

Arnold Jacobs master class notes from Trenton State University, 1989

TRENTON, New Jersey, June 1989 and 1990 -- I recently stumbled upon a notebook that I had used during a couple of week-long master classes given by the late Arnold Jacobs at Trenton State College. These classes were an invaluable learning experience for me and the few dozen other attendees, so I thought I'd share my notes.

Jacobs had an unparalleled ability to pinpoint a player's technical problems and correct them with a few simple adjustments.

In the master classes I attended at Trenton State, Jacobs displayed his legendary teaching skills by working with individual players in front of the class. Typically, he'd have a student come up and play a short solo, after which he'd work with the student for a few minutes, then have him or her play the solo again. Without exception, the second performance was improved to an amazing degree -- Jacobs had an unparalleled ability to pinpoint a player's technical problems and correct them with a few simple adjustments, usually involving improvements in breathing technique.

The Inner Game of Tuba

Besides his understanding of how to breathe properly, Jacobs had mastered the mental approach to playing music. He described playing solos confidently as "issuing statements," rather than "asking questions," which he said tended to happen with nervous performers. One of his most important ideas was the importance of the "bio-computer" part of the brain. The subconscious part of the brain, he argued, does a much better job of telling your muscles what to do than does the conscious part of the brain. This approach is remarkably similar to that expressed by W. Timothy Gallwey's "Inner Game" books. Jacobs told us to "order the product," concentrating on the *sound* we wanted to produce, rather than trying to control *how* we produced the sound. "Think of how Bud Herseth would sound," he'd say. "What would a great artist sound like on this piece?"

Another very important concept Jacobs espoused was that when you've got some kind of technical problem or a bad habit, it's not important to "get rid" of

the habit, per se -- instead, bypass it with something good. "Introducing an unfamiliar stimulus," in the form of a new technique, will lead to the old (bad) habit going away by itself, without conscious effort on our part.

In performance situations, I've often used one of his axioms in particular, especially when I'm not feeling well: "You don't have to feel good to sound good," Jacobs said. "Make the audience think you feel great, even when you feel terrible."

Jacobs's master classes were an invaluable part of my musical development, and there's a lot more to say about the specifics that he discussed. For now, though, what follows is a transcription of my notes from the classes. In some cases, you'll notice certain ideas repeated over and over throughout the notes -- that's because Jacobs was instructing different students in succession throughout the week; he'd frequently have to say the same thing to many different students.

Keep in mind that these are unedited notes; taken out of context, some of them may be misleading -- use them at your own risk! If you have specific questions about anything below, please [drop me a line](#) and I'll try to explain what Jacobs was getting at or provide some context for the ideas contained below.

6/26/1989

Born in Phila., raised Calif -- Long Beach

Home entertainment back then

Imagination developed bec. no TV, etc.

Mother a vaudeville pianist, concert work

ear training -- repeating bugle calls

got a trumpet w/no instruction book

guided into music on trumpet -- not w/tpt teacher

switched to trombone 'til stolen

-- switched to Sousaphone

Auditioned successfully for Curtis at 15 -- Eb tuba w/4th valve taped down

played trumpet, bone, string bass, too on dance band gigs

playing one note sounding like Herse

"lots of rules given to young people" -- don't play "by the rules"

have a good sound in your head

actors think of emotion, experience life, influence audience

act of learning -- gathering info, thru sensors

-- audio system of brain

-- impart info through motor impulses

playing as "issuing statements"

body responds to stimuli from brain

-- lots of students lack stimuli

"bio-computer level of brain" that adjusts physiology to interpret brain instructions

don't go by what embouchure feels like, go with it as a motor impulse

-- don't spend too long getting the right feel on chops

playing is motor activity -- 7th cranial nerve (sensory uses 5th cranial nerve)

1. Think in the art form

-- gasoline doesn't do it -- need an engine

musician -- not trombone player

"communicating to body" -- transmitting

-- constant motion in body all the time

body as machine -- set of controls you use to communicate with the machinery

-- tell body *what* to do, not *how*

change of attitude

communicate to body w/very *simple* orders

2. Respiratory activity

look for the simple answer -- you can't handle the complex one

Boyle's law -- pressure inversely proportional to volume

muscles of respiration -- air in/out

stabilization

pelvic pressure -- correlates w/closure of throat

breath involves "follow-through"

generalized expansion/reduction -- not restricted to one area

neural inhibition -- immediate reversal of direction required -- no need to relax muscles first -- positive order to brain

-- use an "honest order"

-- you don't feel air below the larynx

chest/abdomen can hold 150 pounds, but air pressure to play is a few ounces

you *don't need* enormous strength in abdominal area

lungs -- body reacts differently according to how much air is in lungs

-- don't empty lungs -- finish phrase comfortably -- work effort increases as you get down to empty lung volume

-- have a surplus of air

excessive air in thorax -- think of blowing air out through instrument

too much friction to breath through nose

"breathe to expand -- don't expand to breathe"

"suction with minimal friction"

"thin air," e.g., "sssssssssss" under pressure

"thick air," e.g., ordinary blow -- less pressure

low-pressure, high-volume on trombone, tuba

often, people end up psychologically reversing pressure, volume

"playing an instrument is not manual labor"

inspiration

tongue -- reflexive response to a stimulus

-- not manual control

somatotyping -- body type indicates lung capacity

phenomena outside body -- conditioned reflexes handled at "lower levels" of brain -- serial activities

"paralysis by analysis"

don't fight old habits -- substitute something different/new -- change stimuli

separate differences into black and white

you should have as much aperture at pharynx, windpipe as at lip

awakening the sense of air as a *quantity*, outside the body -- not pressure *inside* body

don't correct, *bypass* bad habits

capacity breath, not "regional breathing"

"comfortable free volume of air, caused by maximum suction w/minimum friction"

introducing an unfamiliar stimulus, replacing (bypassing) the conditioned response

cannot take charge of individual parts of body and separately order them to move

"order the product" -- not the individual stuff

importance of being an artist -- "storyteller of sound"

"play your best, feel the least"

"play your worst, feel the most"

"you don't have to feel good to sound good"

comfortable use of air volume

listening is a question -- playing a statement

playing for an imaginary audience -- communicate a message

imitative, creative -- think of Bud Herseth

what do you want to sound like?

play by 85% singing, 15% blowing

chops are like vocal cords, not woodwind reed

do *not* substitute shape change for volume of air -- body can "lie" to you

air into the mouth, not the body

large volume of air -- time a secondary factor

[there are a couple of diagrams in my notes here, illustrating that Jacobs wants you to play with a lot of air in your lungs -- when they're getting close to empty, take a breath instead of continuing to play until your lungs are empty]

6/27/89

same pitch -- regardless of instrument -- takes the same effort -- e.g., 440cps takes same effort.

-- they tried it w/trumpet, 'bone, tuba

low C maybe 5 oz. pressure; middle C, 10; high C, 20 (intra-oral pressure)
intra-oral pressure to play a given pitch is same on any instrument but lip tension varies
from player to player

find least effort -- not most

659 muscles, 654 paired as antagonists

use minimal motor effort

trumpet high-pressure, low-flow rate

tuba low-pressure, high-flow rate

"to protect high range, low notes should be as free as possible" -- low pressure

fiber groups inside lip muscle change shape

"embouchure develops because of music you play" -- 5th cranial nerve

7th cranial nerve is the motor nerve

hypertrophy -- development of muscle fibers -- enlarged tissue inside embouchure

work from sound back to embouchure

guide sound, not lips

start with crudity, develop skill

piano: motor face (vibration), resonance

trumpet: resonance; player has to provide pitch

horn amplifying what player puts in

work from product back to means

abdominal muscles are the primary expiration muscles

diaphragm -- muscle of inspiration

free use of physical properties better than limited use

avoid isometrics --

abdominal muscles pulling in cause air to move out -- expiration

minor respiratory problems -- "sub-clinical asthma"

hyperventilation lowers CO2 level in blood

hear self play -- after playing -- what did it actually sound like? Compare that with what wanted to sound like

focus air -- *not* at embouchure -- at ball in device, or wherever it's going [Jacobs was using a breathing device that involved blowing air into a tube in order to keep a ball airborne]

intelligence -- coping w/external stuff -- lower level of brain activity takes care of internal stuff

head plays horn -- not individual parts -- "storyteller of sound"

take in large quantity of air -- "waste it"

be concerned with what's *right* -- not what's wrong
the device [again, Jacobs is using a breathing device] makes the subject temporarily aware of what's involved in breathing; then, they forget and just breathe

"get out of the way" of part of brain that controls breathing apparatus

think of air outside lips -- not inside

horn is a stimulus of habit -- avoid it when practicing new techniques

lip as a source of *vibration* -- not resistance

"starvation of the embouchure" can result from inadequate air

effort is resultant, not causative of music

try hyperventilating, then holding a long note -- 30 seconds

"don't be knowledgeable about methodology -- be knowledgeable about music"

tongue does not function in tone production, but can be used to alter tone quality

note takes sufficient volume of air -- don't starve embouchure

"thick air"

embouchure needs volume of air -- not just pressure

pressure is a *product* of motion

speech reflexes (vowel sounds) can be used to move tongue -- "ah" "oh" "oo"

instead of Ta, think tA -- vowel has priority -- *it* is the sound, after all

segmentation ("double buzz") caused by insufficient volume of air at lips -- breath, not embouchure -- air
"thickness"

break into phrase if necessary

learning is a sensory activity, talking/playing a motor activity

don't waste time thinking about muscles

"ignorance of body, knowledge of sound"

-----> **narrow it down to 85% song, 15% wind**

tone "sitting on column of air"

tape recorder, mirror important tools

don't go by feel -- when sounds good, it'll feel good

6/28/89

You start breathing the moment you're born -- why try to strengthen breathing muscles? They already work 24 hours a day

Athletic exercise that requires more air causes larger volumes of air to be used
the big danger is *isometrics* -- simultaneous opposing muscles applied

strength is needed, but not strength of abdominal muscles -- strength of air column is important

-- making music brings about adequate strength

body strength and blowing strength are two different things

in abdominal muscles, "weakness is your friend"

standing posture is the best for breathing

pressure -- reduction in volume of air

you can generate the same pressure with almost-empty lungs as with full lungs -- won't do you much good, though -- don't let "tank" get below 1/3-1/2 full

differentiate between air *pressure*, wind -- think *wind* -- air pressure can exist w/o wind, but no wind w/o pressure

"song and wind" -- song is all the motor functions involved in tone production

-- don't think of pressure behind lip -- think wind outside

keep sound even in all registers by *conceiving even tone* in brain -- don't go by *feel* of body

a little knowledge is dangerous -- don't use it to control body -- control *sound*

you learn to control sound, and in so doing, you learn to control the underlying apparatus

as you study sounds, other levels of body learn to control the physiology

"when you control the sound, you've controlled the meat"

length, thickness, and tension of vibrating surface

when embouchure "breaks down," that distracts player -- brain stops sending motor signals, starts concentrating on sensory signals -- player has to ensure that brain is still sending motor messages, rather than "asking questions"

form the attitude of sending messages -- "make people think you feel great"

treat the embouchure like the voice -- say something with it

"don't stabilize embouchure -- stabilize the music"

high register -- re-do (in high range) what made you good in middle range

"go to the product" -- forget the feel

don't worry about the start of the note -- get it, hold it, improve the note

-- try high note w/just mouthpiece

short phrases -- not too long -- 4-6 seconds -- play music in high range w/just mouthpiece

lips are tough -- can take abuse -- because have a good blood supply

the *end result* is what counts

no need for fixed (any particular) posture

try Herbert Clarke solos

be flexible -- if one area impaired, make up for it with another area -- flexibility of body activity

a high note is merely a fast vibration

it's a developmental process -- an experience you go through -- experimentation, not strength or rules

-- part of musical insights

become a fine musician in high register -- try some vibrato on high phrases

"focus air 2 feet in front of you"

blow up a balloon in front of you

in high range, air in lungs is at higher pressure, so volume is less

wind should blow in large quantities

air *volume* under higher pressure -- not just high *pressure*

thick air -- get tongue out of the way

never ask student to change something that works

active air -- not muscle activity

habits acquired through meeting challenges

interpreting music vs. trombone playing

mental preparation for musical "storytelling"

if something goes wrong, make the next thing better

phrasing, solfege study important

singing a phrase/tune/whatever before playing

increase the "mentalization" -- not physical activity -- "have the brain of a singer" -- pitch recall and recognition

"cut off a slice of excellence on each note"

think of words, on proper pitch, and vocalize them

get French horn off lap, hold it up so you're not bent over

play as authoritatively as if you had music memorized

back should have length -- it's OK to lean against back of chair if you want

stretch toward ceiling

practice breathing in front of a mirror -- away from the horn

sit tall -- allow ribs to come up as lungs expand

don't spend a lot of time preparing embouchure

6/29/89

thin, thick air -- pressure/volume

thin air is like pushing w/one finger

thick air is like pushing with whole hand

"key" (thin air) "HO" (thick air) "ah - oh -oo" (thick) "sssssss" (thin)

air decreases in velocity after it passes the tongue

shape of embouchure

sufficient volume, pressure of air needed for embouchure to function

too thick an air column is better than too thin

you can generate plenty of air *pressure* even with almost empty lungs -- but not *volume*

don't try to get to the end of a phrase w/ thin air except where needed for "veiled pp"

think slow-fast air speed

dynamics -- "fuel supply"

take reflexes of speech

T is 100% momentary cessation of movement -- the tone is the vowel
-- the consonant is silent -- minimize it

air isn't a phenomenon of sound -- it's a means to vibrate embouchure -- buzz should dominate

"thick air" -- think of vowels -- aaah

reflex response to stimulus

order wind outside -- not inside

"childlike simplicity" -- play with thick air, which is *wind* not *pressure* per se

complex thoughts are fine for musical interpretation, but not for blowing the horn

muscles work in systems, not as individuals

insane people can still have good muscle control

become a great musician -- don't worry about how you do it

overcome *musical* challenges

play by *song and wind*

when nervous, breath is rapid, shallow -- run-or-fight syndrome
normalize body by taking long (5 seconds), slow breaths -- very full
for an audition, learn music vocally, do a lot of slow, deep breathing

to open airway, practice vowels -- to get tongue out of the way

drop jaw, rub floor of mouth w/tongue

inflated cheeks don't matter much

to communicate the way of taking a quick breath by studying a slow breath -- learn
quantity first -- air as volume -- slowly exhale -- 5 beats at mm 45 or so -- then inhale for
5 beats

study in 5/4 time -- 4 beats of exhalation (slow mm 45-60) 1 beat of inhalation

for fast, try exhale for 3-1/2 beats, inhale for 1/2 beat

go full-empty-full -- "frog-to-tip" -- do these in front of a mirror

study breath as breath -- away from horn

blow in and out at same volume/velocity

breathe in and out with syllable "oh"

a full breath involves all the respiratory areas
by doing so, you involve wide areas of musculature, so no one muscle group has to
work very hard -- generalized lower respiratory tract has a lot more capacity, but the
whole thing should be used -- *general* reduction and enlargement

breathe *to expand* -- not vice versa

suction w/minimal friction

"turn on tapes" inside your head -- recall, recognition

ink spots become sound if you study solfege

play, then stop and hear yourself -- then try hearing it again the next morning

hear a phrase played by the worst, then the best player you can imagine

brain flooded with sound as you conceive them

"Do I sound like what I wanted to sound like?"

for intonation on valves, keep internal standards high -- "bio-computer" signals will try to fix

DO NOT try to play in tune -- establish tone quality internally, then bring in intonation

find qualities on open tones, then figure out whether it's you or the horn

find the best note on the horn (euphonium etc.), and make the others sound like that one

get the best possible sound, and then match that *sound* on the other notes. match *quality* first, then do whatever is necessary to fix intonation

buzzing w/o mouthpiece -- benefits and costs: doesn't isolate to specific fibers that work when you've got mouthpiece or rim -- better to do on a ring -- back pressure should be less on horn than on ring

when Jacobs practiced on mouthpiece while in hospital, he came home and played much better -- after doing a lot of mouthpiece work -- disrupts old habits

play all kinds of *music* on mouthpiece; not exercises, *music*

stay away from high notes on ring -- do low notes to get lip to vibrate

"get the notes -- when you have the notes, you'll have the embouchure"

don't spend a lot of time setting embouchure

sufficient contact pressure -- isolate tissues that shape lip

"no pressure" doesn't work well -- some pressure on upper and lower lips

play for audience -- real or imaginary

sit up tall -- keep the height when blow out

a little sub-clinical asthma can be caused by pollutants -- bronchial dilator can help

when practicing, experiment by getting "as wrong as possible," then right

think of tone as a ping-pong ball held up on a "fountain" of air

slice the line of notes off at any point and find the same ingredients as anywhere else

brain should issue statements, not ask questions -- talk to somebody else, not to yourself

look for [expansion] upon inhalation -- enlargement

don't fight the conditioned reflexes brought on by horn -- put horn away and practice breathing w/o it -- w/o horn, you can consciously think about how you're doing it

like a karate chop -- don't chop *at* the board; chop *through* the board

breathe in and out of breathing bag for 15-20 seconds -- try it in front of a mirror [this was another one of Jacobs's devices -- a bag you breathe into]

3 times in and out w/just the tube -- more, and you hyperventilate

6/30/89

separate thoughts -- sensory awareness a reinforcement to playing -- feeling is not that important -- it's a "question"

"it doesn't have to feel good to sound good"

"when you feel the most, you sound the worst"

intelligence has to do w/relationship to environment -- not internal stuff

when we play, we're actors -- using motor activity to impart knowledge -- to influence the environment -- imparting, not gathering, info

establish ability to impart -- send info

audition nervousness is made up of questions -- *statements* are the idea

imbalance between sensory, motor activity is a problem

stop and think "what would a great artist sound like on this piece?"

what do you want the audience to hear?

a nerve is a one-way street

rather than correcting things that are wrong, imitate what's great!

conditioned reflexes -- response patterns -- are associated with holding the horn

mouthpiece playing helpful -- make music on the mouthpiece

differences among individuals OK

go with the results

facial muscles not bonded by connective tissue

don't set rules for how embouchure should be set up

exaggerate -- turn grey into black, white

circular breathing -- for rapid replacement of breath, e.g., end of Bruckner 7 adagio c-sharp -- set up a beat -- 60 or so -- blow air out of cheeks on each beat -- then try inhalation on each beat -- then alternate

T is silence, A is sound, in "TA" syllable

embouchure should be a source of change, not stability

don't go into self-analysis "what's wrong?"

concentrate on motor impulses/activity

you can't "fill" a bass trombone -- it's already full of air -- you need to increase vibration

keep body tall at all times -- don't alter the spinal column posture

"always tell your body the truth" -- don't order methodology, use the "control panel" -- keep instructions simple

expansion does not equal breath -- but with a lot of breath, there's got to be expansion

air in the oral cavity -- "breeze" inside the mouth

think of a bell at the correct pitch you're about to play -- "hit" yourself with the bell

be like a piano, moving from one octave to another

"take the excellence of the norms" and transfer it to the extreme areas -- transfer the quality of the middle octave to the upper and lower -- keep going back to the middle octave to keep the tone quality in mind

improve pulmonary function by practicing inspiration off the horn

keep friction at front of lips, feel air w/lips

put mouthpiece into tube, breathe into other end -- breathe slowly

feel air in oral cavity -- not in the body

do 3 complete cycles -- you'll hyperventilate on the 4th -- stop breathing momentarily

practice this stuff away from the horn, to avoid the conditioned reflexes -- when it becomes a physical skill, transfer it to the horn

breathe through the tube [here, Jacobs is using a few inches of garden hose or plastic tube, 7/8" internal diameter], in front of mirror

train the brain -- not just lip -- sing w/voice

try interpreting the same tune different ways

[That's the end of the 1989 class. What follows are my notes from the 1990 class.]

6/25/90

began teaching c. 1932-3

studied with Edward Whitfield, Abe Torchinsky

studied biology, anatomy as a hobby

complex structures, but simple thoughts -- stress art, not science

specific thoughts that produce motor activity

far more benefit from simplicity than complexity

human aspects of playing

- receiving external info
- "bio-computer" parts of brain control body
- leaves mind free for other thoughts

ability to influence external environment

- motor, sensory nerves

playing is motor activity -- hearing sensory, learning sensory, playing motor

"a worried brain opens wide for sensory input"

embouchure vibrates like a set of vocal cords

"find notes with the brain, not the lip"

motor activity, pitch vibration, resonance

breath pressure brings about closure -- breath *motion* (wind) is the thing

individuals vary greatly in lung capacity

efficiency of tone production

relax abdominal muscles -- "minimal motors"

659 muscles, 654 paired as antagonists

"changing directions"

don't think of correcting bad habits, think of adding ability -- "fighting" bad habits renews them -- instead, add new habits

"don't play by phrase; *create* the phrase"

statements, not questions

the musical art form is communication -- don't play great trumpet, *sound* great

no need to spend half a minute getting mouthpiece set

how easily can you do a task?

large flow, based on weakness, is what you want -- like a bow arm -- don't think of building strength

depend on brain, not lip

"bad playing can be made into good playing; silence can't"

"protect the ends of phrases" with air

hyperventilation is a shortage of CO₂ in blood

"song in the head"

air goes in, out the mouth -- abdominal expansion contraction can "lie"

"song and wind" -- soft = slower wind speed

control sound to control tissue, not the other way around

diaphragm has no position sense (nerves) so you have to go by other indicators

6/26/90

learn through info from sensors

activities that influence ... are motor, but you can be analyzing stimuli at same time -- always a mixture

-- but focus on difference between learning (sensory), communication (motor)

brain constantly compensates for "falling" one way, the other

sitting in judgment of oneself destructive -- think of a role model instead -- e.g., think of Bud Herseth, or at least conceive of what great playing sounds like. avoid "paralysis by analysis"

playing as "talking" to audience

gather info through receptors, impart through effectors

study of solfege helps ear -- make up words for a tune

embouchure as vocal cords -- use them

Jacobs used to play string bass in dance bands in early 1930s

embouchure radiates out from center

mouthpiece rim isolates tissue

don't follow rules -- find out what works for you -- the only rule is you've got to sound good

approach it from the product, not the method

maximal efficiency, minimal motors -- always try to find an easier way

too much air pressure causes lips to create resistance

"weakness is your friend" -- when it comes to muscle contractions

sensory awareness in breathing should be as far forward as possible

"air, not air apparatus"

replacement breaths should be the same size (approx.) as initial one

practice breathing in for 5 beats, out for 5 -- in, out in succession

then, let air out a third at a time -- in, a third at a time

5/4 time -- exhale for 4 beats, inhale for entire 5th beat -- then, 7/8 time -- 7 8ths out, 1 8th in

diaphragm used to lower air pressure within body -- pulls air in

blow out a match at arm's length

"standing posture while seated" -- "standing from hips up" while seated

a missed note is just a wrong frequency of vibration, usually caused by wrong motor impulse

hearing notes -- "two voices, horn, inner voice"

solfege helpful

take in maximum breath, count "one... 2...3...4" while keeping air in

don't substitute a blockage for a note

think of air further forward -- not "at" tongue

more quantity of air, less pressure to get it there

"protect high notes by making them sound great"

slow, quantitative (measured) inhalation can combat nervousness -- slow, measured -- then, have something to say to audience

don't set up contests between closure, air

think parts; don't just practice them

awareness of "mentalization"; less "physicalization"

as fatigue sets in, "sing louder in head"

"the worse you feel, the more musical you should think"

don't always start excerpts at the beginning

"Don't wait 'til you feel good; you can sound great when you feel lousy!"

6/27/90

Skill developed out of crudity

things won't be great right away -- it takes awhile

focus attention on air at the lips -- in, out

mirror a useful practice tool

Jacobs says don't drop jaw -- open lips, breathe in corners -- no need to drop jaw

if you put the right note in, the horn, will amplify it

stay within the art form -- don't get hung up on athletics, engineering

bringing on hyperventilation (moderate) before playing a long phrase (45 sec)

muscles paired as antagonists lend selves to tension

simple thoughts

lots of flow, not much back pressure, nice song

don't spend a lot of time setting embouchure

work from signals inside brain

6/28/90

understand how things work (underneath the surface), then forget about it

somatotype has a lot to do w/lung capacity

tongue can increase, decrease size of oral cavity

shape of mouth cavity changes tone

use tongue movement as speech -- language patterns

don't try to control air with tongue -- control tone

tongue can, with speech patterns, move around -- address psychology, not anatomy

practice air without instrument

practice thin, thick air

space, not closure

make good contact with the mouthpiece before you start playing

you don't need to inhale all the way, generally

avoid "pseudo-activity" of breathing

if you send the correct pitch into the horn, it will amplify it

repetition as "brain training"

"who, too" -- "who" provides rhythmic air attack -- aspirant -- "who"

"laughter" -- adding an h consonant -- blow in rhythm, as well as tongue

recorded sounds are slightly different from live -- often recorded trumpet, horn sound brighter -- watch out for sounding like recording

[That's all the notes I have, from the 1990 class.]