BY DANNY MILES

# The Brass Section's Bottom Line

## Low brass instruments like tuba, sousaphone, euphonium, baritone horn and trombone shore up the foundations of orchestras and marching bands.

Few instruments can match the sheer power of the low brass. Whether it's lending power to a symphony orchestra or adding bass to a marching band, low brass can be felt as well as heard.

The members of the low brass family include the tuba and its close relative, the sousaphone; the euphonium and its cousin the baritone horn; and the trombone family, which has many members.

The physical makeup of these instruments—the length of each horn's *pipe*, as well as its diameter, or *bore*—enables them to produce low pitches at relatively high volume and with pleasing tone. The pipes of lower-pitched horns are longer than those designed to produce midrange and high notes. Fortunately, the horns are coiled or *folded* in order to make them easier to hold. Tubas, for example, use 16 feet of pipe: Imagine carrying that around if it were fully extended!

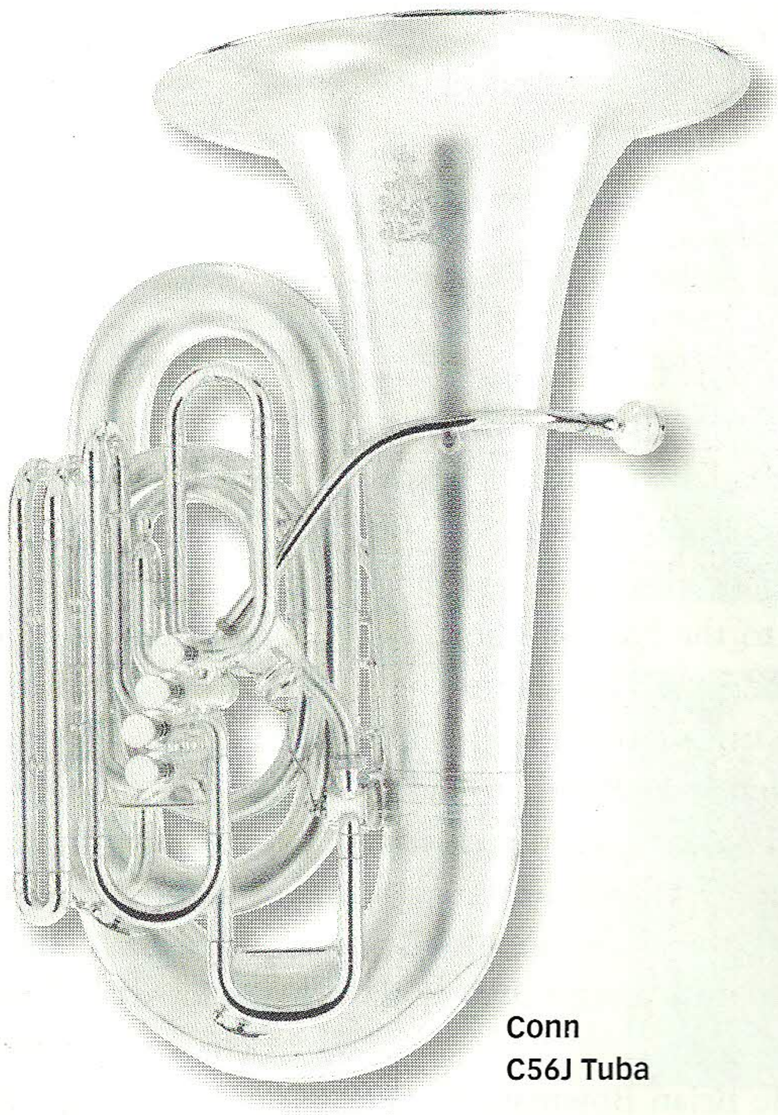
C.G.Conn 20k Sousaphone

Low brass instruments are complex and were among the last of the orchestral instruments to develop their modern form. *Symphonie Fantastique* (1830), by French Romantic composer Hector Berlioz, was the first major orchestral work that called for a tuba. The instrument was so new at the time that Berlioz actually revised his score upon hearing it. Concertos for low brass didn't appear until the Romantic and early Modern periods. (The English composer Ralph Vaughan Williams wrote a famous tuba concerto.)

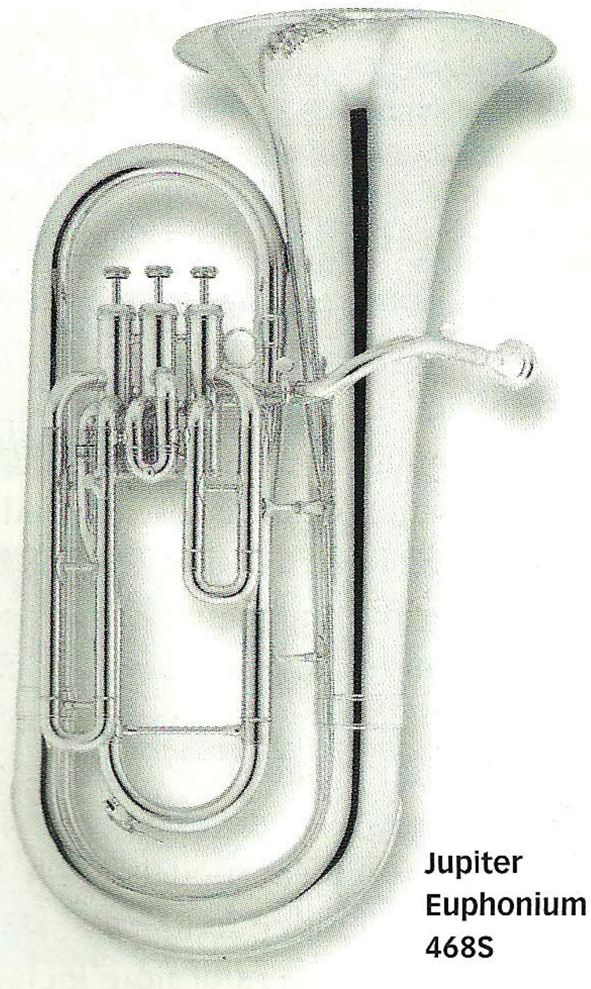
In modern orchestras, there will generally be one tuba and three to four trombones, with euphoniums called upon occasionally. Strings outnumber brass for a couple of reasons. First, there's more music written for strings than for brass. Second, brass is generally louder than woodwinds and strings. One tuba is usually quite enough to hold own with an entire section of eight double-basses!

Low brass instruments are more common in non-classical ensembles, such as concert bands, marching bands, jazz bands, and brass bands. You'll even find low-brass groups, such as the Symphonia Euphonium and Tuba Ensemble, the Tubashop Quartet, and the trombone-focused Bonerama (see this month's Listening List). Trombone choirs, such as Bones West, are also popular because they are so versatile: The trombone is facile enough to play melody, chords, and bass notes. Low brass can be heard in pop, too. Trombones play a central role in funk and ska. And while tuba and sousaphone are less common, they do appear, such as in the rock band DeVotchKa; the work of Damon Bryson, who plays with the funk outfit the Roots; and in the Hypnotic Brass Ensemble.

Yamaha
YBB-631S
Tuba



Conn
C56J Tuba



Jupiter
Euphonium
468S

**Tubas** and their close cousins, the sousaphone (opposite page) and the euphonium (above right), come in different pitches. The most common tubas are the BB♭ (above left)—the lowest brass instrument—and CC (above center). Tubas use 16 feet of pipe to deliver pitches that go down below the lowest note on the piano. The euphonium generally plays one octave higher than the tuba, and is similar to the baritone horn. It uses nine feet of pipe.

## TUBA AND SOUSAPHONE

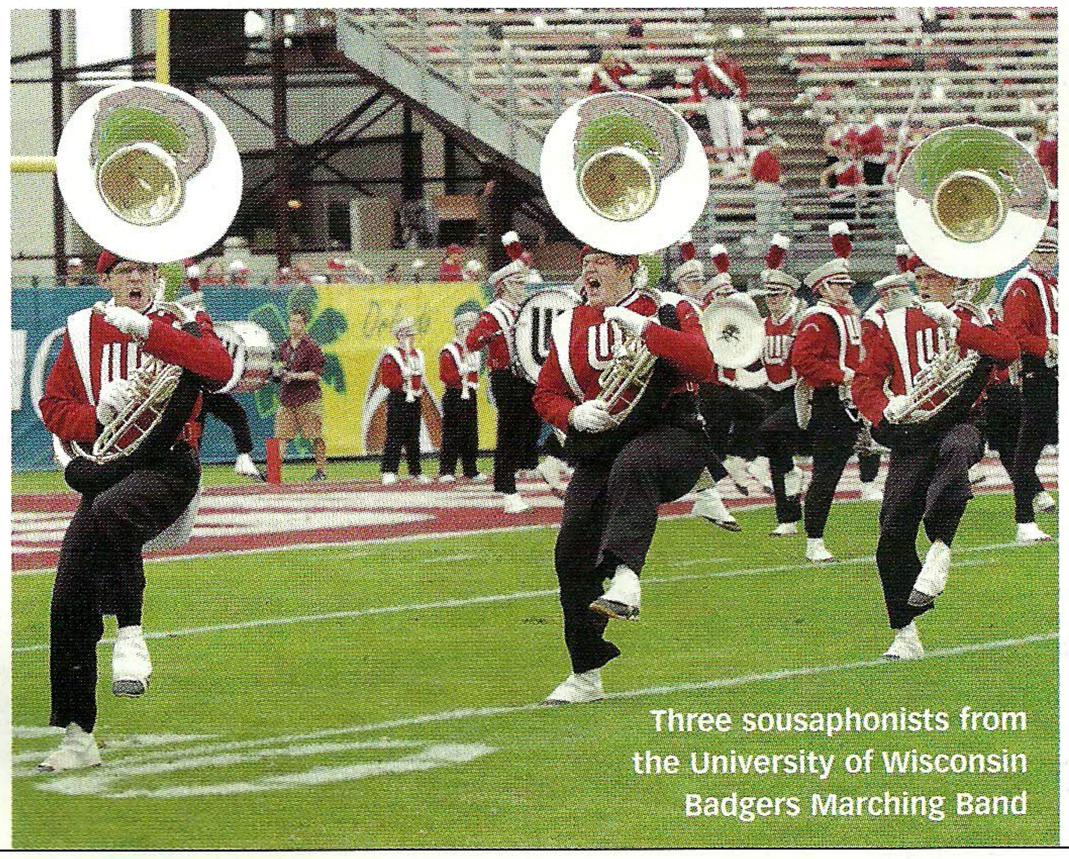
The tuba is the lowest-pitched instrument in the brass family. It comes in three sizes: The tenor tuba in B-flat; the bass tuba, which can be pitched in either E-flat or in F; and the double bass, or contrabass, tubas, which can be pitched in B-flat or C (usually referred to as the BB-flat bass tuba, or CC bass tuba).

The word *tuba* comes from Roman times. The ancient instrument was a straight bronze horn, about four feet long, that was used mainly for signaling. There were many other types of horns in the ancient and medieval world—one, called an oliphant, was made from elephant tusks—but they were primitive by today's standards because they could play only a few notes and had sounds that were more likely to startle than soothe the listener.

The tuba, like the euphonium and sousaphone, is made of cone-shaped brass tubing (similar to the French horn), and this contributes to the instrument's relatively mellow tone. Tubas are equipped with three or four valves (though some have six), which the player uses to open and close sections of the pipe, changing the length of the air-travel through it, and thus, the pitch the instrument produces.

Sound is produced when the player blows a stream of air into a cup-shaped mouthpiece, which causes the air to vibrate the lips at the speed of the air stream. "Each note, high or low, has a corresponding air speed, much like singing," says Norlan Bewley of the Tubashop Quartet and several other low-brass ensembles. "Depending on the skill of the player, most of the ranges of all the brass instruments overlap. Many tuba players can play up into the trumpet range, but the size and length of the tuba is designed to accentuate the tone of the lower range." Other tuba players of note include Harvey Phillips, Arnold Jacobs, Roger Bobo, Oystein Baadsvik, and Jon Sass.

The sousaphone is very closely related to the tuba but is designed for marching musicians. It is named for John Philip Sousa, the great American composer of marching music. The main difference between the tuba and the sousaphone is the shape: Tubas are upright, with the bell of the horn pointing up, in line with the pipe. Sousaphones are circular in shape—similar to the French horn—with a large bell pointing forward. This not only makes it easier to hold, but also aids projection in marching performances. Some marching bands will have more than 25 sousaphonists!



Three sousaphonists from the University of Wisconsin Badgers Marching Band

PHOTO BOTTOM LEFT: FERNANDO MEDINA/WIREIMAGE.COM

Courtois-Paris AC420BT-1-0 Bb/F Trombone

**Trombones** were among the first brass instruments to develop their modern forms. They come in a range of pitches, but the most common are the tenor (seen here with the optional F attachment) and bass trombone. Most orchestras feature three to four trombonists, with one handling the bass.

## EUPHONIUM AND BARITONE HORN

The euphonium (the name comes from the Greek word *euphonos*, meaning beautiful sounding) is similar in construction to the tuba in that it uses a conical pipe, stopped by valves. But the euphonium sounds an octave higher than the bass-range tuba. The euphonium is also related to the baritone horn but has a larger *bore* (the diameter of the pipe) and larger bell, which gives the euphonium a mellow timbre that's well-suited for lower notes. Euphoniums are pitched in B-flat, sounding an octave below the B-flat trumpet. Professional models have three top-action valves. Some have an additional *compensating valve*, which is used to extend the instrument's range downward. (Many student models are limited to three valves without the compensating fourth.)

Euphonium players of note include Brian Bowman, Steven Mead, Nicholas Childs, Toru Miura, and Arthur Lehman. In addition to its pivotal role in marching ensembles, the instrument is featured in classical works, such as "Mars" from Gustav Holst's *The Planets,* Richard Strauss' "Don Quixote," and Gustav Mahler's *Symphony No. 7*.

## TROMBONE

The trombone is one of the earliest of the modern brass instruments to reach its present shape. (Many of the other low brass instruments were not fully developed until the 19th century.) It has a cylindrical bore—which means the diameter remains consistent for most of the length of the pipe—and uses a slide, instead of valves, to change the length of the tubing. This allows it to play a *portamento* (a rapid, continuous change in pitch).

The tenor trombone, pitched in B-flat, comes in a small-bore version used in jazz and a wider-bore version used in symphonic music. The family also includes the bass trombone pitched in F, the tenor-bass, which has the range of the bass but the bore of the tenor, and the contrabass trombone, pitched an octave below the tenor instrument.

Notable players include jazz musicians like Bill Watrous, Tommy Dorsey, Glenn Miller, Jimmy Knepper, and bass trombonist Dave Taylor, and classical artists Christian Lindberg, Charles Vernon, and Doug Yeo (bass trombone). Listen to the work of bandleaders Dorsey and Miller, but also check out Charles Mingus' classic "Boogie Stop Shuffle" for Knepper's lightning-fast trombone workout. On the classical side, listen to Nikolai Rimsky-Korsakov's *Concerto in B-flat*.

## Low Brass Ranges

One of the challenges of playing a low brass instrument is in executing notes that fall above or below the horn's "comfort zone." These diagrams show the ranges (lowest and highest playable notes) of some common low brass instruments. The quarter notes indicate pitches that are playable but difficult to execute quickly or with accuracy and reliability. The range between the whole notes is the "safe zone," where musicians can comfortably play notes at any reasonable speed and tempo.

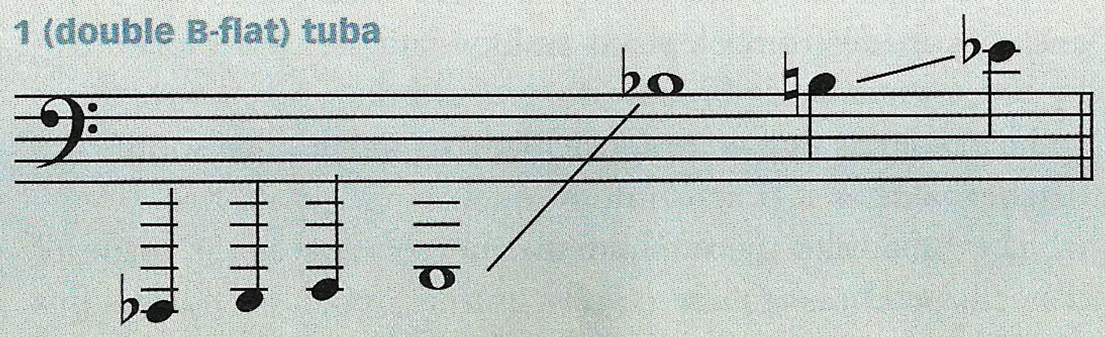
**Ex. 1.** The BB♭ (double B-flat) tuba can play the low B♭ (six ledger lines below the bass clef) as its lowest possible note, but typically plays from low E to the B♭ just below middle C.

**Ex. 2.** The euphonium is really a small tuba, and is sometimes called the baritone. It plays from low E (just below the bass clef) up to B♭ or C above middle C.

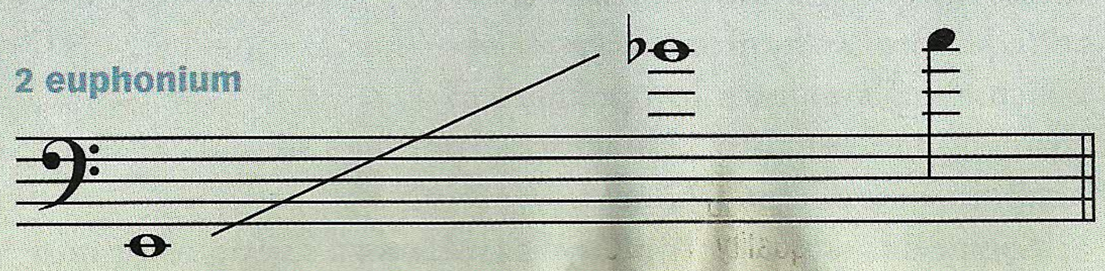
**Ex. 3.** The trombone and bass trombone have almost the same range, except that the bass trombone has a fuller, darker tone in the lower register. The quarter notes in the low end indicate *pedal tones*—a specially played note not used in the normal instrument's playable register. The tenor trombone ranges from a low E to F and, for advanced players, up to B♭ above middle C; the bass trombone plays the same pedal tones with more strength and can play from low C to F and to B♭ above middle C.

Bill Watrous

1 (double B-flat) tuba



2 euphonium



3 trombone and bass trombone