1.08

Material used in FLUTE CONSTRUCTION

by Dr. John W. Coltman

(Third in a series of "exchanges" between Roger Mather and the author. This was written in the form of a letter to the editor. . . Ed")

I would appreciate the opportunity to comment on Roger Mather's article "The Influence of Tube Material and Thickness on Flute Tone Quality" that appeared in the September, 1972 issue of Woodwind World, and which was devoted largely to a criticism of my work on this subject.

We are indeed faced with a puzzle - the problem of separating myth from fact, of relating perceived sensations with physical causes, and of making a distinction between things which merely occur simultaneously and those which are cause and effect. Mr. Mather's article deals with several such questions, but leaves me still curious as to what evidence he may actually have that bears on the subject in his title.

First, we need to be clear about the question. Mather's question is: "Should we conclude that the differences in tone quality noted by generations of manufacturers, players, and listeners are purely imaginary?". My answer to this is: certainly not. No one contends that a wooden baroque flute sounds like a silver Boehm flute. The question is: is it due to the material? To find the root causes is not easy. Mr. Mather's article does a good job of pointing out a number of causes for tone variation, the possibility of interactions between these causes, and the difficulties of sorting them out. I disagree, however, with his final conclusion: "No better way seems to be presently available than to poll the experiences of many flutists playing many instruments under many circumstances. Then the characteristic influences of each material or thickness can be recognized and they do indeed exist."

The last four words raise immediate suspicion as to the impartiality of the poll-taker. But more important, this method has obviously not succeeded in the past. The literature abounds with statements, made by scholarly, experienced men, that take quite opposing positions. The reason is two fold. First, the player and experimenter rarely, if ever, have any way of knowing whether the instruments they are comparing have differences other than those of the material, in fact I know of no reports in which the claim for "no other variation" is made. Second, the musician cannot, under normal playing circumstances, dissociate his personal preferences and prejudices from the question at hand. In the case of the three "flutes" I constructed, nearly every player who picked them up and tried them had a preference for one or the other. Often he would describe his impressions - the wooden flute has a "fuller" tone, the silver one "projects" much better, etc. He was then usually baffled to find that he could not identify any of the instruments under the "blindfold" conditions I described. The plain facts are that his judgment is influenced by preconceived notions and mental associations of tone quality with other properties of the material. This is a normal human reaction, intensified in the case of those trained to incorporate feeling into their art, and to whom the instrument becomes, in effect, an extension of their own body and personality. I do not belittle this attitude; it is, I believe, a desirable condition for the achievement of the fullest artistic expression. It is just not suited for answering narrow, objective questions like the one I posed - namely: can the material of which a flute is made directly influence the tone quality produced? To successfully carry out meaningful work on questions like this, it is essential not only to eliminate as far as possible variations other than the one that is being tested, but also to remove from the experiment personal predispositions, associations, and prejudices. I hope Mr. Mather might find a superior way to do this.

It is also necessary to phrase properly the question. Had I simply asked each player to select the instrument he preferred, I might have obtained a quite valid conclusion, for example: "In tests of three instruments which were identical except for material, eighty percent of the participating flutists preferred the silver flute." Such information is useful for market surveys; it does not, for the reasons given above, answer the question of whether the material can indeed affect the tone.

Mr. Mather questions both the validity and relevance of the tests I carried out, and I would like to comment on points he raises. First, the flutes I used were real flutes - they were not Boehm flutes, or baroque flutes, or recorders, but they were indubitably members of the flute family. Moreover, they very closely approximated the important dimensions of the modern Boehm flute. Contrary to Mr. Mather's hypothesis that the flutes were so different from "real" flutes that the sounds would be unfamiliar, the sounds they produced were very faithful renditions of modern flute sounds. Many players, in fact, commented on how good the sound and the response was. It is true that all I have demonstrated is that material does not perceptibly influence the tone of these instruments, and it requires a logical step to come to the conclusion that the Boehm flute would also not be so influenced. This step I find easier to

Continued on page 21

make than its inverse, namely, that in some mysterious way players and listeners can identify material influence in Boehm flutes, baroque flutes, and recorders, but not in "Coltman flutes."

Mr. Mather's statement "many players have observed that, per inch of length, the material and thickness of the head affect tone color more than do the material of the body" arouses my curiosity. Who are the players? What comparisons did they make? Where are their observations recorded?

The remarks on leaks are interesting, and I am in complete agreement that leaks constitute a major source of tone color variation. But - "fewer know that the effect of leaks varies somewhat with tubing material and thickness. For instance plated flutes generally sound 'metallic' while wood and silver flutes tend to sound 'dull'." Where does this information come from? I have read much literature on the flute, and have nowhere encountered this statement. It would be interesting to get the evidence here, as well as for the later statement, "too much damping makes a flute dull, too little makes it metallic." I don't know of any controlled experiments or reported observations on damping of the wall - if this is anything but sheer hypothesis. Mr. Mather owes us some further information, which I look forward to with interest.

Finally, it might be well to comment on why definitive information on such matters is worth getting. Many people, I know, are unhappy at what they view as an upstart scientist busily trying to tear down what centuries of artistry and craftsmanship have built up. But if my belief that material does not directly affect flute tone is true, and this fact becomes generally accepted, then we really have much more freedom for creativity and expression than before. I am hopeful that the development of the flute has not come to an end - that new makers will be inspired to create new instruments and new artists to develop their strengths as has occurred in the past. Is it not better to know that one can choose a material for its beauty, its feel, its workability, than to be slavishly making all our instruments of one or two materials in the mistaken notion that a change would produce unacceptable tone quality? The heavy reliance of musicians and instrument-makers on tradition (much of which can only be classified as folklore) can be relieved, to the benefit of the art, by some careful separation of fact from fancy, and it is in this spirit that I have engaged in these experiments. I trust that Mr. Mather will be similarly inclined in the article he promises.

Very truly yours,

Dr. John W. Coltman