

Ocean Telephone Cable by 1932

Communications

Early in the year 1932, it will probably be possible to talk from the United States to Europe by telephone regardless of the static and atmospheric conditions that interfere with trans-Atlantic radio at times. By then it is expected that a trans-Atlantic telephone cable will be in use, providing an all wire voice circuit between the two continents.

Engineers at the Bell Telephone Laboratories here are now working on the development of the cable system, which will connect New York with London. Long distance lines will radiate from each of these cities to the other parts of Europe and America. It is not expected that the cable will replace the present radio system, but its greater reliability will assure a connection at all times. It will also provide an additional channel so that more messages can be handled at once. The telephone cable will only handle one conversation at a time.

Recently developed alloys of nickel, cobalt and iron make telephony by cable possible. This metal is known as "perminvar." It is not used to

carry the currents that traverse the cable, but is wrapped spirally around the cable as loading. A copper wire in the center is the actual conductor.

With a plain copper wire, which was used in the first cables, the wire and the sea outside acted as a condenser, even though the wire was fully insulated. Electricity is stored in a condenser something like water in a tank, so it is sluggish in its action. The condenser, which is the entire cable, must be charged before the operator at the other end gets a signal, while it must be discharged before another signal can be sent. This made early cable transmission very slow.

This capacity of the cable—the property that makes it a condenser—can be overcome by loading it. This is done by wrapping it with wire or tape made of metal which becomes magnetized by the slight currents flowing through the cable. For use in telegraphy, the Bell Laboratories developed an alloy called "perm-alloy," which is now in use on several high speed cables. These cables respond instantly to signals from the

transmitting end.

Perminvar has a further advantage over permalloy, however, for it is affected the same extent by the same variation in current, whether in a weak current or a relatively heavy one. With telegraph cables, the current either flows or does not flow, and the change is from on to off so this property is not needed. Telephony, however, requires a wide range of current strength, to take care of the modulations of the voice. With a cable loaded with perminvar, this is possible.

The route of the new cable has not yet been definitely determined. Probably, the submarine part will be from Newfoundland to Ireland, a length of about 2100 miles. From Newfoundland, the circuit will be carried through several other cable sections to Nova Scotia and thence over land wires to New York. From the Irish end, a submarine cable will carry it across the Irish Channel to Scotland, and thence land wires will take it to London.

Science News-Letter, September 28, 1929

Airplane Tests in Progress

Aviation

Tests of airplanes entered in the Daniel Guggenheim Safe-Aircraft Competition are now under way at Mitchel Field, on Long Island, and will continue during October as rapidly as the 25 entrants present their ships. A Handley-Page airplane, equipped with the slotted wing that is said to be a great aid to safe operation, is now en route from England, and will probably be tested within the next few weeks. The autogiro, with its windmill-like wings, is also entered.

The requirements which the planes must pass are very drastic, but they are designed to insure extraordinarily safe operation of a plane that can meet them. It must be able to maintain level and controlled flight at a speed of not more than 35 miles per hour, a condition which few present day planes can meet. It must be able to land in a straight line with all power turned off, coming to rest within 100 feet of first touching ground. It must be able to clear an obstruction 35 feet high, and land within 300 feet of the base of

the obstruction. In taking off, it must leave the ground within 300 feet of a standing start, and clear a 35 foot obstruction 500 feet from rest. It must be able to take off and land within an area 500 feet square, surrounded by a 25 foot wall. For safety in making the tests, the wall will be imaginary.

Other tests relate to the plane's stability, controllability and ability to recover from abnormal conditions. The entrant whose plane best passes the test will receive the main prize of \$100,000, while each of the first five entrants whose planes pass the test will be awarded a \$10,000 safety prize.

Science News-Letter, September 28, 1929

Sleep Like Kitten

Psychology

Movies taken of sleepers indicate that the greatest possible relaxation occurs when the individual coils himself like a kitten and when he sprawls out like a swimmer. This new evidence on sleep is announced by Prof. S. R. Hathaway of Ohio University.

Science News-Letter, September 28, 1929

Patina From Coal Acids

Chemistry

The green patina that appears on copper roofs or drainpipes after years of service and that gives the metal its attractive appearance, is due chiefly to sulphuric acid present in the air from coal smoke. This conclusion was announced at the Düsseldorf meeting of the Institute of Metals, an English society that just held its first meeting in Germany, by Dr. W. R. J. Vernon and L. Whitby, of the Chemical Research Laboratory at Teddington.

The two metallurgists studied samples of copper from buildings in London and other parts of England. Some were as old as three hundred years. In the city specimens, the patina consisted of basic copper sulphate, caused by the action of atmospheric sulphuric acid. A piece of telegraph wire, exposed for 13 years within 200 yards of the sea, showed a patina consisting of basic copper chloride, the chlorine having been furnished from the salt water. At first, they found, the red copper turns black, but then the green patina develops later, and remains indefinitely.

Science News-Letter, September 28, 1929