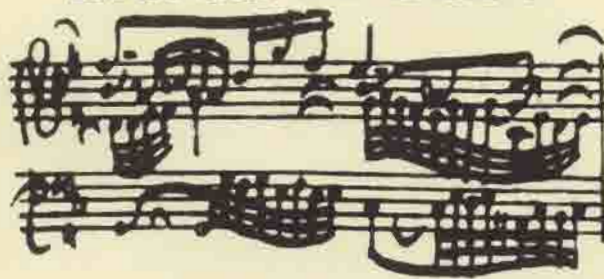


BRUCE M BELO



The Band Director's Guide

For Keeping

Your Instruments

Out of the Repair Shop

Bio

Bruce Belo

- Played saxophone since age 10, clarinet since age 13, flute since age 18.
- Played in the 327th and 76th Army Bands.
- Professional musician for over 10 years.
- 1973 attended Allied Music Instrument Repair Course (the world's largest re-builder of musical instruments with over 1000 years of cumulative experience).
- Musical Instrument Repairman at Anaheim Union High School District from August 1979 to present.
- Operated private repair shop from 1974 to present.

See credentials on the following two pages.

The first pictures are 11 hours prior to the finished repair.

The second pictures are the final results.

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You will soon be anointed band director status, and students, band parents and administrators will expect you to know everything there is to know about anything dealing with the word music. "What's the best instruments, the best repairman, the best private instructors, etc." Unsuccessful instructors assume the posture as "I Guess I do know everything" to the detriment of their students and the performance of their band. The successful band directors realize and accept the fact they don't know everything and are not afraid to ask true experts.

- If you don't have a properly functioning instrument you'll never be able to achieve the sonic potential of your band.
- If the instrument doesn't function properly you won't retain your band members.
- Your students, band parents, and administrators are unaware of the fact that these are precision machines before they're musical instruments, and they need to be properly maintained by the individual playing it.
- The destruction and abuse of the instruments will be directly proportional to what you as the band director permits.
- If you demand from day one that the student must maintain the instrument before and after being played, that will then become the norm from that day forward and you won't hear "we never had to do that before" or "it really doesn't matter".

How to Find a Good Repairman

All repairman are not created equal. More often than not stores look at repair as a necessary evil. They can't sell or rent instruments unless they say "we can fix it". So they get the cheapest person that they can find, who is going to teach himself by destroying your instruments at your expense. Believe me when I say after 30 years of repair, I've seen hundreds of instruments, many of them brand new, destroyed in seconds by inept repair technicians.

Good repair is not cheap. Cheap repair is not good.

Ask pros around your area about who's the best repairman around. Then ask what their credentials are and how much experience they have and can they personally play everything they repair? Preferably you want someone who has repaired in a factory environment where they've experienced the full range of repair from piccolos through tubas. Don't think for a second that you know anything about instrument repair, because you don't!!! Don't think for a second that you're going to get good information from your local music store, because to them the best instrument in the world is the one that they have to sell to you. Talk to the best independent repairman that has nothing to sell you. This way you'll find out what manufacturers have problems and which don't and what the instruments really are, i.e. Bach's Tuba, Euphonium, and French Horns are actually Yamaha, and before that they were Olds and tomorrow they will probably be Conn or King. Armstrong Bass Clarinets are Bundy's. The original Yamaha Bass Clarinets were Vito's. It's only when you speak to someone who lives on the inside of the instrument that you'll find out the truth.

About the Instruments

Cases

Never let anyone sit on or use an instrument case for anything other than its intended purpose of being a dust cover for the instrument. It is not sanctuary! If dropped even from 2 inches to the ground, the adjustments on many instruments can be compromised. You can virtually eliminate handle problems by not letting your students carry the instrument suspended from the handle bars on their bicycles. Cases should always be carried and placed where needed, not slid, tossed or thrown. The case should always be carried with the lid against your leg in case of a latch failure. And don't be afraid to vacuum cases out or use a wisk broom to clean them out. Also, care should be taken for proper interface of the latches. The absolute worst thing you can do to an instrument is put it in a "gig" bag. Then it is not a matter of if you're going to see the repairman, it's only a matter of when? The only "if" in the equation is if it can be resurrected. NEVER USE A GIG BAG!

Theory of Woodwind Operation

As you are all probably aware when you watch a trombone being played the further the slide is pulled out, the lower the pitch response. With woodwinds, however, there are tone holes that are cut at specific lengths along the body to let the sound emanate from. To lower the pitch, the air column must be lengthened. This is achieved by covering, in a "falling dominos" fashion, the tone holes from top to bottom. If one tone hole at the top of the instrument is opened, nothing below it will respond. Therefore, every pad is a 360 degree variable. If it doesn't cover perfectly with an airtight seal, every note below it will be compromised. On many of the wood winds, by depressing one key 2, 3, 4, or even 5 keys must go down and cover simultaneously. These adjustments are critical. If you see any pads that have cracked leather or bladders, they must be replaced.

Pitch Problems with Woodwinds

Many band directors complain "My saxophone section can never play in tune" and the fault lies on no one but them selves for not realizing that embouchure can change the pitch by a half step! The laws of physics are not flexible! Band directors look at the 2 inches of cork on the neck and think that the mouth piece can be placed anywhere and you'll be good to go. You've all been in bands where the director plays a B flat and has everyone tune to it and put a mark with a pen on the cork. *This guarantees that the band will only be in tune on one note!* Since we are dealing with tone holes that are cut in the body, one must find where the instrument wants to play in tune with itself. This is achieved by playing octave leaps, i.e. low b, middle b, high b, low c, middle c, high c, etc. with the least amount of embouchure change. Once this "sweet spot" is found, the embouchure must be altered to pull it into pitch. Variances of more than 1/8th inch will start to effect intonation dramatically.

Flutes and Piccolos
Most Avoidable Problems

Some of the most often seen problems that can easily be avoided are:

- Banana flutes. Students place their flute on the bed, couch, or chair and end up sitting on them bending them in half, which costs in excess of \$100 to fix. When you're not holding the flute, put it back in the case and latch it!
- Flute and Piccolos play out of tune. Routinely, the crown cap at the top of the head joint vibrates loose and in an attempt to tighten it the student keeps turning it until it stops. This in turn pulls the head joint cork up too far so the instrument is at an improper length. Always check for proper alignment by inserting the solid end of the cleaning rod up the head joint so that the mark is centered in the blow hole.
- Flute or Piccolo will only play one note. More often than not a trill key spring has caught on the students clothing and has come off the spring hook.
- Flute or Piccolo plays very inconsistently. Quite often, the rod that holds the "c" key on backs out leaving the upper stack (A, B, & G) very loose. Also, check the lower stack and trill keys for excessive play. Don't over tighten or some keys won't come back up after being depressed.
- Always check for pads with cracked bladders, if the pad looks furry, they must be replaced. Frequently, in an effort to polish the instrument the student will inadvertently hit the pads with the cleaning cloth. This in turn cracks the bladder that is only one one-thousandth of an inch thick. So great care must be emphasized when cleaning the instrument.
- Care must always be taken when assembling the instrument so as not to have pressure on any keys. The head and foot should be attached in a rotating fashion never in a wobbling motion.
- Beware of students with screw drivers and key oil. Oft is the case they tighten down every screw on the instrument including all of the adjusting screw, mal-adjusting the entire instrument. Key oil is generally sold in a bottle that is not conducive to proper application on the instrument. You need only one drop at every key junction once every six months to one year depending on frequency of use. Excessive key oil will migrate to the key corks and destroy the adhesive used to hold them on.
- Rubber bands used in an emergency for broken springs should be removed as quickly as possible for the sulfur content in the rubber will eat through the silver plating very rapidly.
- Prior to stowing the flute, the interior should be swabbed out and the exterior should be wiped off.

Clarinets Most Avoidable Problems

Many of the same things discussed with the flutes and piccolos also apply to clarinets in respect to pads, cleaning, oiling and assembling, and being sat on. Most frequent avoidable problems:

- Tenon corks falling off are generally caused by using too much cork grease. Cork grease will migrate down to the adhesive and destroy it. If you see any cork grease it's too much!! Use cork grease only when assembly is somewhat difficult or "notchy". Once again avoid grabbing around and possibly bending the keys.
- When only one note can be played, it is generally the adjusting screw on the A flat key is screwed in too far. You must always have a tiny bit of play between A and A flat keys.
- When problems occur with the transition over "the break" going to middle B, the most likely cause is a heavy right pinky on the C key that has bent it out of adjustment. Both the C and B must close simultaneously when the B Key is being depressed.
- On occasion the A, D, Stack, Upper ring and bridge key will prevent the lower stack ring keys from closing the pad above the right hand fingers that prevent the entire lower joint from properly operating.
- In cold climates wood clarinets, oboes, and piccolos must be "warmed up" from the outside in by holding the barrel and upper joint in your hands for several minutes. Neglecting to do this, and blowing warm moist air through a cold instrument will cause it to crack.
- Swab out and wipe off keys avoiding contact with the pads moisture before stowing the instrument in the case.

Saxophones Most Avoidable Problems

- When placing the mouthpiece on the neck, one hand must always support the area between the neck cork and octave key or the neck will be folded down and possibly be destroyed. For many instruments, there are no replacement necks. So if the neck is beyond repair you'll be left with a useless instrument.
- Always loosen the receiver screw before moving the neck and retighten. If the neck is still loose, try some tuning slide lube on the tension screw and on the mating surface.
- After playing, the bell must be lowered in order to drain out the condensation that has accumulated in the bottom bow or it will be deposited on the D sharp pad causing it to rapidly deteriorate and in turn you'll lose use of the bell keys. Also, excess water should be blown off of all the palm key pads to slow their deterioration. The body and neck should then be swabbed out to eliminate excess water.
- Never depend on a neck strap to positively prevent a multi-thousand dollar saxophone from coming into contact with the floor!! If you're playing it, you hold on to it at all times. When you're not playing it, put it back in the case and latch it.

- You must use a receiver plug every time the saxophone is in the case or the octave bridge key will be bent or broken off.
- There is not one thing in the case that the manufacturer didn't put there for a reason. Never let your students discard anything, mouthpiece cap, receiver plug, etc.

Oboes
Most Avoidable Problems

- Care and maintenance is very similar to clarinet, however, there are a few differences, namely the amount of adjusting screws. It's best to keep screw drivers away from oboe students because all they see are screw heads that many of them ascertain should be tightened down, which ultimately throws off all the adjustments.
- Great care must be taken while assembling the joints so as not to bend the bridge keys or peel off the bridge key corks.
- Once again, if you see any cork grease it's too much.
- Proper external warm up is imperative to avoid cracking of cold instruments.
- Swab out bore and carefully wipe off keys before stowing the instrument in the case.

Bassoon
Most Avoidable Problems

- When installing the reed, always support the bocal or it will fold down just like a saxophone neck.
- When inserting the bocal into the wing joint, great care must be used so as not to destroy the whisper key pad.
- Once again great care must be taken in assembly so that keys are not bent.
- Swab out all water and wipe off keys and wood before stowing it in the case.

Brass Theory of Operation

Unlike woodwind instruments, with a reed that provides the emanation of resonance that ultimately come out the tone holes, brass instruments are dependent upon lip vibration to supply the resonance that is focused through a specific length of tubing and out the bell relying on the natural harmonic series, i.e. first, third and fifth to change pitch. To complete the chromatic intervals, valves are added to provide additional tubing to add a half step (2nd valve), whole step (1st valve), step and a half (3rd valve), with trombone of course having a slide to provide the additional length to provide the chromatic spectrum.

Trumpets
Most Avoidable Problems

There should never be a need for a trip to the repair shop for stuck slides and valve caps. All that is needed is for the student to spend one minute a day for the machine so that for the 23 hours and 59 minutes it can be a musical instrument.

- Move every slide and cap every time that the instrument is picked up. If they are stiff or notchy, lube immediately.
- Valves should be oiled twice a day, first for the lubrication, second after you've finished playing to wash the valve and casing off of the acid, lime and calcium that has been transferred there via the water vapor being blown through it.
- Install the mouth piece with a slight turning motion. If the mouth piece gets stuck, never let fathers try to remove it. To straighten and reattach a mouth pipe will cost over \$100. Never set a trumpet with the 2nd valve slide down. It will flex the casing so it will be out of round. Most repairman will then destroy the trumpet by "lapping" the valve back in destroying the valve to casing tolerance instead of truing the casing. A new valve is fit to only one thousandth of an inch clearance.
- When any solder joints are broken they should be attended to immediately never using super glue or tape to secure the brace otherwise it becomes a battering ram and will tarnish so a complete disassembly will be in order to properly clean the mating surfaces so that it can be re-soldered.
- The felts on the valve stem and top cap are very critical for proper alignment of the ports in the valve to the ports in the valve casing. If not properly aligned, centering of the pitch, intonation and overall free blowing will be severely compromised.
- Monthly the instruments should be disassembled and washed using a snake, dried and reassembled. Never soak any instrument or the clear lacquer coating will come off and the instrument will begin to tarnish immediately. To rebuff and lacquer an instrument (overhaul) takes considerable time and is extremely expensive. Once again, when finished, the instrument should be emptied of any moisture and wiped off thoroughly or the acids and salts from handling the horn will destroy the lacquer.

Trombones Most Avoidable Problems

Trombone is the simplest of all the instruments but can create severe problems when the slide is not functioning properly. The most common malady impeding good slide action is filthy slide tubes. A snake and steel slide cleaning rod are absolute necessities. The snake should be used once a month to clean the inner tubes and down through the crook on the outers. Once again, never soak the instrument only rinse through it with warm water and dry immediately.

- I recommend that the outer tubes be cleaned with the slide cleaning rod daily and the inners wiped off and left dry. The next day fresh slide lube and distilled water should be applied.
- Hand slide lube is somewhat of a misnomer. It should better be viewed as water repellent. It's actually the beads of water that makes for a good slide action. If a paste or cold cream type of lube is used, beware. If you see any lube, it's way too much. An amount the size of a match head is more than enough. Lube the stockings well and then pull any excess lube down the rest of the inner tube spray with water and work in.
- The reason why the chrome is worn off the inner tubes is the fact that when a slide is not wiped out daily, the lime and calcium that is being blown through the instrument

attaches itself to the inside of the outer tubes creating essentially a coral reef. This acts as an aggregate which pumices away the chrome and also destroys the valves.

- Lime, limestone, great pyramids of Egypt, calcium, calcium carbonate, great barrier reef, this is extremely abrasive and this is what destroys slides and valves.
- Trombones with a rotor valve need two different kinds of lubrication. A thin trumpet piston oil should be used twice a day. With the bell receiver being held pointing straight up and the valve being held in the "F" position many drops should be applied directly on the valve body before and after being played first to lubricate and second to rinse the valve off to help eliminate a lime and calcium build up.
- Once a week, "3 in 1" oil should be applied to the front and back bearings (beneath the cap and at the base of the valve stem beneath the stop arm) and all of the linkage for the lever.
- One of the biggest slide dent problems occurs in assembly when the slide is rotated towards the bell ultimately hitting it.
- Bell and slide assemblies should be thoroughly wiped off before storing in the case.

French Horn Most Avoidable Problems

- Strings for the valves most often break because the valves won't move for no one has ever lubed the valves so lime and calcium has been deposited on the valves and valve casings binding the valve. This must be acid washed out and can ultimately be eliminated afterwards by oiling down the valve slide tubes twice a day with light trumpet piston oil, before you play for lubrication, after to rinse the valve off. Three in one oil should be used once a week on the front and back bearings (beneath the cap and at the valve stem beneath the stop arm) and on the levers and any other linkage.
- The mouth pipe and slide tubes should be rinsed out and cleaned with a snake.
Warning: Do not over commit with the snake getting it stuck in the radical turns of the 3rd valve slide tubes.
- Move all slides and caps daily.
- Empty all excess water from the instrument and wipe off thoroughly before stowing it in the case.

Euphoniums, Baritones, Tubas and Sousaphones Most Avoidable Problems

- Most everything that applies to trumpet applies also to these instruments.
- Move all slides and caps daily.
- Oil valves twice a day, first for lubrication and after you're finished to rinse the lime, calcium and acid off of the valve and casing.
- Never set the horn upside down on the bell. It will crush the bell and also the bow to first branch connector.
- Sousaphone necks should never be moved without loosening the tension screw then retightened. If the neck is still loose, put some tuning slide lube on the screw threads and the seating surface.

- Empty excess water from the instrument and thoroughly wipe off the instrument, before stowing in the case.

Supplies Needed For Proper Maintenance

Piccolos and Flutes	Cleaning Rod and Cleaning Cloth
Clarinets and Oboes	Cleaning Swab and Cleaning Cloth and Cork Grease
Saxophone	Cleaning Swab and Cleaning Cloth and Cork Grease
Bassoon	Cleaning Swab and Cleaning Cloth and Cork Grease
Trumpets	Snake, Tuning Slide Lube, Snake, Piston Valve Oil, Cleaning Rod, Cleaning Cloth
Euphoniums	Snake, Tuning Slide Lube, Snake, Piston Valve Oil, Cleaning Rod, Cleaning Cloth
Tubas and Sousaphones	Snake, Tuning Slide Lube, Snake, Piston Valve Oil, Cleaning Rod, Cleaning Cloth
French Horn	Snake, Tuning Slide Lube, Snake, Piston Valve Oil, 3 in 1 Oil, Cleaning Cloth
Trombone	Snake, Tuning Slide Lube, Hand Slide Lube, Squirt Bottle with Distilled Water, Slide Cleaning Rod, Cleaning Cloth, with F attachment, Piston Valve Oil, 3 in 1 Oil

Band Director Necessities

- 1 LB jar of lanolin anhydrous (tuning slide lube)
- Mouth piece puller
- Spring hook (crocheting needle)
- Piston valve oil
- 3 in 1 oil with needle applicator
- Cork Grease
- Trombone slide cleaning rod
- Small screw driver set
- Distilled water
- Vaseline for 3rd valve and 1st valve slide throws on the trumpets
- Snakes for all instruments

INTONATION

Unless you have a room full of students with perfect pitch, you will have pitch problems. It is very difficult for a student to play in tune if they don't know what that means. The easiest way to enlighten them is by eliminating the variables, such as the overtone series and eliminating the timbre changes from one instrument to another. Simply take two tuners; (because they emanate a true sign wave) one producing the desired pitch, the other, with the meter covered producing a pitch out of tune. Then have each student dial it into pitch from both flat and sharp positions. This way each student will be enabled to hear the dissonance produced and then know how to rectify it.

MUSIC THE UNIVERSAL LANGUAGE

If you think about how we learned our first language we listened for years before we uttered one intelligible thing. The only thing that you can be assured of with the general student body is that they really have no clue of what a piccolo, flute, clarinet, oboe, bassoon, French horn, euphonium, or tuba are truly supposed to sound like let alone how the music that you'll be asking them to play should be performed. Therefore, **TEACH BY OBJECTIVE!** Produce tapes or CDs as required listening for the best examples of the specific instrument and the music to be played. This way any time spent practicing or rehearsing will be vastly more productive because you will have very few players that can truly interpret from the music on the page.

"OK, OK One More Time"

We've all been in band class when the bell for the end of the period is about to ring and the band director wants to try it "one more time". This is the worst thing you can do!!! First this guarantees that the instrument will not be wiped off or emptied and will be thrown in the case and case will be destroyed because it will be thrown in the locker. Don't do this!!! Also, nothing will be accomplished musically!!!

Communicating with nonmusical types, administrators and band parents generally don't know a "b flat from a door slam". Therefore, it is always best to speak in analogy; whether it is sports or sewing it will help eliminate that glazed look in their eyes.

"Don't Let the Door Hit you on the Arse"

Sooner than later, the much anticipated "end of the school year" will be upon all band directors. The best thing that you can do to make your life 10 times easier is attending to the maintenance of the instruments prior to their storage over the summer when all of the unclean and un-lubed slides and valves will be frozen as though someone put super glue on them. **There is not one repairman out there that needs a lot more work between the second week of August and the second week of September!!!** Therefore, the last few days of the school year should be set aside for the preparation for the next year. Therefore, you must demand that all of your students maintain their instruments for your inspection for storage or repair!

"IN TUNE AND ON TIME"