ENGINEERING

Cable With Amplifiers

Underwater telephone lines with built-in amplifiers 40 miles apart provide 24 high-quality talking paths on installation 115 miles long.

➤ UNDERWATER TELEPHONE cables, with built-in amplifiers, have proved effective on a 115-mile installation between Florida and Cuba, it was indicated by J. J. Gilbert, Bell Telephone Laboratories, at the meeting of the American Institute of Electrical Engineers in New York.

Two such cables were recently laid between these two terminals, one for northbound and the other for southbound transmission. Together they provide 24 high-quality talking paths. Their built-in amplifiers are spaced about 40 miles apart, and are powered with current carried along the same coaxial conductors that carry the voice.

The underwater cables bulge from one inch in diameter to three inches in the 25-foot length that contains the amplifiers. The amplifiers themselves use specially developed vacuum tubes which are thought to be able to function, unattended, for perhaps as long as 20 years. The cable is flexible enough for deep-water laying, yet rugged enough to withstand pressures encountered a mile below the surface.

An improvement in the carrying capacity of "short haul" telephone cables was described at the same meeting by three other Bell Telephone Laboratories scientists. They were R. S. Caruthers, W. E. Kahl and L. E. Pedersen. Particularly described were two installations between Harrisburg and Sunbury, Pa.

The system provides 12 high-quality telephone circuits simultaneously on only two pairs of wires, thus avoiding the costly installation of many new cables. Many of its advantages have been realized for a number of years in long distance telephone circuits, but cost of terminal equipment has heretofore prevented its economical application in short-haul circuits. Development of small-size, low-cost apparatus makes the new application possible.

Science News Letter, February 3, 1951

ENGINEERING

Heat Pump Uses Power

➤ BEFORE converting from conventional house heating to modern heat pump systems the cost of the electric power needed should be taken into consideration, it was indicated at the meeting of the American Institute of Electrical Engineers in New York.

A report of a study of five home installations for year-round air-conditioning was presented at the meeting by Philip Sporn and E. R. Ambrose of the American Gas and Electric Service Corporation, of New York City. The homes were located in Virginia, Tennessee, Ohio and Indiana.

The electric load for heat pumps "can easily equal, and perhaps exceed several times, the present day total domestic electric consumption," they stated. "Average figures show that annual energy consumption of an all-electric residence with a heat pump is approximately three and one-half times as great as for the same residence without a heat pump.

Heat pump systems utilize heat from the earth below frostline, or heat from water in deep wells, for heating buildings. No matter how cold the earth or water may be, it contains heat. Some of this heat is picked up by circulating a refrigerant through buried pipes and is built up and delivered to rooms of the home. The principle employed is somewhat the same as that used in the electric refrigerator, but it is working in reverse. Electric power is required to cause the circulation.

Science News Letter, February 3, 1951

MEDICINE

Mechanical Cougher For Polio Patients

➤ A MECHANICAL cougher for infantile paralysis patients who have breathing difficulties was announced by Dr. Alvan L. Barach of Columbia University at a polio conference in Houston, Texas.

The conference was sponsored by the National Foundation for Infantile Paralysis in cooperation with Baylor University College of Medicine and the Southwestern Polio Respiratory Center.

Polio patients with respiratory involvement not only have trouble breathing. They are unable to cough normally. As a result, they cannot expel secretions from their lungs and bronchial tubes. This may lead to serious, often fatal, complications.

The mechanical cougher is attached to a pressure equalizing chamber which looks much like the regulation iron lung. Changes of pressure within the tank provide a flow of air in and out of the patient's lungs. With this type of respirator the patient can breathe at will to the extent to which he is able and does not have to fight against a controlled breathing rate.

Artificial coughing is provided by a close fitting baffle around the patient's neck and a hair trigger air valve geared to operate in one eight-hundredth of a second. This permits a sudden and explosive compression of air on the patient's chest and abdomen which simulates the mechanism of a natural cough and expels the collected secretion from the patient's lungs and bronchial tubes.

Science News Letter, February 3, 1951

ENGINEERING

More Engineer Students Needed by Profession

➤ MORE COLLEGE students in engineering courses are needed to fill the demand for trained men in these professions, it was indicated at the meeting of the American Institute of Electrical Engineers in New York.

Enrollment of engineering students was stimulated by war conditions during the past decade, the scientists were told by Titus G. LeClair, of Chicago, president of the Institute. However, enrollment is now beginning to drop, he said, because of "rumors" that there would be a surplus of engineers.

It is anticipated that 31,000 students will be graduated from engineering courses in 1951. This will decrease to 15,000 in 1954, and the number of "high school enrollments indicate further reductions beyond 1954 unless more high school graduates go to college, or a higher percentage than formerly choose the engineering course."

The 1940-50 engineering graduates were absorbed readily into industry without lowering salary standards, he said. "We can truthfully say that any qualified young man may enter an engineering college without any fear that the profession is approaching a saturation point."

Science News Letter, February 3, 1951

A recent survey made by a paint manufacturer indicates that women prefer for interior decorations in their homes about the same *colors* that Nature uses in the plant world.

Zirconium ore is rather plentiful in some parts of Brazil; this metal is used in steel alloys and now for neutron shields in atomic furnaces.

Many *race horses,* when running at the track, are shod with lightweight aluminum shoes.

In the *Great Smokies* in North Carolina and Tennessee there are 40 mountain peaks more than a mile high.