Staldophone – Explanations Across Five Disciplines

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To explain the Staldophone clearly, one inevitably has to touch on five key disciplines:

- The history of the saxophone's origin
- Physics
- Instrument making
- Music theory
- Anatomy and psychology

The following explanations are based on self-taught knowledge and personal experience with the Staldophone. Therefore, it's legally necessary to say something to avoid further complaints:

No guarantees provided!

1. History of the Saxophone's Origin

History tells us that Adolphe Sax originally equipped the saxophone with a cup mouthpiece, which was typical for overtone instruments in the 19th century. It is also widely accepted that Sax envisioned his new instrument for military bands around the world—because that's where the money was.
This implies that the instrument had to be easy enough for any band musician to play (Mea culpa). Thus, Sax moved away from creating a pure overtone instrument (author's personal conclusion). He eventually gave the saxophone a reed mouthpiece and designed a complex key mechanism to help players reach the upper registers without worrying about more than 20 individual tone holes.

Perhaps it's presumptuous to claim that the Staldophone actually resembles what Sax originally had in mind. In other words, from Saxophone to Staldophone—and perhaps back again—but with even fewer holes and buttons. Consequently, the fingering system of the Staldophone deviates from that of the saxophone.

2. Physics

For a pipe to produce sound, the air within it must vibrate. In wind instruments, this is achieved by blowing into a mouthpiece, which causes the air to vibrate.

From a physics standpoint, the Saxophone—and therefore the Staldophone—is a closed tube (technically: closed at one end). Because of its conical shape (specifically the bell), the acoustic "end" of the tube lies significantly beyond its physical structure. This is why a tenor saxophone sounds about 30 Hz lower than what the theoretical calculation would suggest. This length discrepancy also affects every other note whose sound exits through the bell via an open tone hole. If you measure the length of the tube with all keys closed and calculate the lowest tone, the result is an octave higher than what the instrument actually produces. To function acoustically as the end of the tube, a hole must be large enough, or a sufficient sequence of smaller holes must lead up to it. Otherwise, only the timbre changes or the pitch lowers slightly. Thus, the higher the tone hole, the smaller it can be.

The saxophone uses small tone holes at the top, opened via keys, to assist in overblowing into the overtone series. These are omitted entirely on the Staldophone.

Overtones—or partials—are critical. Every note on a wind instrument contains multiple simultaneous frequencies. These form the overtone series. Overtone instruments take advantage of this to reach higher pitches by overblowing.
For example: by overblowing the fundamental, the first overtone (the octave) can be played using the same fingering. The next overtone is a twelfth, followed by the double octave, and so on. The higher you go, the smaller the intervals become.

Each instrument has preferred overtone frequencies, which may vary even within the same instrument type. That's where anatomy and psychology become essential for accurate intonation.

The term "closed" must be clarified: it refers to the acoustical behavior of the pipe. The “closed” end is created by the mouthpiece being nearly sealed. In woodwinds like the Staldophone, a connection is formed between the musician and instrument via the vibrating reed—a key bridge between human and machine. Again, see the Anatomy and Psychology section for deeper insight.

3. Instrument Making

The Staldophone features a simplified key and pad mechanism, resulting in reduced weight. It has only ten tone holes. To improve handling, the upper thumb rest is designed as a sliding hook.

Due to both physical and musical constraints, tone holes cannot be placed in perfect locations for every pitch and octave (see also Music Theory). Theoretically, tone holes should be infinitesimally small, which contradicts the need for acoustically sufficient size. On the Staldophone, every key corresponds to one tone hole, which can be opened or closed independently. This allows for a variety of timbres, and problematic overtones can be improved slightly by adjusting one key. Conclusion: practically every wind instrument is a series of compromises.

4. Music Theory

Modern keyboard instruments like the piano are tuned in *equal temperament*, which distributes slight intonation errors across all notes. In contrast, horns can theoretically play in *pure intonation*. But, as noted above, tone holes cannot be ideally positioned for this. Over several octaves, the inaccuracies increase.

Because overtones get closer together as they rise, it’s theoretically possible for one to align exactly with a tempered pitch. In practice, however, you sometimes have to use a different overtone from another fundamental. That means the base tone has to be played while the overtone must be "bent" or adjusted to the desired pitch—more on this in the next section.

5. Anatomy and Psychology

The mouthpiece forms the interface between player and instrument. With a reed mouthpiece, it is placed against the upper teeth and sealed with the lips—this is essential for producing sound. As no two mouths are alike, embouchure technique becomes highly personal.

So how do you learn overtone technique?

Start by forming a tight “kissing” mouth, as if blowing out a storm lighter. Blow gently until you hear a tone without tension. Now raise the larynx slightly—though who knows how to do that? Try thinking “eeeh” to raise it, “oooh” to lower it, and “uuuh” for a different timbre. Yes, this is a bit absurd. Also, inflate your belly with air—don’t press! Relax your arms, close your eyes, and just practice.

Hopefully, you've chosen a mouthpiece suitable for your skill level, with a reed that’s not too hard. Mouthpieces and reeds come in countless variations and need occasional adjustments. But there’s no guarantee of instant improvement.

Teeth and bones conduct vibrations differently. Lip and jaw positions also vary. The tongue, throat, larynx, lungs, chest, diaphragm, and abdomen all affect the sound. And above all, your inner idea of the desired tone plays a crucial role. If you want to learn the Staldophone, take your time.

In lower registers, fingering mostly determines the pitch. But even here, pitch and timbre can be shaped with embouchure. In the upper register, the player’s mental image of the tone becomes more important than the fingering. To be blunt: once you include all the elements involved in overtone playing, you’ve left psychology behind and entered the realm of mysticism.

I wish you joy and perseverance on your journey with the Staldophone.

Subject to change without notice.

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