

ENGINEERING

Emergency Radio Phone

Mobile stations stand ready to bridge gaps and keep 'em talking should war or weather cut vital telephone communications.

By **GLENN SONNEDECKER**

➤ **RADIO STATIONS** you never hear are ready for action if blitz by war or weather cuts vital telephone communications.

Over a hundred radio telephone outfits are now stationed throughout the country, ready for any emergency. This is double the number on hand two years ago and radio equipment is being increased further as materials permit.

Most units are mobile, dashing to the scene of disaster. Then an invisible radio beam bridges the wire break to keep messages humming over the great wire web which coordinates the nation's war effort.

Compact radio trailers weighing less than a ton, including all equipment, have been developed. When necessary the radio unit is jerked out, loaded on plane, train or boat, and speeded to the point where war communications have been interrupted.

The radio link in a telephone network involves many engineering problems.

For emergency radio telephone use, scientists were handed the problem of developing terminal arrangements which would be simple, inexpensive and readily portable.

Out of the laboratory came equipment weighing less than 500 pounds and divided into sections that can be handled or operated easily by one man.

Gasoline Generator

A gasoline-driven generator produces the necessary power.

Electricity for a flatiron is all that is needed to operate the complete equipment. A broadcasting frequency of 2,726 kilocycles, considerably above the ordinary broadcast band, has been assigned for this emergency service.

When talking over your telephone during an emergency radio telephone connection, the speech currents are connected through a relay to the transmitter. A part of these speech currents are sidetracked to produce power which automatically turns on the transmitter and also operates another relay hooked to the

sending antenna. Then a speech-modulated wave like the one heard on your own radio, shoots off into space.

Across the wire break, another mobile unit has rolled into place to pick up the message. The waves go into an ordinary radio receiver through a relay similar to that at the other station. Here a part of the amplified signal is again utilized to produce current for the second relay which connects with the telephone line.

When your friend on the other end of the wire talks, the stations just operate in reverse.

Why all these relays? It would be impossible to connect the radio transmitter and receiver to the wire lines and then go ahead and talk, Dr. Austin Bailey of the Bell Telephone System explains. Everything that came out of the receiver would go back into the transmitter and be sent as an echo to the other end of the line.

Your voice would not only sound hollow, like yelling in a rain barrel, but if the radio system amplified the signals, echos would build up into an unintelligible howl.

Relays prevent this by making the radio link a "one way at a time" circuit. Thus only one antenna and one radio channel are needed for both stations.

Only one person can talk at a time because the reversal of transmission direction is under the control of speech currents. Your station operates only as long as you keep talking. Then it goes off the air, clearing the channel for the reply.

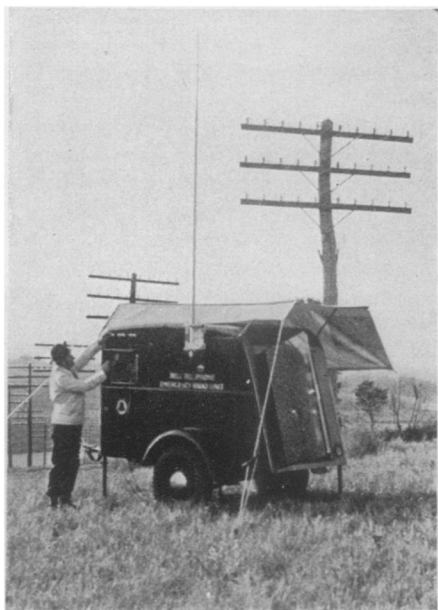
Engineers of the Bell Telephone laboratories had to develop relays that would activate the transmitter in a flash and release slowly to prevent chopping up sentences between words.

With these technical difficulties solved, more equipment on hand, and the increased experience of recent disasters, radio telephone engineers are now ready to protect vital communications in any emergency.

They have met the test against hurri-



BRIDGING GAP—This radio telephone unit spanned the Hudson River after a vessel severed underwater cables.



TRAILER—This emergency outfit can easily be moved to any point where telephone communication wires are broken, completing vital circuits by radio.

canes, sleet, flood and fire during the past few years.

Anticipating such needs, the units are moved about the country on a seasonal basis.

"For example, during the hurricane season more equipments may be held in readiness along the Atlantic and Gulf Coast areas," Dr. Bailey said, "while during the winter months these same equipments have new locations in the sleet belt."

Today, with the United States at war, mobile radio telephone units stand ready to reach vulnerable points within a few hours. They can restore communications that could not be quickly linked by any other means.

Science News Letter, January 23, 1943

● RADIO

Saturday, January 30, 1:30 p.m., EWT

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. William J. Morse, of the U. S. Department of Agriculture, will discuss "Soya Beans as a Food Part."

Monday, January 25, 9:15 a.m., EWT; 2:30 p.m., CWT; 9:30 a.m., MWT; and 1:30 p.m., PWT

Science at Work, School of the Air of the Americas over the Columbia Broadcasting System, presented in cooperation with the National Education Association, Science Service and Science Clubs of America.

"Big Fleas Have Little Fleas" will be the subject of the program.

MANPOWER

Laws Need Change

Government research agent charges that war work is hampered by workmen's compensation laws and attitudes toward physically handicapped.

➤ RECRUITMENT of labor for war production plants is being seriously interfered with and available labor is being inefficiently used because of faults in workmen's compensation laws in some states and the attitude of some employers toward the physically handicapped, Terry Foster, research agent for the vocational rehabilitation division of the U. S. Office of Education, charged at the Congress on Industrial Health sponsored by the American Medical Association in Chicago.

Changes in the laws and in employers' attitudes, he declared, will contribute now to the war effort and greatly facilitate the rehabilitation of the war injured. There will be one hundred thousand of the latter for each year of our participation in the war, he stated. In addition to this there is a constant pool, in peace time, of two million who are unemployed because of physical disability.

Employers should realize, he stated, that a disabled worker properly matched with a job is a safer risk than a physically normal worker improperly matched.

He urged changing present compensation laws so that they will really be compensation laws and not merely employers' liability laws. They should not only protect the employer and compensate the disabled worker but encourage and give him an incentive to rehabilitate himself.

Benefits allowed at present under some laws are so small that the worker may have to use all his compensation to pay for medical care for his injury, leaving nothing for rehabilitation for working again. As a result he is thrown on his family or the taxpayers, to be supported for the rest of his life. Second injury clauses, providing that management must be liable for the total results of a second injury which might run to total permanent disability and be prohibitively costly, are an effective barrier to the worker's reemployment in many cases.

Even in states where benefits are more nearly adequate, there is no encouragement to the worker to rehabilitate himself or any penalty for his failure to do

so. As a result, Mr. Foster charged, many workers are simply pauperized by the laws.

Science News Letter, January 23, 1943

Social Security Blamed

➤ SOCIAL security and labor organizations which force a vast and increasing army of older workers to idleness and to charity disguised under the name of old age pensions were vigorously denounced by Prof. Anton Carlson, of the University of Chicago at the Congress of Industrial Health.

As a labor union carpenter and farm hand before going to college and entering on a career as medical scientist, Dr. Carlson said he spoke with experience and knowledge of all sides of the question. The labor organization or union philosophy of equal hourly wage for all workers in each special trade must, he said, share part of the blame for the discarding of older workers by management and for the destruction of morale and satisfaction in working of the superior worker who is held to the level of the mediocre worker.

Social security for the aging population, he declared, is all right in principle, but it should take the form of labor for which these people are capable, and not the form of pay for doing nothing. It is a sad reflection on education and no sign of intelligent planning if men and women over 60 have neither the opportunity nor training to do some work of value to themselves and society.

"By keeping in idleness older workers who can still perform useful labor," he charged, "we are not only wasting valuable human resources, but we are contributing to biologic parasitism in and degeneration of human society. Man is no exception to the biologic law that existence without effort and without struggle impairs the species."

Science News Letter, January 23, 1943

A double line of eggs reaching from the earth to the moon: that was not the total U. S. egg production in 1942, but merely the increase over previous years.