National Capital Radio & Television Museum

Artifact of the Week:

Carbon Microphone From Station KDKA



Thanks to our generous donors, the museum collection includes microphones spanning decades of technological development. This one has the distinction of having been used at pioneer Pittsburgh radio station KDKA, celebrating its 100th anniversary of broadcasting in 2020. (The mic stand here is a modern type, not the original.)

Prior to radio, the principal demand for microphones arose from the telephone industry, which sought small, rugged, and inexpensive devices for its handsets. To keep costs down, telephone circuits were designed for minimally understandable speech rather than high fidelity, and carbon microphones were well suited to that application. They were widely used at radio stations during the 1920s, but by the 30s, other microphones with better sound quality, such as ribbon-type mics began replacing them.

A carbon microphone is a simple device, a sandwich consisting of a flexible metal diaphragm and a rigid metal plate, with a filling of carbon granules between them. A battery provides direct current that flows between the plates. As sound waves hit the diaphragm, the pressure on the carbon granules varies, which changes the resistance of the device, and hence the current flowing through the mic varies in amplitude and frequency according to the voice signal hitting its diaphragm. The sound waves have been converted into a corresponding electrical signal.

Carbon microphones used in radio were usually suspended by springs in a metal ring because they are sensitive to shock and vibration. Without the springs, if an announcer bumped the mic stand or the table, it would make scratchy sounds over the air. The springs mitigated that problem. Some carbon mics needed to be tapped now and then to shake the granules loose, which an announcer might do at the beginning of a shift.

British inventor David Hughes is generally credited with having created the first carbon microphone in the 1870s, although in the United States Thomas Edison received the first important patent.

We appreciate your support of the museum so that historical artifacts like this one, and the stories that go with them, can be preserved for future generations. THANKS!