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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE

Spring Hunger

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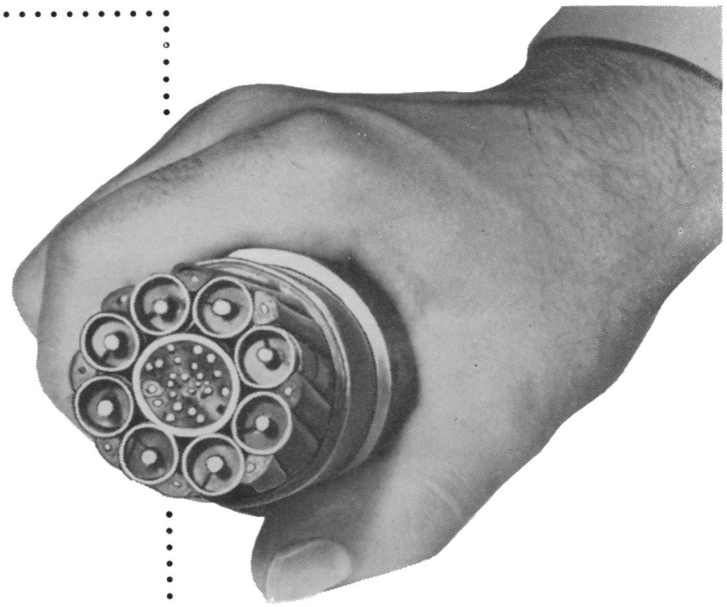
Pipes that grew without getting bigger



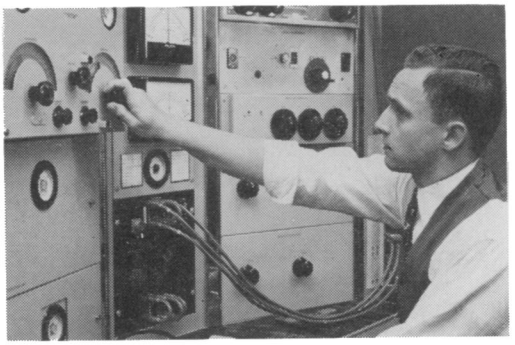
Cross-section of coaxial cable. To triple capacity, Bell Laboratories and Western Electric engineers had to make 1000 amplifiers work perfectly in tandem . . . feed repeater power along the same cable that carries messages . . . put signals on and off the line at numerous cities along the route without distortion.

Pencil-size pipes carry telephone messages and television across country through the Bell System's coaxial cable. Once, each pipe could carry 600 voices, or one television program. Now it can carry 1800 voices, or 600 voices *plus* a broadcast quality television program.

Yet the pipes aren't any larger. They are being made into triple-duty voiceways by new repeaters, new terminal equipment and other transmission advances developed by Bell Laboratories engineers.

The conversion expense is less than the cost of laying extra coaxial cables. But it calls for highly refined manufacturing procedures, made possible only by close co-operation of Bell Laboratories and Western Electric, manufacturing unit of the Bell System.

In improving the coaxial cable system, they created more than 20 years ago, engineers at Bell Telephone Laboratories devised a new way to give America still better telephone service, while the cost stays low.



Laboratories engineer tests new triple-duty coaxial system. It marks the first time that telephone conversations and television can travel through the same pipes at the same time. With a wider frequency band being transmitted, big problem was to eliminate interference between the two types of signals.

BELL TELEPHONE LABORATORIES

Improving telephone service for America provides careers for creative men in scientific and technical fields

What General Electric people are saying . . .

J. H. HAGENGUTH

Mr. Hagenguth is Manager of the Company's High Voltage Engineering Laboratory.

". . . Thanks to the lightning hunters, among them such illustrious names as Steinmetz, Peek, McEachron, Foust, and Lewis of the General Electric Company, Gross of the American Gas & Electric Company, Schonland in South Africa, and others, we now have a fairly complete story on the lightning stroke formation and the currents involved. We have learned that a lightning stroke generally starts at the cloud in the form of a short streamer of about 150-foot length. This streamer hesitates for about 50 millionths of a second or 50 microseconds and then advances another 150 feet. This process is continued more or less regularly until the streamer reaches the earth after about 1/100 of a second from the start. Here charges of opposite polarity have meanwhile accumulated and as the streamer makes contact, there occurs an interchange of charges at a rate about 100 times as great as the streamer advance. A so-called current peak is produced which may have as much as 200,000 amperes of crest current traveling upward toward the cloud. This is the lightning component that shatters trees and houses.

Probably no two strokes are ever alike. However, we now know quite well the range of the important characteristics of lightning stroke current peaks, such as the time it takes to reach its crest, how slow or how fast it decays, the range of its current amplitudes. All these factors are of importance in the equipment protective field.

In our Pittsfield High Voltage Laboratory we can now develop voltages up to 15,000,000 volts and currents as high as 250,000 amperes. We, therefore, can cover the entire field of effects of lightning on our electrical installations.

G-E Science Forum
Station WGY, Schenectady

E. S. LEE

Mr. Lee, a past president of the AIEE, is editor of the General Electric "Review."

". . . Every engineering student is continually wondering what is beyond his student life, what is ahead of him in the great adventure in which he has made a start. The step into industry looms large. The picture of the road ahead is never clear.

And yet this need not be. If he will only realize it, he has been privileged to have the opportunity to obtain the finest education it is possible to provide.

He has learned of the phenomena of Nature in his physics, which is fundamental. He has learned of the materials of Nature in his chemistry, and with these he will live throughout his engineering life. He has learned to write a phenomenon of Nature in the one-line equation of mathematics, to operate upon that equation to obtain a relationship of the variables involved, and to plot those variables in order to see the phenomenon in all its beauty and its usefulness.

For the phenomena of Nature are beautiful, and it is to the honor of the scientist and the engineer to search them out and make them available to mankind in the products of industry. These are the prize possessions of the engineering student; and industry provides him with the opportunity to make use of them. This is not new. It has always been that way.

The opportunities for new advances never cease. Even after 75 years of continuous engineering achievement, the engineer is still opening new doors. Whether these lead to the development of new products, or to the improvement of present ones, they represent opportunities for every engineer. Of these there is no end. Engineering *is* a great adventure.

General Electric Review

J. W. BELANGER

Mr. Belanger is Vice President, Defense Products Group.

" . . . The General Electric Company is devoting 30% of its over-all effort to defense production. We are proud to be in a position to make such a large contribution to the greatest cause of all—keeping our Country free from aggression. We are devoting our efforts only to those areas where a definite contribution can be made, i.e., jet engines, fire control systems for both aircraft and ships, guided missiles, and some of the most complicated systems ever to be devised by man.

The characteristics of deliberate invention, of relentless research and development, are the sign posts of our Company's progress. To these we must add the priceless quality of patience—of being able to live serenely in a dangerous world. We must learn there is never going to be a return to "normal times," at least in the terms in which we used to think of those words. Rather we should think of the cold war and mounting defense expenditures as the years roll by as "normal" in our American picture.

We in General Electric are not devoted to the arts of war, but we are deeply aware of our responsibility to serve our nation in whatever way we can do it best. I am completely confident we will meet the challenge our country has placed upon us.

Lynn, Massachusetts

You can put your confidence in—

GENERAL ELECTRIC