ACOUSTICS

Holes in Congress Ceiling Help Hearing

➤ THERE ARE thousands of holes in the ceilings of the Senate and House Chambers so that the words of wisdom members utter won't bounce back at them.

The tiny holes, 15 to the square inch and 3/32nds of an inch in diameter, solve an acoustical problem presented by the new domed ceilings designed to reflect the indirect lighting of the legislative chambers. With these holes, and with other acoustical improvement, the Senators and Representatives can hear each other much better.

The smooth surface of the domed ceiling was just the thing to produce echoes. However, the holes let the "pointing with pride" and "viewing with alarm" of the legislators go through to a chamber above where sound absorbent material captures them.

Dr. Paul E. Sabine, Colorado Springs, Colo., was acoustical consultant in the remodeling of the two chambers. He reported on his work in the JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA (March).

Science News Letter, May 10, 1952

METALLURGY

Metals Melted in Mid-Air; No Container Contamination

➤ METALS BUOYED in the air by invisible electromagnetic fields can be melted without having any container around them through a new process described to the American Physical Society meeting in Washington by five scientists of the Westinghouse Electric Corporation Research laboratory.

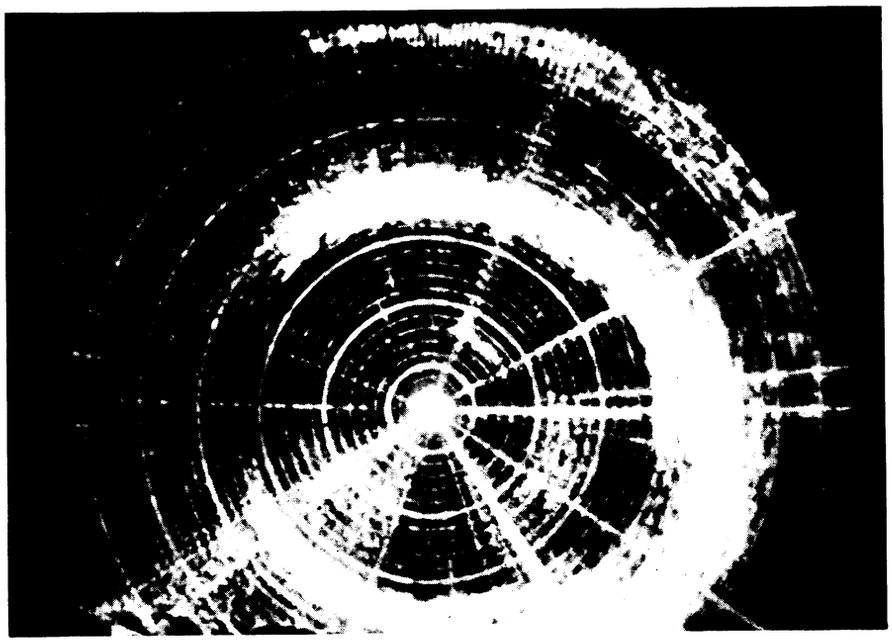
As reported by E. C. Okress, D. M. Wroughton, G. Comenetz, P. H. Brace and J. C. R. Kelly, "electromagnetic levitation" is the answer to many problems created by titanium and other metals which combine with other materials during refining stages.

Mr. Brace told SCIENCE SERVICE that, basically, metals such as aluminum can be suspended in opposing electromagnetic fields generated in two conical coils, one suspended above the other. The coils operate on 9,600-cycle alternating current.

The metal becomes molten under the inductive-heating influence of the electromagnetic field. It melts, but is held together by an oxide film formed where the metal comes in contact with the air. When oxide films do not form, the material is held together by surface tension.

Chunks of aluminum as large as four inches long by two and one-half inches in diameter have been melted successfully using the new method. Silver samples, however, have been smaller because surface tension is depended upon to keep the molten metal together.

Science News Letter, May 10, 1952



PREDICTING RECEPTION—The bright areas on the screen of this oscilloscope show where radio communication can be conducted from the sender's station, the bright spot in the center, the top part of the screen being north. Bright rings mark the distances, with the outer edge indicating about 3,000 miles.

RADIO

Radio Reception Areas

System held in secrecy for four years tells at a glance what remote areas can receive radio signals from sender's transmitter.

➤ INSTANTANEOUS PREDICTION of radio transmission paths, a system developed by Raytheon, Waltham, Mass., in 1948 and held by the government in secrecy until now, was explained with motion pictures by Dr. J. T. deBettencourt by whom it was developed, at a joint meeting of the International Scientific Radio Union and the Institute of Radio Engineers held in Washington.

Formerly a member of Raytheon's research group and now a staff member at the Massachusetts Institute of Technology, Dr. deBettencourt supervised work that led to the discovery of a device which tells at a glance what remote areas can receive radio signals from the sender's transmitter.

Previously it has been necessary to make laborious mathematical calculations merely to obtain a less accurate approximation of the areas which could receive the signals.

Radio waves transmitted from the sender's station and reflected by the ionosphere scatter in all directions upon striking the ground at some distant point. It is these ground-scattered waves that indicate the reception area. Some of the scattered signals return to the sender's station. In the experimental work to assure certainty of results, radio beacons triggered by the scattered waves were employed. These sent tell-tale signals back to the sender's station.

Dr. deBettencourt detected the reflections with a radio receiver and electronically plotted them in terms of distance and direction on the screen of a cathode-ray oscilloscope, the "picture tube" of television sets. The results showed a region of no reception, surrounding the sending station, beyond which was an irregular circular, or partially circular, reception area, then a non-reception area again.

The picture he obtained on the screen showed what areas up to 3,000 miles away could receive his signals. The bright areas on the screen could receive the radio waves, the dark areas could not.

To make certain the returning signals were scattered by the ground rather than by elements in the atmosphere, Dr. deBettencourt and his group used radio beacons situated at various places throughout