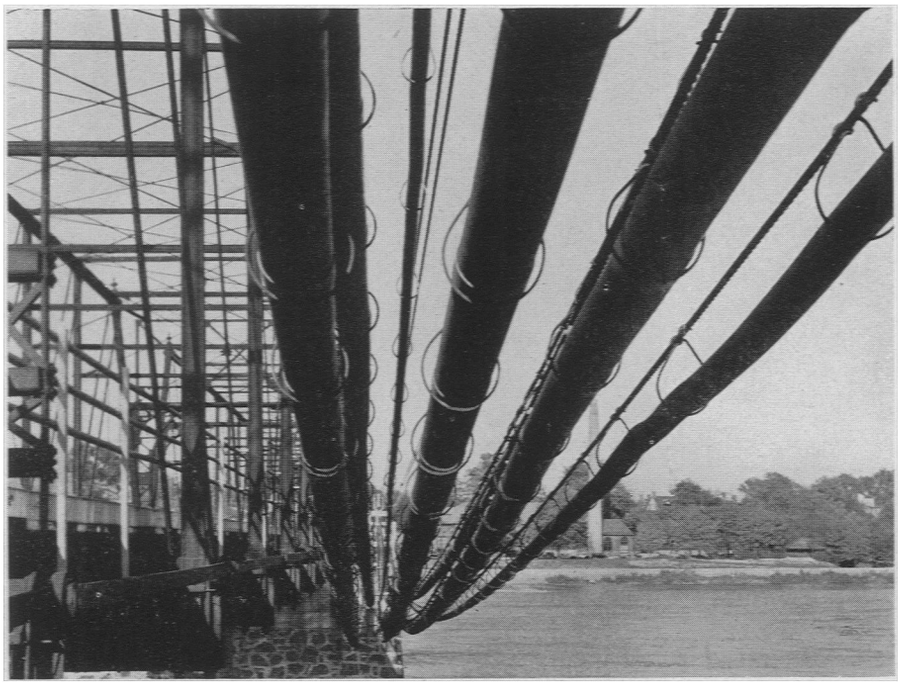


CARRIES MOVIES

The third of these cables, counting from the left, tiny in comparison with the others, can carry hundreds of telephone conversations or thousands of telegrams at one time.

ENGINEERING

Movies Transmitted by Wire In First Coaxial Cable Show

Really a Pipe Containing a Single Wire, It Can Do The Work of From 20 to 40 Pairs of Ordinary Wires

TELEVISION advanced one step nearer to becoming a commercial service as 240-line images were transmitted from New York to Philadelphia over the American Telephone and Telegraph Company's new million-cycle coaxial cable, which can carry at one time one 240-line television image, 240 wirephoto signals or telephone conversations, or 2,880 telegrams.

Using an eight-inch-square cathode-ray receiver in place of the older disk scanning receptors, animated diagrams describing the equipment were transmitted from New York City and received in Philadelphia with no important loss of detail. Flicker was notably decreased, and the images were only slightly colored.

Newsreels were transmitted from New York and could be watched from a distance of ten feet without severe eye strain. Details such as a tennis ball in motion could be followed in the received image.

Present at the demonstration were Dr. Frank B. Jewett, president of the Bell Telephone Laboratories, where engineers have developed the coaxial cable from a theory to a working system, and Dr. Herbert E. Ives, director of electro-optical research, engineer in charge of television investigation.

Intended for use as a communication channnel for any service—code, voice, or image—the coaxial cable is limited in carrying power only by the nature of the terminal equipment. New terminals are now planned to increase the band of a million cycles carried by the cable to a still greater figure.

Television images transmitted are far superior to those sent by the same engineers from Washington to New York in 1927, and somewhat better than those sent over the two-way system demonstrated in New York recently.

Employing single side band transmission, which doubles the possible number of lines that can be sent over a given channel, and utilizing the entire spectrum of frequencies, this million-cycle cable is capable of carrying only the 240-line images shown. A projected two-million-cycle system, capable of carrying 480-line images, would permit twice as much detail or double-sized images with the same detail.

Repeaters Every 10 Miles

Starting in New York, the signals are "repeated," or amplified, every ten miles, each repeater containing about as much equipment as an average radio receiver. Power for the repeaters is transmitted through the cable along with the signals, making the system independent of any local power source.

Special delay equalizers were designed by Bell Laboratories engineers to prevent distortion that would be caused by the different rate of travel of the different signal frequencies. While electrical signals theoretically travel with the speed of light, the cable and terminal mechanisms cause delays sufficient to distort an uncorrected image. The equalizers allow the various signals that start out together to arrive within a quarter of a millionth of a second of each other.

The principle of the coaxial cable has been known for many years, but only recently was machinery for manufacturing the cable developed. Previously its cost was prohibitive.

Literally a pipe, the coaxial cable consists of a single wire inside a metal tube. But the single wire in its tube can do the work of dozens of pairs of ordinary wires.

Early models of the cable were made by hand at a prohibitive cost, each spacer being strung on the central wire. Then an insulating tube was drawn over it, and finally an outer sheath of woven copper braid was pulled over the whole.

The cable's usefulness lies in the fact that it does the work of twenty to forty pairs of wires of the type now in use and that it does things which no standard wire can do. It will effect tremendous savings of materials and instruments.

Every long distance line, for example, has "repeaters" placed at regular intervals to amplify the current carrying a telephone or telegraphic message. Each line, carrying from six to twelve messages, requires its own repeater. One re-

peater on the coaxial cable, however, amplifies 240 telephone messages rather than a mere dozen.

The coaxial pipe owes its advantages to the fact that it can carry at the same time alternating currents of frequencies ranging from zero up to a million or more cycles per second. Ability to carry hundreds of different currents simultaneously has been translated by the communications engineer into the ability to carry hundreds of messages at the same time.

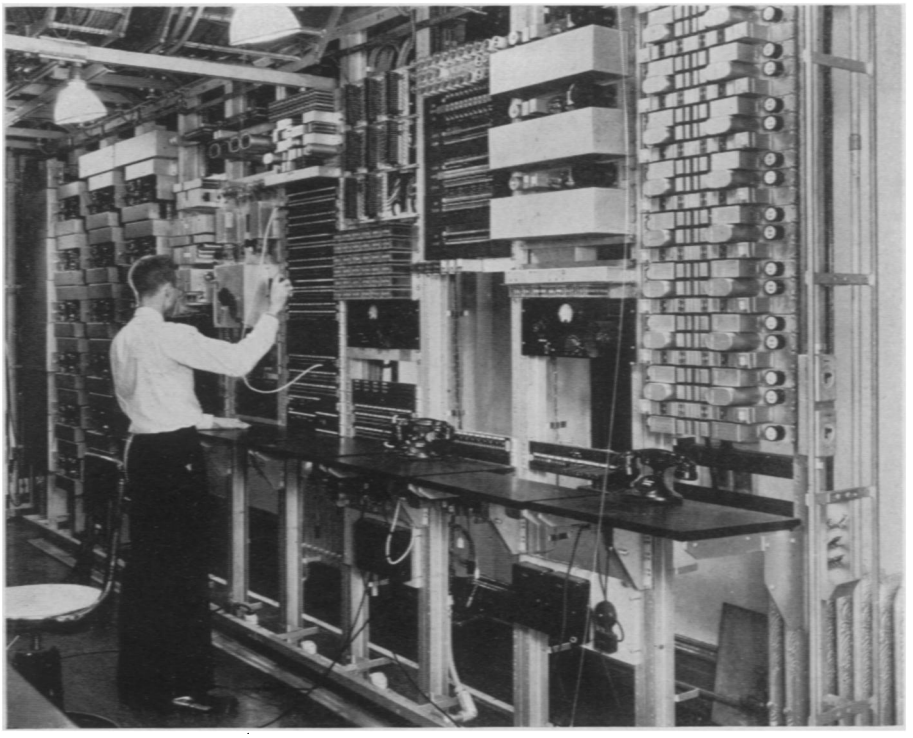
Although neither company is believed to be planning at present a New York to Philadelphia broadcasting hookup, both the Columbia Broadcasting System and the National Broadcasting Company plan to begin regular television broadcasts from New York early in 1938. These experimental "telecasts" will be receivable only in the metropolitan area. Should they expand the service, however, use of the coaxial cable will be required.

The ninety-mile cable between New York and Philadelphia was completed last spring, and preliminary telephone and telegraph transmission tests were then carried out. Terminal difficulties have, however, prevented its use for television purposes until now.

No one engineer, it is believed, can be credited with the development of the coaxial cable. Bell Telephone engineers as a group conducted the experiments leading toward its use.

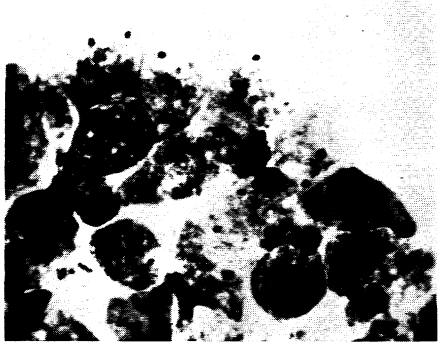
Machinery for its manufacture was designed by the Western Electric Co., a Bell subsidiary. The installation was carried out by the American Telephone and Telegraph Co.

Science News Letter, November 20, 1937



TERMINAL

The Coaxial cable is limited in carrying power only by the nature of the terminal equipment. Here is shown the elaborate apparatus at the Philadelphia terminal.



MEASLES VIRUS BODIES

A black stain shows the measles virus bodies as small dark spots. The large rounded bodies are cells of the nasal membranes which disintegrate under the virus' action, letting the virus escape, as seen in the margin, to reach other parts of the body or, via nasal discharge and saliva, to reach and infect another person. This remarkable photomicrograph is by T. H. Hausmann.

BACTERIOLOGY

Black Stain Makes Measles Virus Bodies Visible

Discovery Will Make Possible Early Treatment and Isolation of Patients; May Prevent the Epidemics

A BLACK, ink-like stain or dye may be the means of conquering measles, dreaded childhood disease, it appears from the discovery by Prof. Jean Broadhurst of Teachers College, Columbia University, announced by the University.

The dye is not a cure or preventive itself but it enables scientists for the first time to see under the microscope the hitherto invisible virus bodies which cause measles. As a result, the disease can be diagnosed 2 or 3 days earlier than is now possible, before the typical rash and fever appear, and the child can be isolated and kept from spreading the disease to others. Not only that, but healthy carriers of the disease virus can be detected and kept from spreading the disease which periodically sweeps the country in epidemics. Important also is the fact that the early diagnosis means treatment can be started early and this may save the child from mastoiditis, ear infections, pneumonia and other serious ails that commonly follow measles.

The dye is called Nigrosin. Its advantage over other dyes is that it colors the virus bodies but not the other germs that lurk in noses and throats.

Prof. Broadhurst's discovery was made with the assistance of Dr. Margaret Estelle McLean of the College and Vincent Saurino, a student. The experiments, aided by a grant from the Milbank Memorial Fund, included examination of mucus from the throats and noses of over 160 measles patients. Details are reported in the *Journal of Infectious Diseases.*

Science News Letter, November 20, 1937