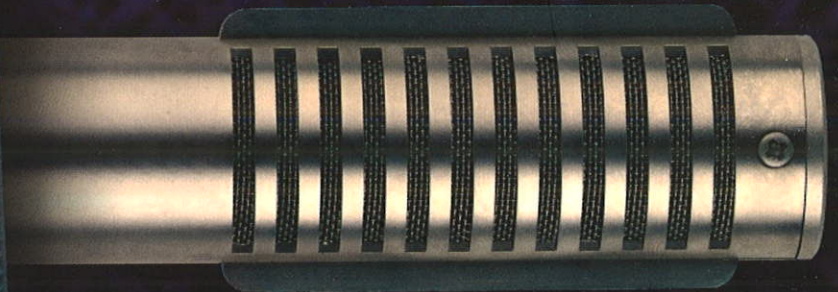


John Eargle

The Microphone Book

Second Edition



From mono to stereo
to surround

A guide to
microphone design
and application



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The Microphone Book

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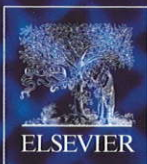
- **The most comprehensive guide available, heavily illustrated with helpful diagrams, charts and equations**
- **A timesaving, one-stop reference covering both microphone technology and practical tips on use and problem solving**
- **Written by a highly respected industry veteran and Grammy award winner**

The Microphone Book is the only guide you will ever need to the latest in microphone technology, application and technique. This new edition features new information on microphone arrays and wireless microphones; a new chapter on classic old models; the latest developments in surround sound; extra advice on studio set up, recording and mic selection; an improved layout for ease of reference and even more illustrations.

John Eargle provides detailed analysis of the different types of microphones available. He then addresses their application through practical examples of actual recording sessions and studio operations. Surround sound is covered from both a creative and a technical viewpoint. Recording and sound reinforcement engineers at all levels of expertise will find *The Microphone Book* an invaluable resource for learning the 'why' as well as the 'how' of choosing a microphone for any situation.

Contents • Microphone History • Pressure Microphone • Pressure Gradient Microphone • Directional Microphones • High Directionality Microphones • Microphone Measurements • Electronic Considerations • Wireless Microphones • Accessories • Stereo Microphones and Techniques • Classical Recording • Studio Recording • Surround Recording • Broadcast and Communications • Speech and Music Reinforcement • Adaptive Microphone Arrays • Care and Maintenance • Classic Microphones

John Eargle holds multiple degrees in music and engineering, and has consulted extensively on electroacoustical product development. He is President of JME Consulting Corporation and author of *The Handbook of Recording Engineering*, *The Loudspeaker Handbook*, *Electroacoustical Reference Data* and others. Among the many artists he has recorded are the London Symphony Orchestra, the Los Angeles Chamber Orchestra, Joe Williams, Ruth Brown and Etti James. In February 2001 he received a Grammy award for Best Classical Engineering. He is a fellow, honorary member and past president of the Audio Engineering Society. He has served on the faculty of the Aspen Audio Recording Institute since 1980. He is a member of the National Academy of Recording Arts and Sciences and the Academy of Motion Picture Arts and Sciences.



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SHURE MODEL M-55 UNIDYNE

Introduced in the late 1930s, the Shure M-55 Unidyne was the first dynamic microphone with a cardioid pattern. It became the industry prototype for all dynamic vocal microphones both in the US and in Europe. It was invented by the ever-resourceful Benjamin Bauer, who reasoned that a good cardioid pattern should exist somewhere between omni and dipole. His simple solution was to introduce a two-element acoustical phase shift network instead of a fixed delay path in one branch of a basic dipole. The time constant of the phase shift network provided excellent front-back rejection over a broad portion of the midrange, while forward directionality provided the necessary front-back discrimination at higher frequencies. The M-55 is shown in Figure 21-13A, and on-axis response is shown at B.

The M-55 has been in the Shure catalog in one form or another since its inception in the late 1930s. It is truly one of the icons of the industry and has been documented in press and news activities over the years. Who can forget those photos of Elvis Presley and President Kennedy with the ubiquitous M-55?

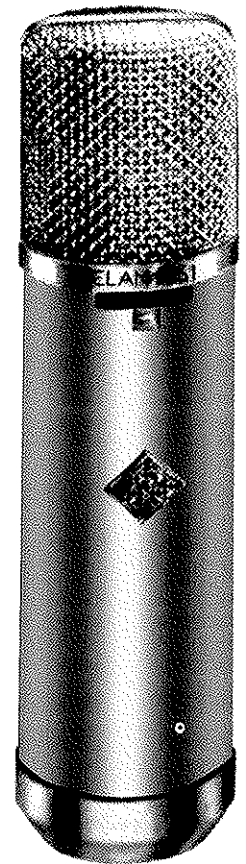


FIGURE 21-12

Telefunken Model ELAM 251. (Data from early company advertising.)

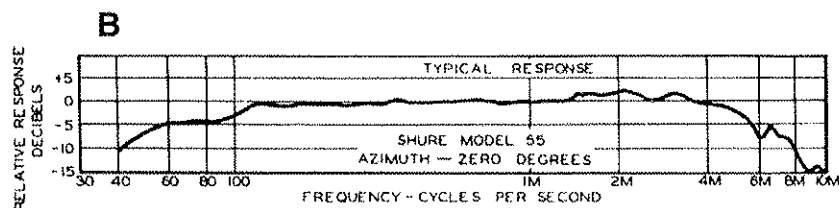
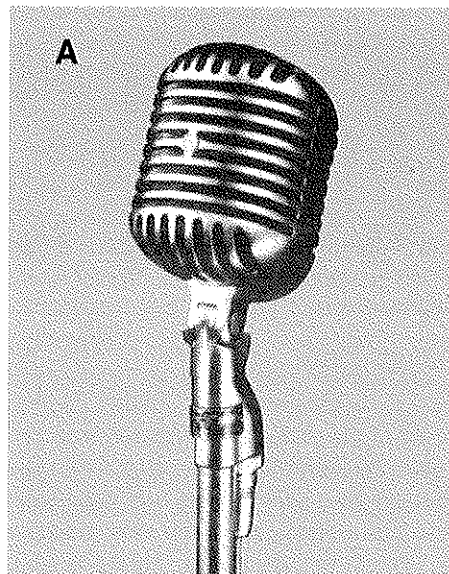


FIGURE 21-13

Shure Model M-55: photo (A); typical on-axis response (B). (Data courtesy of Shure Inc.)