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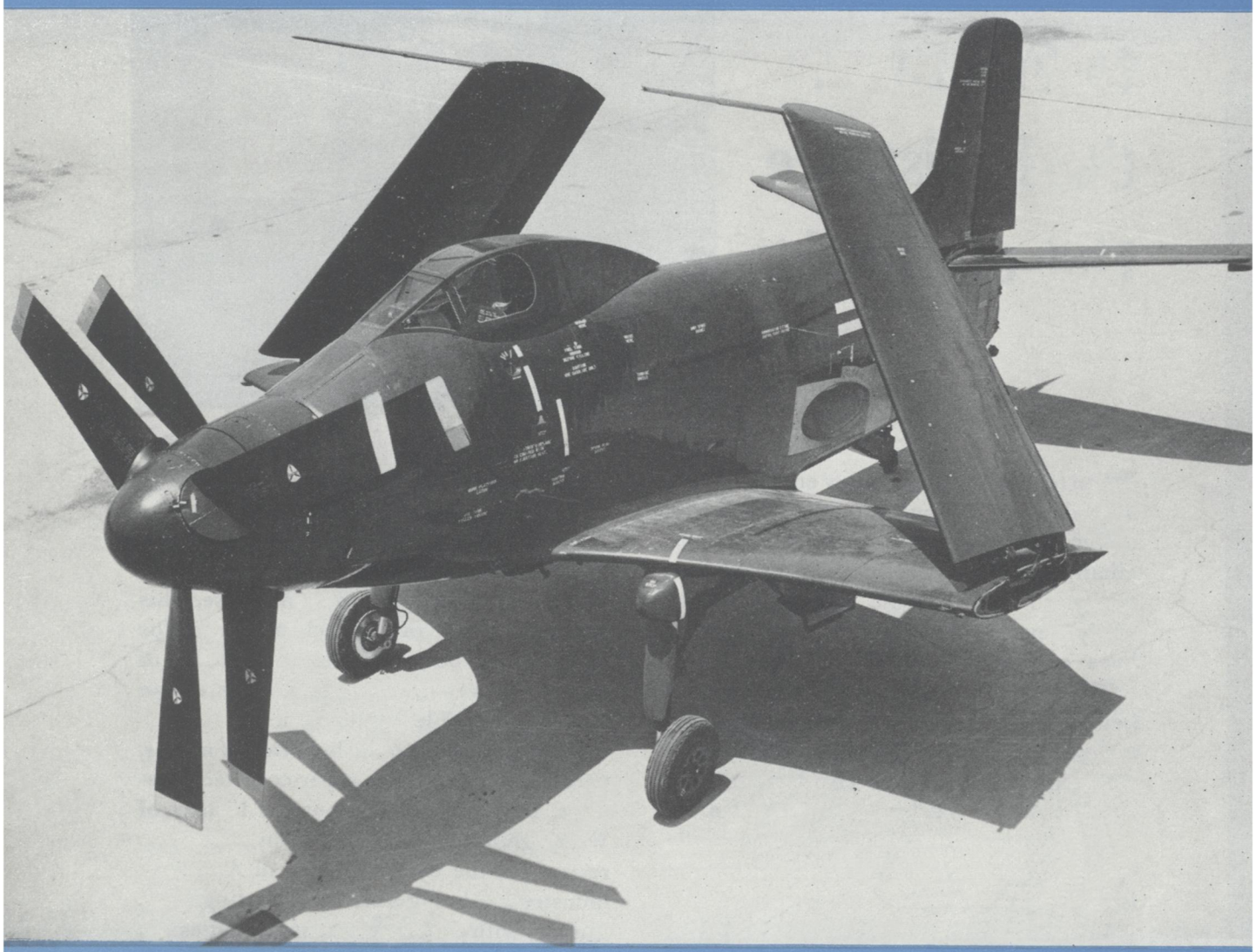
SCIENCE NEWS LETTER

®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Skyshark

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Cold Enough to Freeze... the Resistance Out of Metals

When temperatures drop low enough... say 450 degrees below zero . . . bouncing molecules come to a virtual standstill, eliminating resistance to the flow of electricity so that current will flow indefinitely—even after the power supply has been cut off.

The illustration shows this phenomenon being demonstrated. A circuit has been submerged in liquid helium at a temperature of 452 degrees below zero. The demonstrator . . . Dr. Aaron Wexler . . . has "pulled the plug", disconnecting the circuit. The needle on the upper scale reads zero—no current is entering the circuit.

Yet, the indicator on the recorder below shows that 7,000 amperes are flowing through a cylinder of niobium.

So we have a phenomenon . . . one of the dividends from pure research that is constantly under way with Westinghouse. This particular result of research may lead, for example, to new and better methods of electric power transmission, to mention only one possible application.

Such research into the behavior of matter, particularly metals, at super-cold temperatures, is typical throughout the history of Westinghouse . . . it demonstrates one reason for the dynamic force of American industry . . . it suggests why Westinghouse can live with such a strong statement as . . .

G-10102

YOU CAN BE SURE..IF IT'S Westinghouse

Saving energy for better low-cost telephone service

Arrow points to tube containing a wire specimen under test for surface conductivity. The tube and wire are excited to resonance by microwaves from generator at extreme left. Conductivity is calculated from frequency values indicated by barrel-shaped wavemeter (top center) and resonance curves traced on an oscilloscope screen (not shown).

In the waveguides which conduct microwaves to and from the antennas of radio relay systems, current is concentrated in a surface layer less than 1/10,000 inch thick, on the inner surface of the waveguide. When these surfaces conduct poorly, energy is lost.

To investigate, Bell radio scientists devised exact methods to explore this skin effect at microwave frequencies. Scratches and corrosion, they found, increase losses by 50 per cent or more. Even silver plating, smooth to the eye, can more than double the losses of a polished metal. Very smooth conductors, like electropolished copper, are best. An inexpensive coat of clear lacquer preserves initial high conductivity for many months.

Energy saved *inside* a microwave station can be used in the radio-relay path *outside*. So stations can sometimes be spaced farther apart, with more margin against fading. Here is another example of the practical value of research at Bell Telephone Laboratories.

BELL TELEPHONE LABORATORIES

WORKING CONTINUALLY TO KEEP YOUR TELEPHONE SERVICE BIG IN VALUE AND LOW IN COST