

## Fundamental Properties of Reeds

by R. J. Weisenberger

A reed is basically an air driven relaxation oscillator, producing a fundamental tone plus a high degree of harmonic development of both even and odd harmonics. The basic waveform at the reed is roughly a sawtooth wave of low to moderate intensity before it reaches the resonator.

The resonator can take on many forms to produce the desired effect on this basic waveform by presenting an almost infinite variety of acoustical loads at various bandwidths to the reed, and greatly contributing to overall efficiency.

In general, when speaking of horn type resonators such as those used in tubas, trumpets, etc., the strength of the fundamental is largely determined by the length of the horn and the diameter at the mouth. Large mouth horns produce stronger fundamentals than horns having small mouths. (Note the difference between a tuba and a post horn.) The fundamental is strongest in any resonator when the length is tuned to the pitch of the reed.

The most critical factors to harmonic development in horns are their throat diameter and the rate of flare.

Horns with small throat diameters followed by rapid rates of flare have the most harmonic development. This explains the prominence of high order harmonics in stops such as the post horn or brass trumpet.

Resonators other than horns, such as the type used on the vox humana are not even tuned to the fundamental frequency of the reed at all, but to a harmonic itself. The mouth, being restricted, makes the resonator behave as a bandpass filter, to imitate tonal qualities of the human voice, from which this stop derives its name.

This does not begin to describe the complexity actually involved in the design of reed stops, but gives a

rough idea of some of the reasons why certain reeds have their characteristic tonalities.

Variations in construction of the tongue and shallot will have effects primarily on the operating pressure, frequency, efficiency, and the development of the highest order harmonics.

There is still a lot of room for additional acoustical research along these lines, the variables being almost endless.

My next article will look briefly at the art of voicing, and the less predictable aspects of pipes.

### Definitions:

**Mouth** — The speaking end of a resonator (bell).

**Throat** — The end of a resonator connected to the reed block.

I sincerely hope that my research into organ pipe acoustics has already been of help to those involved in the building and restoration of pipe organs, and that it may create a renewed interest and increase the desire for greater knowledge in this long neglected art.

I will be glad to answer any technical questions concerning the material covered in my past six articles.

I also hope that my research will create an interest in the pipe organ by others in acoustically related fields to continue further research along these lines, so that future builders of pipe organs will no longer be limited to a purely historical knowledge of their art, but to an up-to-date and ever expanding scientific knowledge.

One of our main goals as ATOS members is to promote a greater understanding of the pipe organ. We can do this and more by helping to shed some light on the shadows of the past with the aid of today's technology. As history has been our link with the past, science will be our hope in the future. □



## the letters to the editors

Letters to the Editor concerning all aspects of the theatre organ hobby are encouraged. Send them to the editor concerned. Unless it's stated clearly on the letter "not for publication," the editors feel free to reproduce it, in whole or part.

### Address:

George Thompson  
Editor  
P.O. Box 1314  
Salinas, Calif. 93902

Dear Editor:

First of all, I'd like to add to the accolades your roommate has been receiving upon her retirement as membership/circulation manager; how fitting the lines that start with "Well done, good and faithful servant" . . . . When she took on the job, Vi must have looked at the records of her predecessors and thought, "What am I doing following acts like those?" Well, Vi did a fantastic job, and we are all grateful to her.

My Chief Wife, Jan, and I have enjoyed the articles by Stu Green on Hector Olivera, and were especially thrilled to read about and see pictures of his earliest days. Our first ATOS Convention was the one in 1972 when Ray Brubacher "unveiled" the Fantastic One, and we have followed his career with great interest ever since.

As always, Lloyd Klos has done a "bang-up" job with his article on the Eastman Theatre Austin and its main honcho, Bob Berentsen. Bob and his wife, Ruth ("Pinky"), were very dear friends of ours. Jan and I both took voice lessons from Bob, and Jan took a few organ lessons from him; and, of course, he played for our wedding.

It's really too bad that the organ was positioned so poorly, for it might still be in the Eastman and in playable condition today were it better located. Anyway, thanks, again, to Lloyd for his research and literary efforts.

Sincerely,  
Howard Reagan  
Potomac, MD

Dear Sir:

In the Pacific Northwest the Puget Sound Chapter extends into Vancouver, B.C., Canada. As Canadians we travel to Seattle, Washington, to meetings and concerts, a matter of 300 miles. We would like to express to the parent body of ATOS our thanks for the warm wonderful feeling extended to the Canadians by the executives and members of Puget Sound Chapter when we attend meetings.

It is gratifying to see the effort put forth in keeping the old theatre organs alive. We feel that with people of the Puget Sound Chapter calibre we can only go ahead. With people of the pizza parlours behind us, the public can get a chance to hear and see the majestic sound and quality in the old theatre pipe organs.

We in Vancouver would appreciate a place in your magazine to thank our American neighbours for the wonderful feeling between Canadians and American ATOS members.

Members,  
Bert and Doris Miller  
Vancouver, B.C.

Dear George:

Although London (the ATOS Convention City) is my favorite big city on this old planet for vacations, I had forgotten until recently just how hospitable English folks can be.

It all started one day in January when I ducked into the British Science Museum to warm up after a morning of juggling camera gear around the Albert Memorial in breezy Hyde Park. The Museum guard who checked my gear suggested that I was just in time for the current Music Box demonstration. Why not? But my interest in the fabulous music boxes soon shifted to the knowledgeable and most articulate guide. The face was familiar. When the demonstration ended I found that he was indeed an acquaintance from the '76 Organ Safari. I also

If you  
are thinking of  
"having the time  
of your life"  
in England this  
summer - read  
this letter!  
↓

discovered that there was to be a regular theatre organ meeting two days later at Wurlitzer Lodge, the home of Les and Edith Rawle. Would they mind if I... but the ever-gracious Edith made it quite clear over the phone that they'd be delighted to have a pre-Convention visit. Father Kerr met me at the Northolt station, and a few minutes later I was ushered into the Rawle kitchen where Edith and her helpers were preparing refreshments for later in the evening.

Fortunately there was time to chat for a few minutes about the Convention plans. Yes, all of the featured organists would be British (or at least non-Americans). I agreed with Les and Edith that Americans should have a chance to hear what they couldn't hear back home. The roster of featured organists was most impressive. Even more exciting were the *locations* of many concerts. The library at Blenheim Palace has to be the most beautiful setting in the world for an organ concert. There were rumors that Harrow would be open to the public for the first time in history — and for an ATOS concert!

Edith asked if I thought Americans would be comfortable at the London Penta Hotel. Of the very large London hotels, the Penta was certainly the best choice. The location is ideal for those who may want to wander off on their own for a few hours, handy to the museums,

Knightsbridge shopping, and the famous debaters at Hyde Park Corner. Each room has a refrigerator and warming oven for snacks, and there are handy stores at Gloucester Road tube station (around the corner) where one can buy anything reasonably from breakfast fodder to a quick meal. Food service at the Penta I've found to be fast, good, and the prices are not outrageous; on a par, I'd say, with your local Holiday Inn back home.

By this time forty or so members had crowded into the Rawle music room to hear a concert by Len Rawle on dad's Wurlitzer. After breathless apologies for not having time to prepare (it had been a big day at Yama-ha!) Len was soon very much at home and having a ball. Just before intermission he turned over the four manuals to Stephen Vincent, the recent winner of the young organist award. I talked with the lad and his teacher, John Norris, later that evening and found that Stephen hadn't "turned on" to theatre pipes until he heard some of the Americans during the '76 Safari. Before this particular concert he had never even heard Len Rawle play. That's ironic because Len is perhaps the most "American" of the fine British theatre organists.

After intermission Len played requests until it was time to watch Douglas Reeve on the telly from Brighton. The excellent BBC documentary was marred only by a power failure which lasted just long enough to break out the candles. After a most satisfying concert, Len insisted that I hear how much better dad's Wurlitzer sounded when the music room was empty — so of course I missed the last train back to my hotel. It was well worth it!

When Len and Judith suggested that I must hear *their* Wurlitzer the next evening, I gladly cancelled West End theatre plans and skipped dinner to make the long trek by tube out to Rickmansworth, arriving just in time to witness a demonstration of a new experimental electronic. All was very top secret and hush-hush, but I can say that some Japanese technicians had obviously been listening carefully to some of Len's Wurlitzer pipes with incredible results.

What can one say about the Len Rawle Wurlitzer that hasn't already been said? For me it has the most

beautifully balanced percussions on any Wurlitzer installation anywhere. If the Rawle living room lacks reverb — and it does — Len has balanced ranks so skillfully that the full organ sound is richly satisfying without any painful hoots or shrieks. Having heard Len play both Rawle Wurlitzers I can only say that each has its unique beauty and integrity, and both are far and away the best home installations I've ever heard. When you go to the Convention in London try to hear at least one of them if you possibly can.

I returned to the States convinced that the London ATOS Convention would be the event of a lifetime. It will be well worth the little extra effort on our part.

Cordially,  
Walter J. Beaupre  
Kingston, RI

Gentlemen:

In regard to the erroneous information printed in the Dairyland Chapter News in the Dec./Jan. THEATRE ORGAN concerning the Kimball Theatre Organ Society (of Milwaukee), we would like to set the record straight.

The Centre (formerly Warner) Kimball in question is a 3-manual, 28-rank instrument being restored to original condition by a team of dedicated and capable buffs, both professional and nonprofessional, for eventual installation in the Oriental Landmark Theatre of Milwaukee, which originally housed a 3-manual Barton. The Kimball, when installed, will be enlarged by two ranks and a 32' pedal extension. Also, a new solid-state relay will be included in the rework for expanded versatility.

The Kimball Theatre Organ Society is an independent organization and has no affiliation with the Dairyland Chapter of ATOS, although there are several Dairylanders working with us on this project.

When the Kimball is complete, we should be happy to provide a full account to THEATRE ORGAN of its rebuilding and reinstallation. An original organ of this magnitude should hopefully make an outstanding addition to the present concert circuit.

Sincerely,  
J. Clark Wilson,  
Vice-President KTOS  
Brown Deer, WI ☐



**Let us know what's happening in YOUR Chapter!**

Send PHOTOS and News to:

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**Deadlines**

Jan. 1st. for Feb./Mar.  
Mar. 1st. for Apr./May  
May 1st. for June/July  
July 1st. for Aug./Sept.  
Sept. 1st. for Oct./Nov.  
Nov. 1st. for Dec./Jan.

**ALABAMA**

After a long lapse in reporting, the correspondent is back in business. Last year was one of our best years yet, as far as concerts, group activities and membership are concerned. The Dennis James concert in April and the Tom Helms concert in October were both great successes, particularly because more and more people are now taking a greater interest in the Alabama Theatre and its beautiful Wurlitzer organ.

The chapter met at the Alabama Theatre on January 13th to hear chapter member Dr. Cecil Prescott at "Big Bertha." To make his program even more delightful, his daughter, Cecilia, brought her trumpet and joined him in several selections. The combination of organ and trumpet was quite a treat for those who had never heard Dr. Prescott play before.

On February 10th, members braved a very cold and icy morning to enjoy the music of "Big Bertha" once again. As has been a custom for several years, February is open console. The nimble-fingered artistry of talented members JoAnn Radue, Beatrice Fee, Sam Troutman, Jr. and Sr., Bob Rabin, Chris Radue, Cecil

Whitmire and Linda Whitmire was featured. It was an informal meeting that most thought was the best in some time.

As the year 1980 progresses, members are looking forward with great anticipation to the upcoming spring concert in April, which will present Walt Strony to the people of Alabama for the first time. Walt has said he likes to use the pizzicato for special effects and the crew is diligently working to have it in operation before the April concert. This will be the first time the unit has worked since before 1968.

Aside from the normal maintenance work on "Big Bertha," the crew has made several trips to the home of member George Ferguson to assist in the completion of his pipe installation. A few more trips and the organ will be in full operation.

The chapter's Slide Spectacular, telling about the Alabama Theatre, the Wurlitzer and the activities of the chapter, is still in great demand. Last month it was presented to the Teachers' Association and this month will be presented to the Retired Teachers' Association. The program is being revised somewhat this year to bring it up to date and to replace some of the slides that have become worn from much use. The chapter is proud of its slide presentation and is always delighted when asked to present it. It has proved to be the best way to keep the chapter, the beautiful Alabama Theatre and the Wurlitzer in the public eye. It works!

CECIL WHITMIRE

**ALOHA**

The roof has not caved in on the Aloha Chapter, but for a while members thought it might.

Heavy rains and a deteriorating