The Instrumentalist January 1972

How to Choose a Brass Instrument Mouthpiece

Vincent Bach

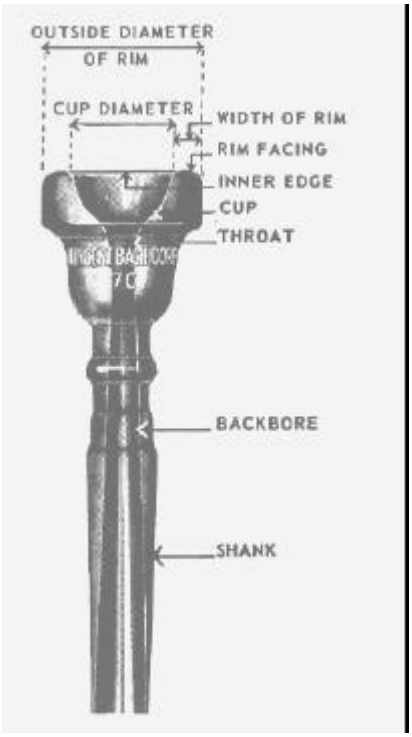
The most important tool and first requisite of a brass instrumentalist's success is a mouthpiece which enables him to emit a beautiful singing tone, with an easy and reliable response in all registers. The creation of such a mouthpiece is an art that can hardly be mastered by anybody but an accomplished brass instrumentalist who also enjoys sufficient mechanical training to combine both skills into a superior product; in other words, by a specialist.

The tone quality of a mouthpiece depends on various factors—the rim, the size and curvature of the cup, the funnel-like shape and size of the throat and the backbore.

The rim affects the tone-quality to the extent by which it controls the free movement of the lip muscles and response. The tone will be more metallic if the rim has a sharp inner edge, and more fuzzy, with the attack insecure, if the rim is too rounded. An extra-wide rim hampers the flexibility — only players with very thick, fleshy, soil lips can use it advantageously. A too narrow rim will dig into the muscle tissue and cut off the blood circulation, thereby paralyzing the lips, which causes slurring to become difficult. A medium-wide rim offers the greatest comfort, flexibility and endurance, however, a rim which fits must comfortably on the lips does not necessarily give the best playing results. When a mouthpiece rim cuts the lips. the instrumentalist is most likely playing with a receding lower jaw so that the lips do not rest on the flat face of the rim, but on the sharp inner edge against the teeth. The solution is for the player to raise his instrument above the horizontal position, without leaning his head hack, so that the mouthpiece will press exactly perpendicularly to the face of the upper front teeth. If the |aw is pushed out so that the lower teeth are in line with the upper ones, the rim will not cut the lip.

The Cup

The cup of the mouthpiece determines the timbre (color) of tone. A shallow cup facilitates the high register, favors the higher frequencies, produces a more brilliant, bright lone, but all of this is at the expense of the low register. A medium-deep cup emits the best overall results for the high and low register and is recommended for general use. The deep cup enriches the low register causing the high tones to be more mellow and less penetrating; it is generally preferred by players performing second or fourth trumpet or French horn parts.



A musical tone is a composite consisting of the predominating fundamental tone (the tone we tune by) and the less intense overtones (harmonics) which are multiples of vibrations of the fundamental component. The human ear is most sensitive to frequencies above 500 vibrations. Therefore, a player whose hearing is very sensitive to high vibrations is convinced that he is playing louder by producing an excessively brilliant tone, rich in overtones, which "cuts" and sticks out like a sore thumb. While a lone rich in harmonics sounds clear and brilliant and responds well, a tone flavored with enharmonics (not bring multiples of the vibrations of the fundamental element) or non-periodic vibrations, will sound nasal and displeasing, and will cause the tone to crack easily (wolf-tone). Using a mouthpiece with a deep cup (especially when playing a mellow-toned Bb flugelhorn), an instrumentalist may complain that he can't hear himself, yet it is that kind of a rich tone that produces the greatest carrying power.

The Throat

The throat—both the funnel-shaped entrance **a**nd the size of the hole—controls the air resistance. If too small, the tone will choke and lower the high register; if too large, the mouthpiece will lack resistance, will suck the lips of the player into the cup and will tire him unduly in strenuous

work. It is the medium throat, size 144". Morse drill #27, which is most desirable and which offers the average player sufficient volume of lone, excellent all-around register and maximum endurance. Symphony artists, performing in an 85 to 100 piece orchestra, may require a slightly larger "symphony throat," up to .155," Morse drill #3.9 mm, to produce that immense volume of tone required (let the manufacturer enlarge the throat — don't try to do it yourself).

The Backbore

The backbore is made in numerous sizes, generally using a few standard designs, some for special purposes, to overcome deficiencies in instruments or embouchures. The choice of these should be left to the manufacturer.

In the end, *it is the skillfu! blend of all factors involved—the rim. cup, throat and backbore—which produces the mouthpiece of your dreams.*

The Practical Way to Select a Mouthpiece

Any brass instrument sounds best in the middle register; a mouthpiece should be selected with that in mind.

If the player tries different models of mouthpieces and obtains equally good results with both large and medium sizes, he should always give preference to the larger. A bigger cup diameter will cause a larger portion of the lip to vibrate and therefore produce more volume of tune; it will also give better lip control. If the lips should swell from too much playing, there will always be enough room to control the response. If a player splits too many tones, it is usually a sign that he is using a mouthpiece with too small a cup diameter.

By using a larger sized mouthpiece, playing with moist open lips (not pinching them tightly together so they cannot vibrate), using a minimum pressure and relaxed embouchure, a maximum volume of lone will he attained. Pinching the lips tightly together will cause the tone to be raw and fuzzy; keep the chin down. By practicing with minimum pressure on sustained tones, the lip muscles will gradually become stronger, resulting in a healthy, easy high register and a relaxed low register.

You must understand, however, that you cannot play entirely without pressure; the higher or louder you play, the more pressure you have to use; otherwise the air will escape around the outer rim of the mouthpiece. Playing a high tone *ff*. you have to contract your lip muscles, which will cause them to stiffen, and vibrate harder, requiring more air support. If you play in a full-sized concert band or in a large symphony orchestra, performing a Strauss symphony or a Wagner opera, for example, you cannot avoid using heavier pressure occasionally during a *ff* passage. The lip muscles can endure such occasional heavy pressure easily if they are not damaged by constant abuse. The idea is to do it with *restraint* — and preserve a flexible embouchure.

Famous virtuosos like Fritz Werner, Albert Couturier, Herbert Clarke, George Stellwagen (Pernet), Jules Levy, Theodore Hoch, Pans Chambers, Walter Rogers, have all used large mouthpieces with deep cups and large throats, and they have obtained fantastic results. They produced high tones Just the same by diligently training their embouchures. I therefore do not hesitate to recommend that young students start on mouthpieces of a large cup diameter, playing for a while with litlle pressure only in the middle register, between the staves, then gradually building the range into the higher and lower compass. By using a large mouthpiece, a player can hardly force the high register, but is compelled to use his lip muscles correctly. The average trumpet player performing heavy dance work or the one who isn't keen on practicing regularly, seems to prefer a medium-sized mouthpiece; so do girls who have more delicate lip muscles.

Avoid Strain

During the initial period of becoming used to a new mouthpiece, don't get over-enthusiastic; stop playing on it *before* you tire. The secret of developing a powerful embouchure is never to abuse your lip muscles; always avoid unnecessary strain. Relax the mouthpiece pressure as often as possible by removing the mouth piece from your lips at every opportunity. This will permit the blood to circulate. Beginners especially are in the habit of keeping the mouthpiece on the lips. . . for tear they cannot find the same place again! In so doing, they cause the lips to become numb quickly.

Many of our young people listen to so much dance music that when they play cornet, they strive to imitate the brilliant tone of jazz trumpeters by using too shallow mouthpieces or by selecting a cornet of a too small bore. The genuine cornet tone should be of dark timbre, mellow and smooth, with a voice-like quality similar to the lyric soprano in opera.

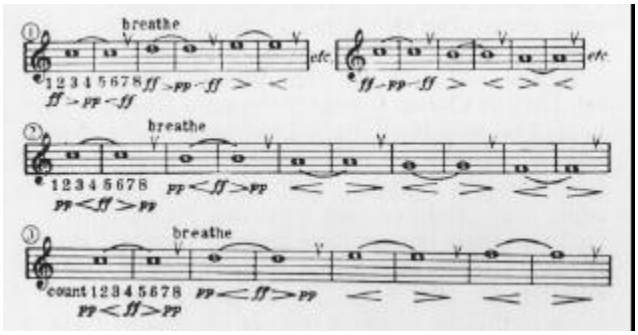
Some players imagine that if they use a mouthpiece with a small throat, they can get healthy high tones more easily, but just the reverse is true.

A Few Tips on Developing a Powerful Embouchure

The player must not permit his lips to protrude into the mouthpiece cup but should draw them back tightly against the front teeth, raising the aperture or slot between the lips a little higher so that it is exactly in line with the open spare between the teeth. In other words, he should not roll the lips over the upper teeth; looking in a mirror, he should be able to see his teeth while drawing (he lips back. While it is

necessary to use slightly more pressure for the high tones, the additional amount of pressure is negligible; let the lip muscles do the work by *contracting* them or by *tightening* them, but not by *stretching* them.

A beginner should take it easy and avoid heavy strain. He should not attempt to force the high register but should start playing in the middle register between middle G, second line, and middle **C**[5], third space. Once he controls that register, he should always use **C**[5] as a pivot, practicing long tones *crescendo* and *decrescendo,* starting from middle **C**[5] up and then down:



J.J. Baptiste Arban, the most successful early tutor, followed this method. When accomplishing the *crescendo,* be sure not to raise the pitch of the tone, but be sure it remains at the same level.

Line 1 should be played slowly, attacking with a pianissimo "tee," increasing the tone evenly and without vibrato up lo count 4 fortissimo, at 5 start to diminish the tone, disappearing completely at the end of the eighth beat. Remove the mouthpiece from the lips for about live seconds; now proceed with the next higher tones as high as you can play without undue strain. Then stop for 15 seconds and repeat the procedure with the notes on line 2. Practicing in this manner will eventually enable one to play the high and low registers with the same embouchure by JUST contracting or relaxing his lip muscles. I strongly advise against starting with the lower register, which encourages the player to let his lips protrude too far forward,

A student should practice these long tones very frequently between other technical studies so that he will continue to play with a relaxed embouchure and will not neglect his tone production.

For a beginner, 20 to 25 minutes practice at a time is sufficient, but alter two or three months he should be able to play 30 to 40 minutes. He should always stop before he becomes loo tired, for in that way he will, after two or three hours of rest, be able to recuperate quickly and lo start again with a fresh embouchure. Playing three or four sessions daily, the embouchure will gradually become stronger and stronger An advanced player may average 40 to 60 minutes or more per session if gifted with a powerful and well-trained embouchure.

A Special Note About Beginners

A beginner should not attempt to play a horn without proper supervision. *It's the first lesson which makes or breaks a brass instrumentalist*

Also, too many promising talents are from the beginning doomed to pass into oblivion by choosing low quality equipment — an improperly designed mouthpiece or an inferior instrument. A student will easily become discouraged if required to play sub-standard equipment with which a professional is unable to perform.

We have today highly competent music instructors in our schools who are familiar with the results which can be obtained by pupils using quality mouthpieces and instruments. But even the best teacher cannot accomplish much if a student is poorly equipped. To purchase a cheap mouthpiece or .a second-grade instrument is a very poor investment.