tornado Disaster Relief and Warning – **SKYWARN**, 1999



The National Weather Service's SkyWarn uses Amateur Radio Operators



Established in the early 1970s; Trained Observers reporting “Ground Truth” by Radio

REACT – Radio Emergency Associated
Communications Team



State Councils and Teams Nationwide.

REACT uses GMRS, CB and Amateur Radio

- REACT Objectives:
- 1. To assist in any emergency by supplying volunteer radio communications in cooperation with authorities and other volunteer organizations.
- 2. To practice and encourage operating excellence through professional communication techniques.
- 3. To maintain equipment at peak efficiency and operate in accordance with all government regulations.
- 4. To advise the public of correct effective use of the emergency frequencies, such as Citizens Band (CB) channel 9, General Mobile Radio Service (GMRS) frequency 462.675, and Cellular 9-1-1.

Source: www.reactintl.org/about

9/11 NYC 2001 – an Amateur Radio Response to Terrorism



The First Hijacked Aircraft Aims for WTC South about 08:47 11 Sept 2001;
from a set of 9/11 photographs compiled by George Hughes, W0WEB, SF ARC.

9/11



9/11



9/11 Second Hit



Note WTC7, the Black Building left of the North Tower, which held the EOC for New York City.

9/11 by 09:14 + -

Note Second
Aircraft →



Last five Images from a set of 9/11 photographs compiled by George Hughes, W0WEB, SF ARC.

9/11 – Red Cross Uses Amateur Radio



All other modes of communication failed for the first week and Red Cross lost its own radio capability with the fall of the Twin Towers.

The Fall of the Emergency Operations Center, 9/11/2001, 17:22 hours



WTC7 Crumples after Burning since 08:52 11 Sept 01; photo by Bart Lee, Copyright 2001.

Ground Zero -The Smoldering Ruins of the Emergency Operations Center, WTC7 on 9/21/2001



Smoking Girders of WTC7
In the Foreground →

← Ruins of WTC North
In the background.

Photo by 2001 Bart Lee, 21 Sept 01, 11:00 hours, Ground Zero, New York City, Copyright 2001.

Orientation for Red Cross Ops

One of the ops, Robert Gissing, VE3ZLV, and I put together a memo for new ops, based on my orientations for the first several days; excerpts follow:

Red Cross Radio WTC
Operations Procedures Guidelines
To Radio Operators, From Staff (KV6LEE)
Version History 2.0; version date 18 Sept. 2001 4:00 AM

Introduction: In responding to disasters there is much general information that can be useful... this document is meant to help the volunteer understand disaster relief work, the radio network, operating procedures, rules of operation [etc.].

THE FIRST RULE OF DISASTER WORK IS DO NOT BECOME A VICTIM OR OTHERWISE MAKE THINGS WORSE INSTEAD OF BETTER.

In all things, remember your role within this operation. You are a communicator of information. Do not try to solve problems you are not qualified or empowered to solve. Be careful, DRINK LOTS OF WATER, i.e., stay hydrated, and get your rest. The security on the site is very strict and there is no tolerance for anything less than total commitment.

[Excerpts from Procedure, Rules and Order of the Day:] The helmet is your friend. The [news] camera is your enemy... Be clear, concise and unambiguous. Use standard phonetics and "niner." Remember: Who, what, where, when why and how. The Net Controller is always in control of the NET. Do what he says. ... Communicate with your shift manager when you are off shift and arrange for your next shift. Go home and sleep:

"When you leave the firehouse, leave the firehouse at the firehouse."
– RED CROSS THANKS YOU FOR YOUR HELP
– NEW YORK THANKS YOU FOR YOUR HELP

The work was exhausting. After nine days, I turned my job over to my assistant and replacement, Brian Fernandez, K1BRF. At 17:52 on Sept. 19, he took this traffic from W2ML:

About 10 minutes ago on the New Jersey Turnpike a New Jersey State Trooper pulled over a ham, showed him a 2-Meter H/T and asked him to relay to the Net that they had been doing a great job and congratulations to all. The Trooper said it was "ham radio's finest hour." [Per K1BRF at 18:30]

9/11 Shelter and OEM Locations Staffed by Ham Ops for Red Cross in 12 hour shifts and 16 hour days

ARC/CNY
"WTC" 9/01

STEVE W3EVE
PICK K1FLR CROSS OUT "OPEN"

IF CLOSED, THEN
↓

Shelter OEM	Operator	Status	Clients	Volunteers	Nurses	Mental Health	Manager	MD	PD/S
Seward Park	LINDA	Open							
Washington Irving	K2HMT	Open							
HS Fashion Industry	K3BSV	Open							
Chelsea HS	W3EVE	Open							
Norman Thomas HS	W3EVE	Open							
City School	W3EVE	Open							
JHS 22	N2HME	Open							
Compr Day & Nite	MICHEL	Open							
Curtis HS		Open							
Westinghouse HS	K2HMT	Open							
IS 131	N2NAF	Open							
IS 89-OEM 2		Open							

DATE: 9/18
DAY: TUES
TIME: 0500

Unveiled? Yes

Goes to File? M/S

COMMENTS:
HQ BILL K2CZ
RICK K2C
BOBBY KW

DAT
NAZPES
MATT
N2ULS

(USE 24 hr system) SET

About 560 Amateur Radio Operators Helped Red Cross.

2005 Katrina, 1,800 killed



Photo from Wikipedia.

Just about *All Else Did* Fail, but 1,000+ Amateur Radio Operators Provided Emergency and Disaster Relief Communications for Weeks.

What Went Right ...

- “The largest disaster response by U.S. amateur radio operators was during Hurricane Katrina which first made landfall as a Category 1 hurricane went through Miami, Florida on August 25, 2005, eventually strengthening to Category 5. **More than a thousand ham operators from all over the U.S. converged on the Gulf Coast** in an effort to provide emergency communications assistance. Subsequent **Congressional hearings highlighted the Amateur Radio response as one of the few examples of what went right in the disaster relief effort.**” -- *Wikipedia*

SATERN at Katrina – 25,000 People Located; 60,000 Messages



3,700 +
members

**Salvation
Army
Team
Emergency
Radio
Network**

Founded in 1988 by Salvation Army Major Patrick McPherson, WW9E.

Some Pre-Katrina SATERN Callouts

- Hurricane Andrew
- the Midwest Flood
- the Lemont Tornado
- The Kobe Earthquake
- Hurricane Marilyn
- The Rose Lawn Air Crash
- the Yucca Valley/Big Bear Earthquakes
- the Northridge Earthquake
- The Fort Smith, AR Tornado
- the US Air Crash in Pittsburgh
- The TWA Flight 800 Air Crash
- the Grand Forks Flood
- New York City Ground Zero

Since 1925, and Effective in Katrina,
2005, Using Winlink E-Mail.



MARS is moving towards military operators, with its 5,000 amateur radio operators as its active reserve; MARS now supports TSA airport and national operations.

... And 2010 +

• *Is the
Hayward Fault
Next?*

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Correspondence is invited: KV6LEE@gmail.com .