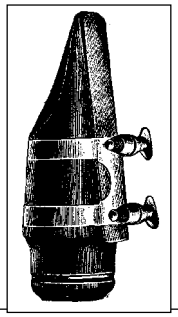
Ralph Morgan



The Saxophone Mouthpiece
A Meyer Is A Meyer Is A Meyer

An intriguing letter came in some time ago, referring to the writer's individual situation, as most do. However, his problem is of great consequence to all players, and I sincerely hope that this column will be of value to you all.

I have played an old Meyer Bros. alto mouthpiece for many years, with fine results. Recently, I bought a new one with the same model marking, but the playing characteristics are quite different. If I send it to you, can you analyze it and tell me why it doesn't play like the old model?"

Your question is one I hear quite frequently, and not only about the particular brand you own. Please send it to me; I welcome the opportunity to be of service.

This mouthpiece was received, observed, measured, diagramed, and play-tested by me and several others. All of our findings confirmed reasons for the concerns of the owner. Because of the long history of popularity of this mouthpiece (for some fifty years world-wide) I felt that this problem merited a much deeper investigation, since many of the same facets were present in several other brands. This column will deal with just this one brand name, and with the years from the 1930s on. Please pardon the need for becoming a bit more technical, but don't become overwhelmed by it. Just re-read the technical portions and give them some deeper thought. Perhaps you will find some parallel problems with your own equipment, and also get a much more practical picture of how even very slight changes in the mouthpiece, affect it's performance capabilities dramatically. You may also find that some of the problems you perceive as being caused by the instrument, originate with the mouthpiece, since it governs the saxophone, not vice-versa!

A quotation from Ed and Frank Meyer, from one of their early brochures, will serve to state their personal feelings, as well as my own, about this most exacting and important business: the design and manufacture of the single reed mouthpiece for you, the musician. "When you play your instrument, you are not interested in a thousandth of an inch, or the proper rubber formula, or the post-cure time for the castings. You are interested, however, in results, results which enhance your playing, and perhaps increase your earning power. We (on our design board, in our molding room, and in our workshop) are also interested in the results which you get on the job. But, in order to provide you with the finest mouthpieces money can buy, we must be scientifically accurate down to a degree of temperature, and the tenth of a thousandth of an inch. There is no place in the world where clarinet and saxophone mouthpiece making has been so thoroughly investigated and refined. In no other plant has the element of hand-craftsmanship and sheer pride, as well as years of mouthpiece specialization, been so grounded in each and every product. More cannot be said."

These thoughts lead me to more concerted efforts to sort out the various elements of my findings, so that my answer to the question will give you the most information and help. The brochure of Meyer Bros. shows the first Meyer products were made of three materials: the finest dental rubber, a patented bronze (fine brass alloy), and a crystal-clear material termed Crystalyte, which was a recent addition (at that time) to the standard ebonite and metal models. The logo stamped on the mouthpieces was just MEYER, running lengthwise on the top of the body. Also, NEW YORK was impressed around the top, at the very back end. All facings were called "TRU-FLEX", listed as #2 through #6, with no chamber or facing length variations noted, such as they have in later years. A full page of the brochure is devoted to the features of the "Truflex" facing concept, a patented idea. The unique feature consists of milling out most of the table section of the facing so there is a lengthwise depression under the butt end of the reed. I might point out that this bit of "progress" didn't work very well, since, as soon as the reed was wet through, the pressure from the ligature would sink the middle of the reed down into the cavity, and you know that "warped" reeds just don't function very well! Anyway, by 1939, the line had seen quite a few changes and assumed the more familiar format. Only the hard rubber models now

being listed, with facing length and chamber designations used, such as medium chamber, and 5M, 5S, and 5L. Here I might point out that I hear many players referring to the M with the 5 as the chamber size, when it is really the length of the facing, with "S" for short, and "L" for long. We cannot always depend on the in-shop accuracy of these markings, since we have seen all combinations, such as a small chamber mouthpiece stamped as a "large chamber."

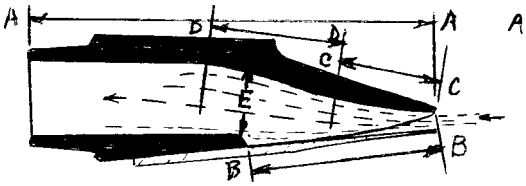


Fig. 1
Long roll-over baffle

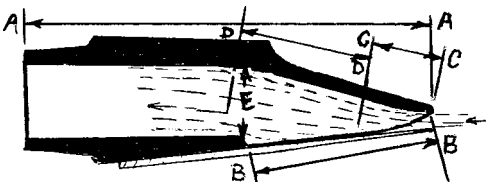


Fig. 2
Short roll-over baffle

When playing various mouthpieces to determine which one will work the best, keep in mind that, first of all, the facing curve (including the tip opening) is all-important in allowing the reed to function most efficiently. All the other aspects of the mouthpiece become secondary, though they all contribute to your judgement of the quality of the piece for your needs. In my archives is a facings chart for Meyer mouthpieces printed in 1939. It shows facings for clarinet and baritone sax, but we will only list those for alto and tenor sax for comparison purposes. The comparison will be with a similar chart printed by a leading retailer in 1970, and I think you will find it most interesting and enlightening. My analysis of these charts, which may get a little involved, is due to my concern in alleviating one more source of frustration for our readers. We must remember that, between 1939 and 1970, the Meyer Company had changed ownership and the mouthpieces were now being made in Elkhart, Indiana. Many models had been added to the line, and you will note that the dimensions for the facings had changed, which leads to confusion if you are trying to find a new mouthpiece to duplicate an old one. I have no explanation for the variations other than to note that, as our needs seem to call for more open tipped pieces, some manufacturers tend to satisfy that trend with renumbering the models. For instance, recently a player came in to have his old tenor mouthpiece opened up to today's #7 tip. When I measured the new #4 he had been playing, comparing it to an old #4 model of the same brand, I found the facing curves to be the same! How easy it is to fool an unwary customer into believing they need to follow the trends of the times! I consider the old facings used by the Link Company and the Meyer Company to still be the standards, since they seem to have been designed to accommodate the reed strength families, so I use them in our models. To add to the problem of selection, I note that other retailers also copy the newer chart for the Meyer facings. One other most important observation: both the old and the new charts show the facing lengths in 32nd's of an inch. Considering the extreme accuracy which must be used in determining the measurements of the facing, shows a 32nd of an inch to be a ridiculous increment of measure, but I'm sure it has been used only as a comparative figure. Companies have been very secretive about the actual figures, possibly afraid that another company will copy their models. However, for accuracy of comparison, I have converted all figures to millimeters and the corresponding thousandths of an inch.

NOTES ON ALTO SAX FACINGS CHART

1. Only five facing models were of-

ALTO SAXOPHONE

1970 -- MODELS				1939 MODELS			
model #	tip opening	facing length on glass gauge	facing length actual	Model #	Tip Opening	Facing Length on glass gauge	Facing Length actual
#1S	1.30mm, .051"	30.2	15.1mm				
1M	1.30mm, .051"	33.4	16.7mm				
1L	1.30mm, .051"	36.6	18.3mm				
#2S	1.42mm, .056"	31.8	15.9mm	#2S	1.27mm, .050"	36.6	18.3mm
2M	1.42mm, .056"	35	17.5mm	2M	1.27mm .050"	41.2	20.6mm
2L	1.42mm, .056"	38.2	19.1mm	2L	1.27mm .050"	46	23 mm
#3S	1.60mm, .061"	33.4	16.7mm	#3S	1.52mm, .060"	36.6	18.3mm
3M	1.60mm, .061"	36.6	18.3mm	3M	1.52mm, .060"	41.2	20.6mm
3L	1.60mm, .061"	39.8	19.8mm	3L	1.52mm, .060"	46	23 mm
#4S	1.68mm, .066"	35	17.5mm	#4S	1.78mm, .070"	36.6	18.3mm
4M	1.68mm, .066"	38.2	19.1mm	4M	1.78mm, .070"	41.2	20.6mm
4L	1.68mm, .066"	41.2	20.6mm	4L	1.78mm, .070"	46	23 mm
#5S	1.86mm, .071"	36.6	18.3mm	5S	2.03mm, .080"	36.6	18.3mm
5M	1.86mm, .071"	39.6	19.8mm	5M	2.03mm, .080"	41.2	20.6mm
5L	1.86mm, .071"	42.8	21.4mm	5L	2.03mm, .080"	46	23 mm
#6S	1.98mm, .076"	38.2	19.1mm	6S	2.16mm, .085"	36.6	18.3mm
6M	1.98mm, .076"	41.2	20.6mm	6M	2.16mm, .085"	41.2	20.6mm
6L	1.98mm, .076"	44.4	22.2mm	6L	2.16mm, .085"	46	23 mm
#7S	2.06mm, .081"	39.6	19.8mm				
7M	2.06mm, .081"	42.8	21.4mm				
7L	2.06mm, .081"	46	23 mm				
#8S	2.18mm, .086"	41.2	20.6mm				
8M	2.18mm, .086"	44.4	22.2mm				
8L	2.18mm, .086"	47.6	23.8mm				
#9S	2.34mm, .092"	42.8	21.4mm				
9M	2.34mm, .092"	46	23.0mm				
9L	2.34mm, .092"	49.2	24.6mm				
#10S	2.45mm, .098"	44.4	22.2mm				
10M	2.45mm, .098"	47.6	23.8mm				
10L	2.45mm, .098"	50.8	25.4mm				
#11S	2.64mm, .104"	46	23 mm				
11M	2.64mm, .104"	49.2	24.6mm				
11L	2.64mm, .104"	52.8	26.4mm				
#12S	2.80mm, .110"	47.6	23.8mm				
12M	2.80mm, .110"	50.8	25.4mm				
12L	2.80mm, .110"	54.4	27.2mm				

fered in 1939, covering the practical range of tip openings for the alto saxophone, from classical through jazz work. The twelve models offered in the later list actually cover the range of tip openings and facing lengths normally used for clarinet through baritone sax mouthpieces!

2. The 1939 chart shows the same facing lengths for all similar models, as all S's, etc.. This is correct design procedure, since the length of an alto sax reed does not change because the strength number does, thus each needs the same facing length to allow for maximum efficiency of vibration. Notice the continuous lengthening of the facings as the tip openings increase. Beginning with a model #1 through #3, these facing lengths normally are used on regular clarinet mouthpieces. At the other end, the lengths noted for the #7L, 8M & 8L, 9M & 9L, and on through 12L, are normally assigned to tenor and baritone model, because their reeds are progressively longer. Longer reeds dictate the need for a longer facing.

3. Note the changes in tip openings as applied to the various models. The 1939 models, few in number, cover adequately the needs, especially when one considers the other choices, namely the small, medium, and large chambers. Thus, a 2L with a large chamber would make an acceptable classic mouthpiece, while a 6S with a small chamber would scream with the best of them. When you consider the addition of the three chambers to the 1970 models, we now have a total of one hundred-eight models for alto sax, and we still only play very few, with the 5M, 6M, and 7M accounting for the great majority used, usually all in medium chamber. Prior to World War II the preference was for the 4M and 5M, also with medium chambers.

4. Using the old design charts, and putting in the numbers as used in the 1970 chart, tends to show very vividly that most of the resultant facing curves will not allow the alto reed to vibrate efficiently.

5. The figures of the newer chart follow a seemingly contrived pattern which looks impressive to the casual viewer, but which does not follow a reasonable acoustical design sequence as is seen in the 1939 chart by the Meyer brothers. Of course, it is not up to me to even speculate as to why a superb line of models from earlier days should under such wide change.

Now that I have dazzled you with figures, let me tell you why, and point out a few more interesting, and perhaps bewildering things to be learned by a close study and comparison of these two charts. Note that the list of comments concerning the alto mouthpieces also applies to the tenor chart. For those who may not know what the heading "on glass gauge" refers to, this is the gauge which is used along with the set of five feeler gauges to determine the facing curve characteristics. It is a standard part of a refacing kit. Each line on the gauge is equal to 2mm, thus the actual length column is half that for the gauge.

Note: the tip opening figures are given in thousandths of an inch, as we see them normally printed, but also in hundredths of a millimeter, since in hand-facing the curved tip wand gauge used to measure tip openings is marked in millimeters. This gives far greater accuracy, since one-thousandth of an inch is equal to 2.54 hundredths of a millimeter. Thus we can achieve the accuracy of one-ten-thousandth of an inch in hand-facing.

Please go back to the two charts and compare the figures for the alto to the figures for the tenor models. Note the following:

1. For the 1939 models, the tenor models are different from the alto, both in tip openings and facing lengths, i.e., the alto tip for #3M is .060", while the tenor #3M is .065". This pattern is normal for good acoustical design, since the corresponding reeds are different in size.

2. Now compare the 1970 charts, and we find some very unorthodox figures.

A. The facing length figures correspond exactly to those of the other, alto, to tenor. This says that the tenor reed and the alto reed are presumed to

TENOR SAXOPHONE

1970 -- MODELS				1939 MODELS			
Model #	Tip Opening	Facing Length on glass gauge	Facing Length actual	Model #	Tip Opening	Facing Length on glass gauge	Facing Length actual
#1S	1.42mm, .056"	30.2	15.1mm				
1M	1.42mm, .056"	33.4	16.7mm				
1L	1.42mm, .056"	36.6	18.3mm				
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3M	1.68mm, .066"	36.6	18.3mm	3M	1.66mm, .065"	42.8	21.4mm
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#5S	1.98mm, .076"	36.6	18.3mm	5S	2.16mm, .085"	38.2	19.1mm
5M	1.98mm, .076"	39.6	19.8mm	5M	2.16mm, .085"	42.8	21.4mm
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#8S	2.34mm, .092"	41.2	20.6mm				
8M	2.34mm, .092"	44.4	22.2mm				
8L	2.34mm, .092"	47.6	23.6mm				
#9S	2.49mm, .098"	42.8	21.4mm				
9M	2.49mm, .098"	46	23 mm				
9L	2.49mm, .098"	49.2	24.6mm				
#10S	2.64mm, .104"	44.4	22.2mm				
10M	2.64mm, .104"	47.6	23.8mm				
10L	2.64mm, .104"	50.8	25.4mm				
#11S	2.80mm, .110"	46	23 mm				
11M	2.80mm, .110"	49.2	24.6mm				
11L	2.80mm, .110"	52.8	26.4mm				
#12S	2.97mm, .117"	47.6	23.8mm				
12M	2.97mm, .117"	50.8	25.4mm				
12L	2.97mm, .117"	54.4	27.2mm				

be the same size!

B. Note the tip openings are the same, alto to tenor, except that they are offset by one model number, so that alto #2 equates to tenor #1, and so on to alto #12 the same as tenor #11. I only wish correct design was as simplistic as that! But, then everybody might be making their own mouthpieces, and I would be out of business!

A closer comparison of the figures does show why the most popular models became that way, while we rarely if ever see many of the listed models. In alto, the figures which correspond most closely to the needs of reeds are, in alto, the #4M, 5M, and 6M, from the 1939 chart, while in tenor, it is the #6M. In all these models, the measurements are still the most popular today. We have added a few more open tips, now up to .110" in tenor, for example, but the facing curves are still the same length as those in these few listed models, regardless of the tip openings. Of course, the curve increments readings must change to fit various reed strengths, or the reeds do not vibrate efficiently. This adds to my previous observation that the later charts show many signs of having been "engineered", rather than being the true numbers used in manufacturing. The Meyer brothers were superb designers and craftsmen, and examination of many of their older mouthpieces shows this skill. I'm quite sure they would never have put a facing on an alto mouthpiece which could only fit a baritone sax reed, as we see in the alto #12L model! Normally, alto facing lengths stay within the range of 19mm to 21mm, and tenor facings should stay very close to 24 or 25mm. The old Otto Link tenor models normally were 25mm, or only slightly shorter. Usually the length stayed much the same, while the tip openings became progressively more open, which corresponds to reed configurations for various strengths.

We have now covered part of the answer to our original question, showing the numerous variations now in use from the old Meyer models. Just as important are the differences in the interior contours and measurements. While the facings allow proper vibration of the reed, the air flow is governed by the interior or chamber and bore configurations. We must realize that the design of a mouthpiece must be aerodynamically sound to produce a mouthpiece that allows the instrument to play in tune, with an even feel and response over its whole range. Indeed, the instrument can only function as well as the mouthpiece allows it to. I hope you will recognize the following illustrations as cross-sectional views of a mouthpiece. Compare the shape of the old Meyer with that of the new, and follow the descriptions given for the various crosssections as labeled by matching letters, A-A through E-E. If you are looking at your particular mouthpiece, you may see slight variations from the shapes I have drawn here, but there should be the same general shapes present. Many mouthpieces have been measured,and these drawings are a good average of them.

MOUTHPIECE INTERIOR COMPARISON

OLD MEYER MODEL
A-A Overall length - 3.470"
NEW MEYER MODEL
A-A Overall length - 3.415"
(.055" shorter)
General Effect From Change

The overall pitch level will be raised due to the smaller volume of air in the chamber, but certain notes,the palm keys, and fourth line D, will be raised very noticeably.

OLD MEYER MODEL
B-B Window length and width
l.568" and .595"
NEWER MEYER MODEL
B-B Window length and width
1.500" and .578"
.068" shorter and .017" narrower.
General Effect From Change

The shorter window also reduces the air volume in the chamber, since the ramp is now longer, as well as being much thicker, about 50% more than the old models. The distance between the side rails at the tip is less, making the side rails thicker, and further reducing the chamber volume. The thicker side rails also damp the vibrations of the reed, cutting down on response.

OLD MEYER MODEL
C-C Roll-over baffle, very long
NEWER MEYER MODEL
C-C Roll-over baffle, very short with gentle convex curve. Abrupt convex surface.

General effect from change; the gentle curve with good length gives much smoother air flow and better 'POP' and response, as well as better control. The short abrupt baffle roll creates more air turbulence, a harsher tone, and a feeling of lack of control.

OLD MEYER MODEL
D-D Roof from baffle to the throat. A constant long "S" curve, first convex, and then concave, with good depth before entering the throat area.
NEWER MEYER MODEL
D-D Roof from baffle to the throat a flatter and wider roof surface, convex, and then concave, with all the way into the throat area. Good depth before entering the throat area.
General Effect From Change

The shape of the old model allows smoother air flow, with a better feeling of control and a more solid 'core' to the sound. The flatter plane of the newer models not only further reduces the chamber volume, but allows the sound to 'spread' more, giving the feeling of less control.

OLD MEYER MODEL
E-E Side walls at throat area have a well and evenly-shaped "squeeze" in the throat area which resulted in the fine "pop" in the response.
NEWER MEYER MODEL
E-E Sidewalls at throat area are much straighter through. The air column is not "squeezed" enough to speed up the flow and give the "pop."

It occurs to me that I might also add an F-F notation to cover the facings, Many of the fine old mouthpieces were faced and finished by hand by workers who were truly artisans in their craft. Only by that method can the many idiosyncracies of hard rubber be detected and compensated for so that the table is perfectly flat, allowing the reed to seal properly, or the facing curve be consistently constructed so that the reed can vibrate efficiently. Through the years the demand for greater numbers of mouthpieces, plus the natural attrition of the 'old grey heads', has caused almost universal use of machine faced mouthpieces. If you happen to own a good Refacing Kit, with the proper gauges for measuring facings of the pieces, you will quickly see that a machine cannot cut a flat table

on a piece of hard rubber, due to the fact that, in machine-facing, the rubber heats up and tends to swell in the middle of the table area. On the second, or return cut, the swelled portion is cut again. When it cools, that section is now lower than the rest of the table. The flat reed is now pulled down into the slight depression, with the result that you may have various tip openings, and response or feel, each time you remove the reed and replace it on the mouthpiece. If you can detect tiny wavy lines on the surface of the table and/or side rails, it was most certainly machine-faced.

Do you remember that I started this column with a warning that it might become a little technical and complicated? My deepest apologies if I lost you somewhere, but perhaps rereading those parts and trying to apply the facts to your own pieces will give you a better understanding of this most important subject, maintaining proper acoustical design of the mouthpiece, as exemplified by the old masters of their art and craft. Your efforts will be better served and clarified if, as mentioned, you have the proper gauges to help you, since the increments which are talked about in this column are normally measured in tenths of thousandths of an inch, or hundredths of a millimeter. Properly used, the gauges are capable of that.

Hopefully you are now aware of the various portions of the mouthpiece which can contribute to the concerns of the player who's question I have addressed, and how they, as a group, have produced the characteristics of his mouthpiece. Please understand that I do not mean to point a finger at one particular manufacturer, but have only endeavored to address his own question, making reference to his mouthpiece.

Thank you for all your letters and calls, and for your concern. Please direct questions to me at MORGAN ENTERPRISES, 490 Forest Dr., Springfield, Ohio, 45505. §