

## THE ACOUSTICAL CONSULTANT

### The Effects of Ear Design on Pipe Performance

by R. J. Weisenberger

In previous articles I have briefly mentioned some of the effects ears have on pipe performance. I will now give this aspect of pipe design the attention it deserves.

Ears, if properly sized and positioned, will produce the following effects on the performance of open cylindrical flue pipes:

A. The operating pressure range will be doubled.

B. The acoustical power will be quadrupled (+ 6 db).

C. The harmonic development will be extended, as the pipe will stay in its fundamental mode at higher pressures before overblowing to its harmonic.

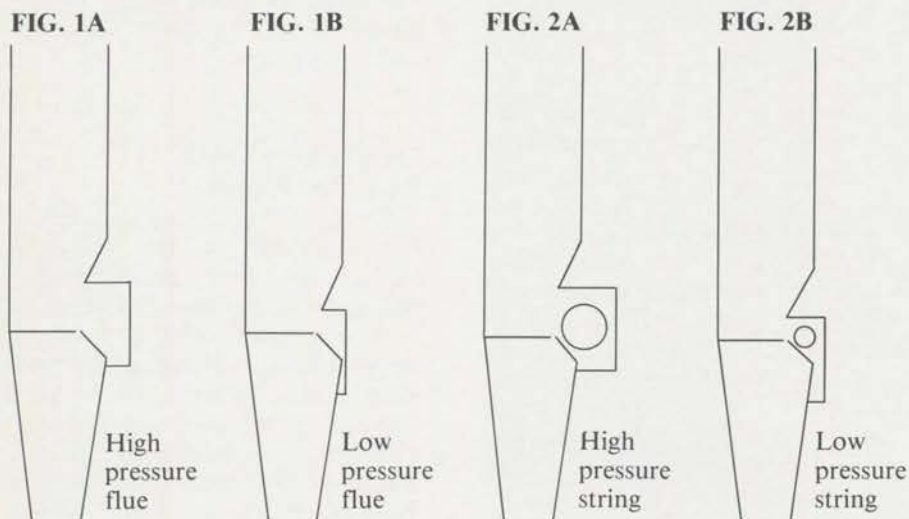
The above conditions will result when using ears, each the size of the mouth, with their tops bordering on the upper lip (see figures 1A and 1B). The use of ears larger than the mouth will do little more than flatten the tone, while the use of smaller ears will produce results similar to those above, but to a lesser degree. Like-

wise, if the ears are positioned differently, their effect will be lessened.

Thus, for high pressure and low pressure pipes of a given scale to be tonally similar, *all* of the above conditions must be met.

The use of a harmonic bridge between the ears takes the above process a step further, by permitting the pipe to operate with stability at pressures up to double that obtained by adding ears alone. Naturally, for pipes using a harmonic bridge, the ears must be larger than normal to accommodate the bridge. For a harmonic bridge to give optimum results, it should be of the same dimensions as the mouth and carefully positioned for a stable fundamental tone (see figures 2A and 2B). If the harmonic bridge is either too small or too large, proper voicing will be difficult, if not impossible.

Tests can be used to verify that high pressure pipework designed in this manner will possess a roughly equal amount of harmonic development as similarly-scaled low pressure pipe-



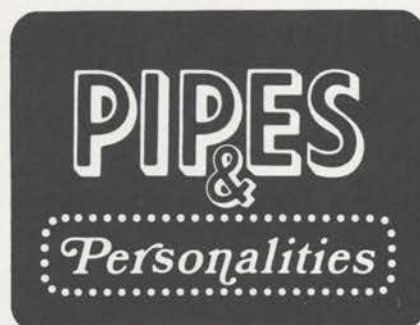
The correct placement and relative sizes of ears required to maintain a given tonality over a wide range of pressures and outputs.

work, while providing many times the acoustical output.

#### Erratum:

The diameter of the toe hole given on page 22 of the May/June '82 issue should be 1/4" minimum, not 1/2" minimum as given, as the toe hole diameter never need be as large as the diameter of the pipe itself. However, for those attempting to build this pipe, it will work without the added effort of tapering the foot.

Readers may send questions to Mr. Weisenberger in care of THEATRE ORGAN. Mail should be addressed to 3448 Cowper Court, Palo Alto, California 94306. Enclose a self-addressed stamped envelope. □



#### Landon Returns to Kentucky

Dr. John W. Landon reports that he has moved back to his former address, 809 Celia Lane, Lexington, Kentucky 40504. Fortunately, the property was not sold during his short stay in Cincinnati, so when a fund reduction forced the University of Kentucky to curtail the program in Cincinnati, John was able to return and reinstall his 3/10 hybrid theatre organ and 2/13 Pilcher church organ in his house. He says, "I am anxious to keep in touch with all my friends in the theatre organ world."

#### Mighty Wurlitzer Given To Colorado State University

A Mighty Wurlitzer will be installed in the Lory Student Center Theatre at Colorado State University this fall. The organ is a gift from Marian Miner Cook of Beverly Hills, California, in memory of her husband, John Brown Cook.

Valued at an estimated \$185,000, the organ was built in 1928 for the Piccadilly Theatre, Rochester, New