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IN JAZZ

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ABSTRACT

Multiphonics is the production of more than one tone at a time from an instrument that would normally play a single line. The aim of this work is to identify and explore the elements of multiphonics as played by jazz brass players and to examine the production and development of multiphonics with particular reference to Albert Mangelsdorff's¹ mature technique. The research procedure includes a literature review, transcription and analysis of relevant music, and reflection on personal practice. The findings and discussion are used to draw conclusions in order to derive applicable testable techniques. The research points to where the accretion and extension of Mangelsdorff's playing style may lead, and demonstrates the acquisition of discovered multiphonic techniques by the performance of transcriptions and new or extended musical applications of multiphonics in two recorded assessed recitals.

The body of the paper gives brief biographical information on the main practitioners, with specific focus on how each of them acquired particular technical elements. Reference is made to prior research and specific recordings and players are mentioned in regard to their innovations and stylistic techniques. Elements were discovered and explored in the researcher's own practice over the previous decade and specifically the duration of the masters study from February 2008 – June 2009, and the effects of various approaches and exercises are discussed. This discussion includes the areas of mental and physical preparation, limitations and parameters of the physical playing, and the method used for developing multiphonic technique.

The summary identifies the main findings and makes specific reference to how they might relate to practice. It suggests areas where further research can be developed to support the acquisition and practical application of

¹ Albert Mangelsdorff, German trombonist born 1928, died 2005

multiphonic technique and extended techniques in brass performance.

The work is presented as a paper and accompanying DVD that demonstrates findings as played by the researcher in live recitals.

LITERATURE REVIEW

McKenney Davidson, Michael. *An Annotated Database of 102 Selected Published Works For Trombone Requiring Multiphonics*. DMA Research document, 2005, Cincinnati.

Accurate technical information on multiphonic production is found in this doctoral thesis. It has a useful section describing the various notations of multiphonics and divides the pieces into various categories of usage based on the type of multiphonic technique employed.

[Paulot, Bruno](#) **Gesprache: Conversations with Albert Mangelsdorff 1994**

A German Language book with biographical information, substantial conversations with Mangelsdorff and several others close to him such as His brother Emil, some of his contemporary musicians, music critics, experts and journalists. Contains much useful information on multiphonics and solo playing, and also is clearly the pre-eminent resource on Mangelsdorff.

Masterclass with Dick Griffin: Multiphonics on the Trombone

Bernitas, Bob <http://www.trombone.org/articles/library/viewarticles.asp?ArtID=85>

Article with some practical discussion on producing multiphonics with reference to Griffin's own performance with such as Roland Kirk.

Baker, David. *Contemporary Techniques for Trombone* out of print

This book by ex George Russell trombonist and Jazz educator Baker suggests performing 2 part inventions, and contains a chapter with some information and exercises to develop multiphonics.

Jazzpages April 11, 2007

http://www.jazzpages.com/Mangelsdorff/index_e.htm

Author Frank Schindelbeck is a Jazz photographer/radio broadcaster/journalist/blogger who writes about jazz, mainly in the German language. This webpage contains a time-line of Mangelsdorff's life and includes quotes alongside biographical information pertaining to his career and trombone playing. It also has mp3s of representative tracks from Mangelsdorff's albums and links to related pages. It describes the influence of Lee Konitz on his playing. The page has a link to a comprehensive discography by Schindelbeck

(http://www.jazzpages.com/Mangelsdorff/disco_d.htm#top) categorized chronologically into recordings as a leader and as a sideman, with columns of information on the record label and number, other musicians on the recording, and the instrumentation. He produced more than 60 recordings as a leader (although most are out of print).

In Memorium: Albert Mangelsdorff 1928–2005

<http://www.allaboutjazz.com/php/article.php?id=18950> sept 10 2005

Kumpf, H. Hampel, G. Dauner, W. Weber, E. Surman, J. Breuker, W. Lindberg, J. Lewis, G. Phillips, B. van Hove, F. Favre, P. published in All About Jazz, <http://www.allaboutjazz.com/newyork/> Brief obituary and biographical article on Mangelsdorff.

This article was written by former sidemen and top European musicians who worked closely with Mangelsdorff and fellow trombone innovator George Lewis. It provides their brief insights and remembrances of him, collected shortly after the time of his death. There are revelations of his quiet, open and warm character, his development of an original voice, multi-phonics,

and his musical interest in, and study of birdsong. This is rather unique information.

“Albert Mangelsdorff; A Legend at 75”, article by Henkin, Andrey. , October 20 2003 <http://www.allaboutjazz.com/newyork/>. Henkin is the Editorial Director and Production Designer for All About Jazz – New York, a jazz magazine.

Contains a brief article outlining the life achievements of Mangelsdorff and containing biographical information and quotes which reveal a little about his multi-phonic technique and how he developed and practiced it. There are also quotes from a couple of sidemen, and a description of a gig near the time of writing.

Albert Mangelsdorff, a Strong Pair of Chops

<http://www.iht.com/articles/1997/11/21/mangel.t.php>

By Mike Zwerin International Herald Tribune

Friday, November 21, 1997

Zwerin was the trombone player in the Birth of the Cool band (sharing the chair with JJ Johnson), and has written several books on jazz, as well as contributing to many magazines and papers as jazz critic, including the Village Voice through a journalistic career of 5 decades. He mainly plays bass trumpet, a variant of a valve trombone.

This light-hearted article speaks of Mangelsdorff's dual roles as a player, and as artistic director of the Berlin Jazz Festival in 1995–97 (he may have continued the role after this). There is a brief biographical part, a few comments about his technique, and a few quotes about playing and directing the festival from Mangelsdorff. Mangelsdorff seemed to be parochial towards local German acts, and dutifully listened to all recordings sent him from beginning to end before making decisions. These were clearly artistic choices, and not influenced by the drawing power of names at all.

Motivische Arbeit im Jazz. (English Title: Motivic work in jazz)

Article in a periodical **Author(s):** [Glawischnig, Dieter](#) 1969

[Jazzforschung / Jazz research, Austria](#) Vol. I (1969) 133–39. Music examples. In German; summary in English

An analysis of four blues choruses by the trombonist **Albert Mangelsdorff**. **Mangelsdorff's** improvisation, which can be traced to a single motive. This is different from the form of 'chain development' improvisation that obtains musical segments by deriving them from the immediately preceding material. An organic correspondence exists in his work not only between small melodic segments but also between complete phrases and longer sequences. The analysis demonstrates that all four blues choruses are logically connected.

<http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,cookie,url,uid&db=rih&AN=1969-04645-ap&site=ehost-live>

Database: RILM Abstracts of Music Literature

Mangelsdorff, A. Three Originals CD recording 1993, MPS Masterseries 519 213-2

This CD includes 3 recordings originally issued on vinyl as *The Wide Point* 1975, *Trilogue* 1977, and *Albert Live at Montreux* 1980. The musicians participating in these trios include profile musicians Jaco Pastorius, Elvin Jones and Alphonse Mouzon. The CD has informative liner notes by Werner Stiefe, a contributor to AUDIO magazine. The recording contains much multi-phonic technique, lip trilling and quartal linear playing in the free/jazz idiom, while some tracks lean more towards jazz/rock vamps. There is also a second volume of three originals from Mangelsdorff packaged under this title.

[Sandner, Wolfgang](#) Frankfurt, Germany, 1972

[Jazzforschung / Jazz research, Austria](#) Vol. III–IV (1971–72) 166–71.

Shows Mangelsdorff's style of jazz improvisation is characterized by thematic development of distinctly melodic motives, by structures built on modulations inherent in the melody, and by disguised or intricate rhythmic patterns. (Franz Kerschbaumer, abridged)

Accession Number: 1973–04154–ap

Database: RILM Abstracts of Music Literature

Fiedler, Joe. Plays the music of Albert Mangelsdorff, 2005

(CD recording) **Accession Number:** 2006–01381

New York based trombonist Joe Fiedler's recording of a tribute to the critically feted German jazz trombonist Albert Mangelsdorff with his New York trio. The CD contains multiphonic playing throughout versions of Mangelsdorff's middle period compositions.

[Sandner, Wolfgang](#), A jazz portrait of Albert Mangelsdorff

(Article in a periodical) 1977. **Source:** [HiFi–Stereophonie, Germany](#) Vol.

XVI/7 (1977) 814–18. In German **Accession Number:** 1977–01305–ap

<http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,cookie,url,uid&db=rih&AN=1977-01305-ap&site=ehost-live>

Biographical information and some discussion of multiphonic production.

Mangelsdorff, Albert, *Purity* (CD recording) MPS 1990

This CD serves as a source for five transcriptions and analyses found in appendix I. The solo recording shows many aspects of Mangelsdorff's mature multiphonic technique. Other relevant recordings are cited in the references sections. In addition to the cited CD recordings, the researcher listened to over 200 tracks by Mangelsdorff (many available on the MPS label) and others during the course of the research.

WHAT ARE MULTIPHONICS?

Multiphonics (literally *many sounds*) are achieved by the player singing into the trombone at the same time as they play another note that is buzzed with their lips. It is commonly used by Didgeridoo players, and less commonly on other wind instruments. As with most advanced techniques, multiphonic performance requires some practice to gain control of the pitches and sounds produced. Because the waves of the notes both interact through the instrument, the resulting sound is rich with harmonic overtones, creating a characteristic gruff and otherworldly timbre.

Sound

The two elements are 1) buzz and 2) voice

Parameters

As the waveforms are emanating from both the same body and passing through the instrument, a change in any one parameter of buzzed or voice effects the other to a greater or lesser degree

buzzed note

The frequency and tone colour is largely determined by:

- The reinforced formants of the horn
The tubing length defines the fundamental wavelength and by multiples of that wavelength, the resonating upper harmonic partials of that basic tube length. That is to say; each partial is a multiple of the fundamental frequency
- Embouchure setting; lip tension, aperture width, horn pivot angle², setting of the mouthpiece on the lips

² For further information, see Dr Donald Reinhardt's book *Encyclopaedia of The Pivot System*, Colin, 1973

- Air pressure and support (speed of air, stability of air, balance of low abdominal or high chest support)
- Tongue vowel form
- Posture
- Volume; the audibly measurable result of the interaction between the air pressure and embouchure

Sung note

The frequency and tone colour is largely determined by:

- Pitch; rate of vibration of the vocal chords determined largely by the tightening and relaxing of the glotis³
- Tonal quality based on relative volumes of the sung note and its present overtones (head =falsetto voice or real voice, vowel sound, nasal, throat and chest resonance (a look at Tibetan and Tuvan throat singing is appropriate)
- Volume

Both Played and sung notes in combination

The combined frequencies and tone colours are largely affected by:

- Amount of consonance between the frequencies of the buzzed/sung tones

Complexity of the beat frequencies and resultants (both upper ADDITIVE OVERTONE the sung and played frequencies added, and lower DIFFERENCE TONE, the upper subtracted from the lower frequency. These resultants are measurably heard, although softer. It is conjectured as likely that the resultants interact to create further very soft over and undertones that contribute further to the timbre)

- Volume of each element

³ from

http://journals.cambridge.org/download.php?file=%2FJLO%2FJLO23_12%2FS1755146300182083a.pdf&code=5768b8988c7b7cd7b5d589f01343f27c , Article accessed 12/6/09

- Reinforced formants of the horn tube length (can be filtered slightly with a plunger mute) lips, oral cavity, and voice
- Room acoustics and combination with other instruments

Ways to practice multiphonics (see appendix vi: practice routine)

One part and then the other separately and then together (swap parts?)

1. With lips & voice alone wearing one ear plug (to hear resonance) ⁴
2. With mouthpiece alone
3. On horn

JAZZ MULTIPHONICS PRACTITIONERS

Multiphonics pioneers

Didgeridu (aboriginal wooden trumpet) and pukaia (maori trumpet)

The practice of playing on these long hollow wooden instruments go back into the mists of time, with the Aboriginal style of didgeridu playing being a very ancient art form. The musical usage generally reflections nature sounds and evokes the dreamtime or mystic realm of the spirits. This dreamtime is a representation of the super conscious or metaphysical as experienced by Aboriginals, and has parallels in the Maori mythology and spirituality, as in the western heaven and hell. On recordings such as Aboriginal Music of the Land (Applause 40482) the animal sounds of Australian birds, dingos and rivers can be heard being imitated. The techniques on this recording include circular breathing, manipulation of the upper partials by mouth cavity shape, and Multiphonics sung intermittently with the played drone. Conch shells have also been used as a primitive trumpet but generally not with sung multiphonics, although the researcher's practice has shown it to be possible and effective on conch shell.

⁴ suggested by Albert Mangelsdorff in Gespräche p 120

Multiphonics are possible on most wind instruments, such as saxophone, flute, oboe, clarinet, bassoon. They vary in performance difficulty as these are all a form of split multiphonic, where the same vibration source is made to produce two frequencies at once. A fine control of the embouchure and knowledge of alternate fingerings is required. John Gilmore and John Coltrane were pioneers on saxophone, whose idiom was extended on by the likes of and Albert Ayler, Pharoah Saunders Michael Brecker.

Jazz Brass Players

Precedents to the flowering of Multiphonics in the 60s can be traced to the more vocal and guttural side of the playing of **Louis Armstrong** (trp), **Kid Ory** (trb), **Bubber Miley** and **Cootie Williams** (trps), **Sam Nanton**, **Juan Tizol** and **Lawrence Brown** (trbs) of the early Duke Ellington Band, and characteristic blues and swing Trombone players **Vic Dickenson** and **Dickie Wells**.

One of the pioneers of Multiphonics in jazz, certainly in the European free jazz scene in 1960s, **Paul Rutherford** developed a singular way of playing that could be seen as a parallel to the art of the free expressionists and Jackson Pollack. Rutherford was a major innovator who specialized in a quite different, more avant-garde textural Multiphonics usage that was less harmonically functional than Albert Mangelsdorff. He did not use them so much to define harmony, as for textural and timbral coloration. This way of utilising Multiphonics is similar to **Eje Thelin** from the 1970s on, and seems to have influenced the playing of **George Lewis**, **Gunter Christmann** and **Wolter Weirbos** among others.

Gunter Christmann was a colleague of Albert Mangelsdorff and Paul Rutherford in many performances of the Globe Unity Orchestra, and on *White Earth Streak* (1981) he shows a command of the range of the trombone, and experiments with all sorts of avant-garde technique including Multiphonics and sounds that appear to be particularly influenced by the free players, **Paul Rutherford** and **Roswell Rudd** and the improvisational approach of free-jazz guitarist Derek Bailey.

.... Sounds of Kid Ory and George Lewis, the earlier of the two jazz greats by this name -- ironically both have a link to this German musician. The New Orleans players beckoned him into their world of joyous extrapolation with their fat, swaggering tones. The younger George Lewis, a Chicago trombonist from that city's Association for the Advancement of Creative Musicians, was one of many young improvising trombonists who would be inspired by Gunter Christmann's fluid use of newly invented musical language on that often cumbersome and difficult to control instrument.

–Eugene Chadbourne , *All Music Guide*⁵

Germans **Conrad Bauer** and his brother **Johannes** have various ways of utilising multiphonics on trombone, with the timbral and textural free playing, as well as introducing a more melodically and harmonically function to the tones. **Christian Muthspiel** and players such as **James Morrison**, **Nils Wogram** and **Nils Landren** have carried on this chord–spelling melodic and harmonic path. Ray Anderson plays a very rambunctious style of jazz trombone, borrowing from New Orleans, free jazz, funk and swing styles to create a distinctive syncretic mix that sometimes includes the use of multiphonics, as with his trio group bassdrumbone⁶.

With his trio, New Yorker **Joe Fiedler** has researched Multiphonics by listening, transcription and performance, his recordings following Albert Mangelsdorff's path. Two musically satisfying CDs, *Joe Fiedler Trio Plays the Music of Albert Mangelsdorff*, and *The Crab* show his influence. Both can be found on the catalogue of Clean Feed records.

With his group Root 70, young German trombonist **Nils Wogram** occasionally uses trombone multiphonics, usually as accompaniment in his quartet that does not have a 'chord' instrument (the instrumentation is

⁵ From All Music Guide

<http://www.emusic.com/artist/Gunther-Christmann-MP3-Download/11590221.html>

⁶ An example of Anderson's trio playing can be found at

<http://www.youtube.com/watch?v=PgE8frHTOrQ&feature=related>

Trombone, Alto saxophone, Bass, Drums). His multiphonic chords are often based on the stable self-reinforcing intervals such as 5ths, and Wogram demonstrates astounding facility, an accurate ear and voice pitching in all situations⁷.

James Morrison is a strong musician and entertainer whose work is within the bebop and straight ahead jazz idioms on trumpet and trombone, as well as piano and other instruments. He uses consonant parallel Multiphonics (mainly 10ths and 11ths) to functional effect on Autumn Leaves From his 1990CD Snappy-Doo⁸

"Autumn Leaves" has no overdubs. It is simply James playing triple-stop on one trombone and is a gem all round with every facet glistening.

-Len Barnard ~ Sydney 1990⁹

Among those to record solo trombone albums incorporating Multiphonics are **Conrad Bauer**, female player **Jen Baker** (Blue Dreams), **Samuel Blaser** (Solo Bone) and avante garde player, computer music programmer and author **George Lewis** (The Solo Trombone Record)¹⁰. Other Trombonists who have utilised Multiphonics effectively in Jazz include **Bill Watrous**, **Phil Wilson**, **Wolter Weirbos**, **Dick Griffin**, **Roswell Rudd**¹¹ and **Nils Landgren**¹².

A distinctive and innovative Polish contemporary trumpet player is **Tomasz Stanko**, who follows the direction initiated by Miles Davis and Lester Bowie. His music is spare and lyrical, with a group focus, as demonstrated on his many recordings for the ECM label. Stanko sings in his baritone voice,

⁷ Wogram can be heard at <http://www.youtube.com/watch?v=yQ5NHgO10AA>

⁸ Snappy-Doo MRA Entertainment/Morrison Records MR025

⁹ <http://www.jamesmorrison.com/index.php?page=snappy-doo>

¹⁰ <http://www.allaboutjazz.com/php/article.php?id=31830>

¹¹ Rudd plays some Multiphonics on <http://www.youtube.com/watch?v=pILOLfmeiWU&feature=channel>

¹² Dick Griffin played initially with Raasan Roland Kirk, Nils Landgren with his Funk Unit, while Rudd contributed to the October Revolution and was sideman with the likes of Cecil Taylor and Steve Lacy. Weirbos is entrenched in the Dutch free scene.

generally without falsetto, so the sung notes are below the played ones. He tends towards a very occasional use of consonant Multiphonics within the single note melody lines. The effect is gruff and consistent with the flow and mood of the improvisations.

Performing on trumpet and voice, **Matt Schulman** is a young emerging player from the “Knitting Factory”¹³ scene New York, who has won second place in the Thelonious Monk Trumpet Competition, and put out two recordings that showcase his Multiphonics on trumpet, as well as his burgeoning vocal renditions of standards and originals in a style similar to Chet Baker. Like Mangelsdorff, his multiphonics generally use the voice above the played tones in functional harmonic situations, showing his strong tenor and falsetto ranges.

On his recording of Kelly Blue from *Gravity* (2003), **Howard Johnson** can be heard to use Multiphonics in an extended cadenza section based on the 5th, 6th and b7th of the blues chord structure. Johnson says he uses his voice range, as “I don’t have a falsetto”¹⁴ **Earl MacKintyre**, **Bob Stewart**, and **Joe Daley** are others who have worked with Johnson in his tuba band Gravity¹⁵, and recorded improvised Multiphonics on tuba with accomplishment¹⁶. The low tuba range and sound makes a very effective blend for Multiphonics lines and resultant overtones can be heard clearly above the played lines, particularly at consonant intervals such as 10ths, 5ths and octaves.

Nat Mackintosh on Sousaphone can be heard on YouTube¹⁷ video clips to borrow from Øystein Baadsvik’s beat-box technique transferred onto

¹³ The Knitting Factory was a New York venue and hotbed for the new generation of modern jazz/avante garde players of the 80s through to mid 2000s.

¹⁴ From an Email correspondence between the researcher and Johnson, 14th Dec. 2008

¹⁵ Gravity!!! Audio CD May 21, 1996 Label: Polygram Records ASIN: B00000472B

¹⁶ Witness Stewart in performance with the Arthur Blythe Trio in 1996

<http://www.youtube.com/watch?v=aID0F96rgdo>

¹⁷ E.G. *The Warrior Comes Out to Play* http://www.youtube.com/watch?v=s1Gx_Yq9534

sousaphone, and also imitating a record being scratched at high speed with his falsetto. The high-energy performance is a wonderful circus type of cadenza that wows the audience.

Classical Musicians Who Have Innovated with Multiphonics

Although it is not the brief of this report, there have been precedents and innovators across all spectrums of music, Multiphonics apparently entering the western music cannon with Carl Maria Von Weber's Concertino for Horn op. 45 in 1806¹⁸. Trombone artists who have innovated and continue to innovate by performing and commissioning works including Multiphonics are **Vinko Globokar** and American **Stuart Dempster**, both of whom cross-over stylistic genres as new music composers, practitioners and improvisors.

Pieces such as Sandstrøm's Motorbike Concerto commissioned/performed by the wonderful virtuoso **Christian Lindburg**, and Baadsvik's Blue Fnugg have brought the technique into the popular spotlight. **Edwin Harkins** is another tremendous new music performer and maverick on trumpet who utilises Multiphonics effectively.

Tuba soloist **Øystein Baadsvik** uses these same consonant intervals almost exclusively in his composition Blue Fnugg¹⁹ (Fnugg is a Norwegian word meaning speck). He often combines the Multiphonics with a vowel sweep that changes the formants of the overtones as would a phaser or plunger mute on the trombone. Like Mackintosh, He also does a beat-box style that alternates very low multiple tonguing with squeals in the high register for the back beats 2 and 4.

¹⁸ McKenney Davidson, Michael, An Annotated Database of 102 Selected Published Works For Trombone Requiring Multiphonics; DMA Research document 2005, Cincinnati, p1

¹⁹ *Fnugg Blue* Performers: Christian Lindberg, Øystein Baadsvik Composers: Øystein Baadsvik, Svein H. Giske Original Release Date: December 20, 2007 Label: BIS ASIN: B0013PAVI2

THE MULTIPHONIC TECHNIQUE OF ALBERT MANGELSDORFF

This part of the research investigates how the elements of Albert Mangelsdorff's mature technique were produced and developed. The idea was to find out where Mangelsdorff's playing style leads towards, in order to develop and demonstrate new musical applications. The researcher transcribed compositions and solos by Mangelsdorff²⁰ in order to acquire the playing technique, and develop it further.

Albert Mangelsdorff's Background

The development of Mangelsdorff's technique seems to occur through 3 distinct periods. The Researcher shall delineate these as Early (conventional), Middle (experimental/avante-garde), and Mature (consolidation of personal language), and describe the derivation of each of the elements of Mangelsdorff's style.

- **Early Period 1948–68**

Albert Mangelsdorff (b.1928– d.2005) was widely acknowledged as one of the greatest German Jazz musicians. He played trombone with great skill throughout his expanding career. His practice routine was consistent, with just the daily warm up section “....*Practice warm-up one hour....*”²¹

At the outset in the late 50s his sound was fairly conventional, derived from the playing styles trombonists JJ Johnson, Bill Harris, Frank Rosolino and the saxophonist Lee Konitz²². The researcher also detects the influence of the Mingus sideman Jimmy Knepper²³.

²⁰ see appendix i

²¹ Gespräche p 123

²² Gespräche P129

²³ listen to *Now Jazz Ramwong*, Albert Mangelsdorff Sextet, 1960s on YouTube accessed 3/5/09

http://www.youtube.com/watch?v=42V8QIZ4bMc&feature=PlayList&p=07E2B8739B566091&playnext=1&playnext_from=PL&index=5

Mangelsdorff's style and sound was originally similar to the Charles Mingus trombonist Knepper, and Woody Herman sideman Bill Harris as shown in 1957's *European Tour'57 [LIVE]*, With Bud Shank and Bob Cooper. On this, the swoops and inflections by these great 50s stylists are evident. Already Mangelsdorff is leaning towards the cleanly articulated modern virtuosic saxophone-like lines of JJ Johnson, and Curtis Fuller. He comes much closer to this in his *Now Jazz Ramwong* recording of 1964. In *Now Jazz Ramwong*, his playing is more assured, swinging and personal. He leads with distinctive original compositions and a piano-less quintet that is thoroughly modern. The music reflects Mangelsdorff's Goethe Institute sponsored tour of the Middle East, a musical journey similar to Ellington's earlier state sponsored tour and subsequent Eastern ethnically influenced recording *The Far East Suite*. On *Now Jazz Ramwong* Mangelsdorff shows himself to be a leading modern European player coming from within the jazz tradition, without as yet any of the particular extended techniques that he developed over the next 10 years.

He is however showing a tendency toward economic development of short melodic and rhythmic cells and the use of constant intervallic structures²⁴, revealing his keen intellect, wide open concept and sound technical foundation that is expanded on in Mangelsdorff's next developmental period. He discusses his motivation to extend his technique in his book *Gesprache*, authored by Bruce Paulot:

“Compared with other wind instruments such as saxophone or trumpet the trombone is a relatively immovable instrument. Simplified, I say: on the saxophone you can do, on the trombone, can not. It is roughly true that saxophonists, and trumpeters or pianists are most advantaged in the new jazz. On these instruments music is much better implemented than on this bulky instrument the trombone.”

²⁴ [Glawischnig, Dieter](#) Article, Jazzforschung 1969

- **Middle Period 1968–78**

Building from his starting point grounded in the conventional modern trombone technique Mangelsdorff developed a wide range of distinctive personal techniques including multiphonics (played notes simultaneously combined with vocalisation through the horn), fast ascending lip trills, economic musical development through the repeated use of a few short motifs, fluent quartal intervallic playing, and he recombined these to construct improvisations and compositions for solo concerts and group performances²⁵. The smooth synthesis of these techniques into a whole musical vocabulary precipitated his position as a leading innovator in the European avant-garde free music scene both in group and solo contexts²⁶. Regarding the motivation to perform solo concerts, Emil Mangelsdorff describes his brother as “a creative loner”²⁷. He himself said of playing solo:

"Before I came up with this Multiphonics, I was already a very good trombone player," Mangelsdorff quips. "But Multiphonics was just a new dimension to be found for the trombone. I didn't invent it. It was there. Nobody made out of it what I did and when I got it, I started practicing it every day, and I was very much surprised what possibilities there were. After discovering these new dimensions, being able to play harmonies, to play chords, opened up the possibility to play solo."

When I today look back over the years, the development of the solo playing appears to me as a completely logical thing that would follow from different circumstances. Already in the early years, if I came into the jazz cellar and wanted to play, but no fellow player was, there I often ardently wished to play solo like it is possible for a pianist or a guitarist. When I started with polyphonics, I thought to myself –‘perhaps you can play there alone with trombone only...’ ”

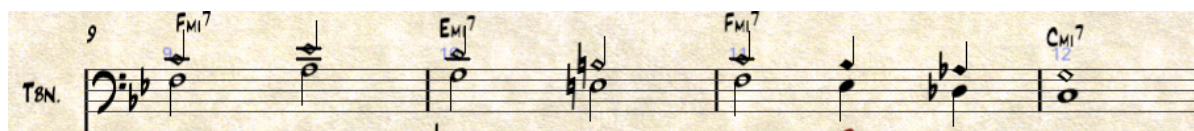
-*Gesprache* p133

Mangelsdorff's multiphonics usage begins with relatively uncontrolled pitch calls such as the imitation of birds in *Blues from a Cellar Lark* and *Yellowhammer* (both on the 1968 Trombirds recording released in 1972) and develops through parallel fixed intervals that define specific harmonies, such as
Street of Loneliness (1978)

²⁵ Mangelsdorff first performed a major solo concert in 1972 at the Munich Olympics

²⁶ <http://www.youtube.com/watch?v=rvLbOTgxJBQ> *Zores Mores* 1976 with Jaco Pastorius, and Alphonze Mouzon is a good example of his playing in the middle period -YouTube accessed 3/5/09. This version is also recorded on Trilogue: Live at the Berlin Jazz Days”

²⁷ *Gesprache* P128



He said of *Yellowhammer*:

“Even in the polyphonic area, not everything is possible, but very much is. The first piece I recorded, *Yellowhammer*, which appeared 1972 on my first solo record *Trombirds*, already was an enormous extension. You can’t deny this. Thus I was very sure of my direction. Nobody had been able to make me feel insecure about it.”

-p 120 *Gesprache*

At the same time, Mangelsdorff also employed standard trombone technique in the wider European Jazz scene, including played with the Big Bands of Peter Herbolzheimer and Kenny Clarke–Francis Boland²⁸ as well as the wild and ground breaking Globe Unity Orchestra. His position as an innovator from within and without the music scene was somewhat equivalent to that of Kenny Wheeler or Evan Parker in its range, scope and influence. He became well known and lauded as an iconoclastic player with a completely new and personal approach to his instrument. To build this personal sound world, he borrowed stylistic elements from the playing techniques of such divergent musicians such as **Roswell Rudd, Lee Konitz, John Coltrane, Eddie Harris, Eric Dolphy and Freddie Hubbard**, as well as the European free players in the wide-open experimental community around him.

The technique comes together well on the recording *A Jazz Tune I Hope* with sidemen Elvin Jones, Eddie Gomez and Wolfgang Dauner

“The development [of my multiphonic technique] on *A jazz Tune I Hope* is clearly understandable. From then on I could play completely relaxed multiphonics with the band. Now that is not a problem at all, although there are pieces that naturally suit solo performance only.”

-p 121 *Gesprache*

²⁸ A Mangelsdorff composition *Osaka Calling* was recorded by the Clarke/Boland on the 2004 reissue of 1970s ‘Off Limits’

Technical borrowings Mangelsdorff acquired in his middle period

- From Roswell Rudd's 60s recordings: swoops, whoops, growls and exclamations, vocalistic phrasing that veered away from chordal patterns and towards the avant-garde sound of surprise. Rudd himself appears to be influenced by the earlier 'gutbucket' styles of Jack Teagarden, 'Tricky' Sam Nanton, Bill Harris, 'Kid' Ory and Vic Dickenson although he states he derived his playing from composer/pianists Thelonious Monk and Herbie Nichols²⁹.

European and early free players: It is stated that Mangelsdorff became acquainted with Multiphonics through the Swedish trombonist Eje Thelin³⁰.

"One of the most important trombonists in modern jazz is for me Eje Thelin, he didn't get appropriate recognition."

-Mangelsdorff in Gesprache

- He would have been aware of Coltrane's use of Multiphonics ³¹on the saxophone (while founded on a different technique that doesn't involve vocalisation, John Coltrane's work is a likely inspiration). From the late 1950's through 1970s, Sun Ra's exploratory saxophonists John Gilmore and Marshall Allen were pioneers of multiphonics, and they reportedly influenced Coltrane³². Closer to home was the influence of European avant-garde artist and extreme saxophonist Peter Brotzmann, who Mangelsdorff recorded with in Alexander von Schlippenbach's Globe Unity Orchestra 69-78 and another influence may be English multiphonics and circular breathing exponent Evan Parker. Trombonists heading in this direction were Vinko Globokar, Stuart Dempster Englishman Paul Rutherford, and somewhat later

²⁹ Jane Spear; from the article

<http://www.musicianguide.com/biographies/1608002584/Roswell-Rudd.html>

³⁰ Schindelbeck <http://www.jazzpages.com/Mangelsdorff/>

³¹ As in Coltrane's *Harmonique* from 1957, and much of his playing recorded in the 60s

³² From liner notes, *The Heavyweight Champion*. John Coltrane: Complete Atlantic Recordings (compilation) 1996

Gunter Christmann. Rutherford followed Mangelsdorff ³³ ('Trombirds' 1972) into recording solo in 1974 ³⁴.

- Lee Konitz: [Mangelsdorff recorded with him in '68 and duo '83] impeccable tight melodic structuring³⁵, a sensitive yet exploratory musical reach.
- John Coltrane: soloing on motifs, Multiphonics, leading a way from the conventional to the avant-garde Mangelsdorff met Coltrane's "classic" quartet drummer Elvin Jones when he toured in 1957 with trombonist JJ Johnson and first recorded with Elvin on Don Cherry's *Eternal Rhythm*³⁶ 1968 recording, leading to several further recordings and tours under Mangelsdorff's name, an association that continued through to at least 1985.
- Freddie Hubbard and Frank Rosolino³⁷: lip trills and extreme acts of flexibility that Rosolino excelled at from the 50s and Hubbard in the 70's. These can be developed from etudes such as the Charles Colin Lip Flexibility exercise books. Also like Mangelsdorff, Hubbard used 'fourthy' intervallic materials at this time, as did John Coltrane, Woody Shaw and late Lee Morgan among others.
- Eddie Harris and Eric Dolphy: A sizable quote from bar 4–5 of Harris's 'Freedom Jazz Dance' is audible at 2'48" of Mangelsdorff's solo on the *Up and Down Man* ³⁸

³³ Mangelsdorff also played his debut solo concert at the Munich Olympic Games of 1972, to general astonishment.

³⁴ Rutherford. Paul *The Gentle harm of the bourgeoisie*, CD 1974

³⁵ Mangelsdorff's economy with developing and repeating a motif in his improvisation is transcribed, analysed and discussed in detail in **Motivische Arbeit im Jazz. (English Title: Motivic work in jazz)** Article in a periodical **Author(s): [Glawischnig, Dieter](#)** 1969 [Jazzforschung / Jazz research, Austria](#) Vol. I (1969) 133-39.

³⁶ *Eternal Rhythm* MPS 15204

³⁷ Mangelsdorff jammed with Rosolino when he toured Europe, *Gesprache*

³⁸ CD *The wide Point 1975* from the compilation *Three Originals* MPS519213-2

Mangelsdorff prevalently used wide intervals as a basis for improvising. Harris's book *The Intervallistic Concept* vols 1,2 & 3 published in the 70s was a resource for intervallic practice, and quartal playing is evident in the recordings of saxophonists such as Harris, Yusef Lateef, Oliver Nelson and Eric Dolphy of the time.

Mature Period

1978–2005

In this period Mangelsdorff consolidated his technique, developing it with further refinements, simplified his playing a little, and experimented more with combinations of instruments. Formations other than solo included duos, a percussion section³⁹, and performing his compositions with a big band⁴⁰. His essential technical resources remained the same, but became the library for a greater refinement of language and finesse⁴¹. This is shown by compositional experiments that begin to use more contrary motion lines,

such as in 'Pantaloni', From 1990's *Purity*.

In the later years Mangelsdorff kept to projects that were mainly within the scope of the jazz/funk fusion genres, and the open forms of his own angular compositions. He worked more consistently with other players from the jazz scene such as John Lindberg, Christoff Lauer and Wolfgang Dauner,

³⁹ with the Reto Weber Percussion Ensemble

⁴⁰ The haunting with Muisic for Jazz Orchestra with the NDR Big Band, 2003 SKIP label.

⁴¹ http://www.youtube.com/watch?v=_9ocJoUpVnQ&feature=related *HongKong Fu* shows the Albert Mangelsdorff Quintet in 2004 (a year before his death) where the trombone solo makes use of fretted playing, strong and quick flexibility. The technique and sound is slightly weaker than in his prime, but still makes a good jazz concert. YouTube accessed 3/5/09

often as a leader, but did not return the excesses of the 70's experimentation that he was such a major innovator in.

ANALYSIS OF ALBERT MANGELSDORFF'S SOLO ON 'MORBIDIA'

from the 1990 album *Purity* – refer to *appendix I* for the full transcription.

This solo alternates multiphonic motivic phrases in various clear intervals with free single note lines played in the usual manner. Although he occasionally used the plunger mute to aid blending the sung and played sounds, on this track Mangelsdorff plays open horn. The upper part (notated with diamond note-heads, stems up) is the falsetto voice part, all other notes are played conventionally. Of the opening phrase, Bar 1–2 is used

extensively throughout the track as the main motif. It's stepwise dovetailing movement shows the inter-dependent counter-lines that Mangelsdorff was working towards.

As a soloist Mangelsdorff developed his materials in an economic way giving the listener a sense of familiarity and adventure at the same time. For example, most of the single note 'response' lines are similar scalar ascending passages leading into the upper reaches of the trombone. This is like the phrasing of flugelhorn player and sometimes cohort Kenny Wheeler. In the improvisations Mangelsdorff tends to repeat and develop from motifs.

Showing motif development, The idea in bar 12 is similar to that in bar 31 and bar 33.

This figure contributes to a consistent wavelike melodic contour for the solo. Several times the last played note in a run is the next sung note in a multiphonic chord, making it easier to pitch. In order to produce the specific sound he wants, Mangelsdorff varies the dynamics subtly throughout to bring out various under/overtone. On much of his recorded output, Mangelsdorff used patterns of set intervals, and this is demonstrated in the use of 4ths in bars 21–23.

A nice slowing down effect is created in bar 18 through the use of small to larger subdivisions of the beat while the pulse is still felt, showing Mangelsdorff's fluid rhythmic concept.

Mangelsdorff took a singular path with his development of multiphonic technique by using it in harmonic situations, both in parallel and later in his career in the more difficult contrary motion. Near the end of his life he encouraged others to follow in his footsteps, including his students,⁴² as he felt his was pioneering work, and could be taken further.

“There is really still very much to be accomplished by extending [the technique]. To that extent it actually surprises me, that [multiphonic playing] is taken up by so few.”
-p 124 Gespräche

There follows a score of the first half of ‘Morbidia’ that shows quite clearly the alternating of single trombone melody with multiphonics drawn from Mangelsdorff’s theme.

⁴² such as WDR trombonist Stephan Lotterman

PERSONAL REFLECTIONS ON MULTIPHONICS

RESEARCHERS BACKGROUND

Buying and listening to Albert Mangelsdorff's *Trilogue*⁴³ record in 1989 originally began the researchers interest in and experimentation with Multiphonics. The researcher has incorporated Multiphonics in professional performance opportunities from about 1994. These opportunities have been funk cover gigs (Wellington bands Blue Flames, the Deville Bros) where at first the researcher used basically an uncontrolled scream/cry vocalisation punctuating parts of an improvised played melody in a way similar maybe to blues "grunt" flute or harmonica players. Further experiments incorporating more controlled parallelism with specific intervals (and harmonic functionality), cadences, and more use of contrary motion were undertaken within the style Blues/trad (with the Wellington Heads) Free jazz (Anthony Donaldson's small and large ensembles⁴⁴ Zircus big Band⁴⁵, Ed Ware⁴⁶, and the Triphonics⁴⁷, Norman Meehan⁴⁸) and Eastern/Balkan music ensembles (Nico Nezna, Paris Troika) as well as the researcher's own musical projects⁴⁹. They spurred the current research of this fascinating area of extended brass technique.

PERSONAL REFLECTIONS: METHOD

⁴³ *Trilogue* MPS, 1976 recorded live at the Berlin Jazz Days, with Mangelsdorff, Jaco Pastorius and Alphonse Mouzon

⁴⁴ As evidenced in recordings by RNZ and on CD, Donaldson *The School Of Hard Knocks* Adventurers Club 001, 2007

⁴⁵ Pending release *Zircus*, and RNZ live recording, *Zircus* Wellington International Jazz Festival 2006

⁴⁶ Recordings by RNZ *Rugby Racing and Beer* 1997, Wellington International Jazz Festival Ed Ware Quartet 2008

⁴⁷ *Triphonics* cassette release 1996

⁴⁸ Meehan's *Sun, Moon, Rain, Stars* Rattle Records with text by *EE Cummings* recorded St Andrews Church, Wellington 2008

⁴⁹ As on 'Rise' track 7 of the self released CD *Innocents* 2008

The following reflections were written during the practice process in December 2008 through March 2009 to help deal with specific problems or questions that arose. Much is transcribed from a practice diary that was kept. They are presented here with the structure:

1. DATE:

DD/MM/YY

2. SUBJECT TITLE:

3. OBSERVATION:

Which details the problem or question as it occurred

4. DISCUSSION:

Which elaborates on the question with reference to the researchers research, listening and personal experience, both during practice and from prior experimentation

5. EMPIRICAL CONCLUSION:

Which contains a statement or way to solve the question/problem based on the discussion information and practical experimentation in the practice room.

Any other more general comments and observations are noted separately.

8/12/08

- **Tonal resonance and projection with Multiphonics**

OBSERVATION

I observe when practicing long tones on the tuba that certain loose objects in the room resonate with certain specific pitch frequencies.

I further observe that these **objects sympathetically resonate only when the *tone and pitch and volume* reach a quite specific threshold sweet spot.**

DISCUSSION

I realise that a **similar experience seems to occur with the presence of overtones with Multiphonics**. That is: they are most present when the combination of *tonal quality* (mainly affected by the tongue vowel shape), *pitch* (mainly affected by the lip and vocal setting) and *volume* (air column).

Mangelsdorff was said to have needed to work on his singing voice, in order for it to balance the trombone. He appears to have developed a remarkable blend of these into a gruff sound of oneness rather than two-ness, or relative tonal thinness such as displayed by the lighter voices of Bill Watrous and James Morrison. He also clearly wrote his compositions for the maximal (full overtone) effect of the intervals, with a preference for 6ths, #11ths, both major and minor 10ths, and 7ths (usually major). Solo work tends towards the low register played and the sung notes a compound interval above, which gives distinct clarity and presence to each line, while the undertones and overtones tend to also be within harmonically functional ranges.

It is clear from Mangelsdorff's performances that he was aware of the effect of volume on the overtone presence, and manipulated this within his solo compositions for specific musical results. That he worked within these volume/harmonic requirement limits and still produced natural sounding music shows his compositional prowess.

Tonal quality

Baadsvik and Mead in their practice have clearly worked in tonal quality. Baadsvik's stated preference for the most consonant intervals (octaves and fifths which require good intonation to form clearly in a line) and integrating these with the full vowel sweeps as in his piece '*Blue Fnugg*⁵⁰' (generally a strongly projecting nasal "twaiee"). This gives it a distinctive Norwegian flavour – the same vowel practice is found in traditional Norwegian herder's vocal "cow calling" songs. Mead's practice of articulating words and lyrics through the euphonium while playing Multiphonics also runs the gamut of vowel/timbre forms. This is also a main parameter for didgeridoo technique as manifested in the imitation of nature sounds and gruff mood evocations heard in Aboriginal and trance music. The Didgeridoo players also use rhythmic circular breathing pulses, that by distorting both the lip embouchure and the air column (the buzzed or played notes), also function to cover up the irregularities caused by circular breathing. Players such as Wynton Marsalis have worked in the opposite direction to minimise the tonal range while circular breathing to create seamless long phrases⁵¹.

Pitch

Tomasz Stanko works to bend the pitch a lot in some phrases, as does Nils Wogram, who works with 1/4-tone intervals⁵² in some of his music with Hayden Chisholm/Root 70. Mangelsdorff is well in tune, whereas Robin Eubanks in Dave Holland's quintet seems to produce more of a plaintive general pitch-directed scream/cry. Ray Anderson's experiments must have led him to the impressive vocal multiphonics (sans instrument) on his rendition of Ellington's "Just a Lucky So and So"⁵³

⁵⁰ <http://www.baadsvik.com/shop/cart/product.asp?intProdID=430&LangID=3>

⁵¹ Most clearly heard throughout the recording *Carnival*, and on Cherokee from *Live at Blues Alley*

⁵² Nils Wogram's Root 70 *52 and a 1/4 Street*, Enya, 2008

⁵³ Anderson's *What Because*, Gramavision 1992 also on a remarkable video <http://new.music.yahoo.com/Ray-Anderson/videos/view/I'm-Just-A-Lucky-So-And-So--2138874>

Volume

Mangelsdorff⁵⁴ and Fiedler⁵⁵ are clearly aware of the volume thresholds for the overtone sounds they create, so their music contains volume subtleties based on the musical effect desired, while the likes of Tom Smith and Wolter Weirbos tend to barrel away at full volume (and less definitive intervallic pitch) in order to ensure their presence. George Lewis seems to inhabit a middle ground.

EMPIRICAL CONCLUSION

To develop the multiphonic technique it will be necessary to become aware of the three basic parameters *tonal quality* (mainly affected by the tongue vowel shape), *pitch* (mainly affected by the lip and vocal setting) and *volume* (air column) and observe the resulting sound of the overtones. The researcher has composed and tested multiphonic exercises, isolating each parameter *tonal quality*, *pitch* and *volume*, and observed the effects by recording, playback and reflection.

12/12/08

- **Developing pitch and tone of the voice for the performance**

OBSERVATION

Pitch and tonal quality of the voice and to a lesser extent is a problem for me.

DISCUSSION

Put quite plainly, the researcher would not sing solo in front of an audience. The researcher has sung in choirs and backing vocals in commercial bands in the past, but has (like many brass performers), on hearing himself on recorded playback, decided that the voice quality is not adequate for general

⁵⁴ As evidenced in most Mangelsdorff recordings post 1970

⁵⁵ This is inferred from Joe Fiedler's recordings *Joe Fiedler Trio Plays the Music Of Albert Mangeldorff*, 2006 and *The Crab*, 2008, both on CLEAN FEED records

consumption. It needs work, and as elaborated earlier, this too was the main problem encountered by Mangelsdorff in his Multiphonics performance.

EMPIRICAL CONCLUSION

Resolve to increase vocal performance in conjunction with Multiphonics by:

1. Practicing singing voice alone through the mouthpiece, unison with the piano as a pitch guide⁵⁶
2. Doing a separate warm-up for voice including the vowel tones aa-ee-ii-oo-uu⁵⁷ (mainly but not exclusively falsetto) and instrument, and a multiphonic one together with played tones. For the researcher in preparation for recitals this consisted of unisons, set interval scales and patterns, followed by a routine of recital concert repertoire.
3. Working with drones, both as a played bass, and with pre-recorded drones⁵⁸ in the key tonality. This assists with relative pitch and strength of tone.
4. Playing along with pre-recorded Sibelius guide tracks and the original recorded version of any transcribed material, again for matching pitch and tone.

Make these a regular daily practice

COMMENT

It may be useful to write a syllabic vocalise under the vocal part to encourage certain intervals, as well as moderating the volume, and writing in specific dynamics.

In a subsequent lesson with tuba player Andrew Jarvis, looking at Bach's invention 11, it was discovered that a clear "Dah" articulation with each sung tone. and exclusive concentration on hearing and projecting the upper line produces a clearer voice part.

⁵⁶ As practiced by Albert Mangelsdorff, *Gesprache* p121

⁵⁷ The researcher has found the Seth Lloyd speech level method useful for vocal practice.

⁵⁸ Such as the free download available from Tom Gibson's podcast.

EXCERPT from practice diary on Bach's invention 9:

There are a couple of points where it was necessary to displace the sung melody or played part by an octave (generally lower) to accommodate the researcher's comfortable voice range and/or playing range. At the several places where the parts cross or become close, this requires low dynamics (p) to ensure both voices are heard. The played high range is limited when performing multiphonics due to the strain and high air pressure involved with the unstable or more complex lip vibrations.

Counterpoint seems easiest to internalise efficiently if the piece is practiced, as a pianist would prepare it:

- Separately left and right hand
- SMALL to LARGE sections and
- SLOW to FAST.
- One part at a time, then together, even swapping parts over.
- Actual playing at the piano helps internalising the lines for brass performance

15/12/08

- **Play/sung Balance in specific registers**

OBSERVATION

Balance is difficult to achieve between the two lines when changing registers

DISCUSSION

An article on Mangelsdorff by written in 2003 describes Mangelsdorff's vocal routine⁵⁹

To perform such a physically demanding task on a challenging instrument, particularly at age 75, requires work. "In the beginning, for me anyway, the sung note was never loud to get a balance or to get out those overtones clearly," Mangelsdorff explains. "So I had to find practicing techniques; I practice my voice every day on a piano, singing through the mouthpiece, because I found that when I did this the balance would be there." Backstage,

⁵⁹ www.jazzhouse.org/library/library2.php3?read=henkin2 article accessed 6 June 2009

before his birthday concert, Mangelsdorff was audible in his dressing room, practicing his singing with a piano.

- Albert Mangelsdorff; A Legend at 75, Henkin

This is confirmed in an email from pianist and collaborator Wolfgang Dauner to the researcher “...*About his [practicing of his] singing – yes, it was voice alone....*”

Mangelsdorff also states

It [multiphonic practice] requires naturally much very detailed work. The voice needs to be trained, in order to strengthen it, also intonation had to be practiced daily, and must be to this very day. I was never a singer, so from the start it had to be practiced very much; completely apart from coordinating the sung tone with the blown tone, which is not a straight forward simple procedure. The blown tone is produced by the fact that air makes the upper lip vibrate, the air pressure brings a tiny opening between the lips and vibration develops. At the same time the sung tone must go through the opening in the mouthpiece from inside. If the sung tone goes through the nose, how some trombonists do it, that does not sound really compact, and overtones hardly develop.

-*Gesprache P121*

It seems standard that the played line tends to dominate the sung except at wide intervallic distance, or with the voice in it's lower (non falsetto register) at low played dynamic.

Additionally I prefer my mouthpiece. A small mouthpiece is easier for fast playing, a bigger mouthpiece requires much more training.

-*Gesprache p 117*

The researcher tried practicing (Bach 11) at lowest volume slow-ish with a pleasant balance result.

Discovered the best places for the octave shifts for his specific ranges.

The second half of the invention and the highest voice notes generally seem to work best at loud dynamic with a specific tongue and throat set up (ee-ish and somehow forward).

EMPIRICAL CONCLUSION

Highest voice notes seem to work best at loud dynamic, with a specific tongue throat set up for the sung line (ii to ee-ish for high and somehow forward). Good, grounded posture including head position

seems to be important at the extremes. Mangelsdorff preferred a small mouthpiece for multiphonics and general playing (he used a Giardinelli brand mouthpiece).

OTHER COMMENTS

From researcher's Practice diary 15/12/08:

It is best to memorise difficult phrases and sections in chunks of 2 to 4 bars⁶⁰

[Comments regarding performance of the Bach Invention 11]:

Glenn Gould in his 2 and 3 Part Inventions⁶¹ plays this much faster and his conception on the whole CD seems to go along with the Goldberg theme of sleep (invention 9) /wake (invention 11) ~ Gould was a neurotic pill addict and chronic insomniac⁶². He has an amazing ability to make almost separate yet sensible and clear musical statements and phrasal shapes from each hand, sometimes while singing another or a composite part under his breath.

Tricky sections need work. Metronome and isolation then reintroduce into the larger section. Also tried it quietly. Octave at end is difficult for intonation. Play concentrating on relatively loud voice: quiet play, and projecting the image of flowing water. And play again through a conscious feeling of the whole body.

⁶⁰ from a conversation with USA bass trombonist/tuba player Earl MacKintyre

⁶¹ the Glenn Gould Edition, Sony Classics 1993 CD

⁶² as shown in the movie *32 Short Films About Glenn Gould* 1993 dir. Francois Gerard. In this movie he also is shown to enter a café and follow 4 separate conversations by customers, presumably in preparation for his recordings in counterpoint and performances. This almost schizoid tendency is demonstrated by his odd and very entertaining series of self interviews with invented 'alter ego characters', and that one of his few own compositions is entitled *So You Want To Write A Fugue?* which features speech conversations mingled with the fugal melodic and textual lines.

15/12/08

- **Finding breathing space in keyboard music transcriptions where there are few phrase breaks**

OBSERVATION

Breathing is not written for in the Bach Inventions and poses a problem for a blowing instrument.

DISCUSSION

On playing Invention 9 through very slowly (1/4 speed, and then fast ~a tempo); from Bar 8 the researcher tended to make rather many stop start mistakes, due to breathing space difficulty. On these non-stop passages written for keyboard, the breaths must be stolen, either by leaving out a note, or making a note of shorter duration, or by interrupting the metric flow.

EMPIRICAL CONCLUSION

The researchers preference is to make the note at the end of a breath phrase of shorter duration and cramming the next note as a quicker note to retain rhythmic meter.

COMMENTS

About vowel tongue position: In terms of filtering the harmonic spectrum of the tone it is the equivalent inside the mouth and before the horn as using the plunger outside and after the horn. Therefore these two can interact to amplify or nullify each-others effect. **Practice to add/maximise their combined effect on long tones will likely have the greatest tonal outcome in practice.**

Play one part sung unison while imagining the other part (slow).

It is fun and useful to fake improvising in the Bach 2 part style....

16/12/08

- **Articulation with contrary line Multiphonics**

OBSERVATION

Mangelsdorff uses tonguing articulations for the start of notes in a variety of ways, but mostly seems to use little or no tongue in a singing legato style with open trombone.

DISCUSSION

Articulations will naturally break both phrases at the same point, which is usually avoided until cadences in counterpoint composition practice. While much multiphonic usage is parallel (as in the use of harmoniser on guitars/keyboards and EWI such as on Michael Brecker's *Syzygy*⁶³), any contrary motion or rhythmically independently moving lines **require the articulations to be minimised.**

EMPIRICAL CONCLUSION

Any contrary motion or rhythmically independently moving lines **require the articulations to be minimised.** Using very soft (duu to luu tongue) or no tongue solves this break in the flow of the lines. This retains some of the natural glissando characteristic of the trombone, but moving played intervals can be made reasonably clean if required by the use of quick and smooth slide changes.

15/12/08

- **Differing resonance strengths of sung tones to different tube lengths**

OBSERVATION

Some notes and multiphonic chords are clearer than others as chords and within moving lines. Some notes are difficult to sing over certain played tones

DISCUSSION

⁶³ Brecker, Michael (recording) MCA, ASIN: B000002O44, 1987

The tubing length has resonant reinforced frequencies that are the harmonic series for that tubing length. Any sung tones also are subject to these same reinforced frequencies that are the harmonic series for the tubing length. This is found to be the case by singing through the instrument without playing while keeping the fingering/slide in the same position. Some notes sound more stable and projecting than others. It is also observed while changing fingering while singing through the horn but not playing. On counter-lines with this practice of changing fingering while only singing, the voice is inconsistently louder and softer, clear and somewhat muffled, and at times there is an occurrence of ‘funnelling’ (as described by Øystein Baadsvik⁶⁴) towards the closest harmonic of the tube length. This is a basic and generally unremarked characteristic of single note playing produced with the conventional lip buzz. Usually one aims to ‘centre’ the sound; that is align the sounding frequency with the reinforced tube-length frequency. With Multiphonics, this centred stability occurs most with unisons and consonant intervals (however any two intervallic pitches within range are possible with strong embouchure setting, and may even be ‘forced’ on any tube length, the difference being ‘poor’ squeezed tonal quality on non-reinforced tube lengths to rich ‘good’ when the tube length is in agreement with both the sung and buzzed pitches, as in Bb’’ played and F’’’ sung in 1st position on the trombone). However many of the more rich and interesting resultant chords produced by Multiphonics are of non-consonant intervals, and this is clearly investigated by Mangelsdorff on such tunes as *Fur Peter* and *Horn is A Lady*⁶⁵

EMPIRICAL CONCLUSION

The voice needs to be strong and steady when the tube length does agree with its frequency. **Where alternate fingerings/positions support the musical or timbral effect, they may be preferred.** Music written for Multiphonics would do well to reflect this natural harmonic ‘gravitational’

⁶⁴ From correspondence between Baadsvik and the Author, November 2008

⁶⁵ see Appendix I, transcriptions pages...

tendency. It explains why random/un-pitched or consonant intervals are easier to achieve than specific non-consonant intervals.

COMMENT

Mangelsdorff uses vibrato to modulate the multiphonic chord, sometimes going into a lip trill that usually ascends as high as he can go, with the voice following the general contour without the trill effect (on voice this would probably be a 'yodel' sounding effect, and the researcher has not noticed Mangelsdorff yodelling with voice through the horn.

19/12/08

○ **Counterpoint Learning and the 'Flow' State**

OBSERVATION

I can play a fairly strong representation of Bach style while improvising in two parts at the piano.

Why does improvising it seem more difficult on brass such as a tuba?

DISCUSSION

In answering this question, the researcher came up with a couple of ideas:

1. The voice (as many jazz singer students seem to prove) is difficult to know what pitch you are on in the key/scale and its interval relation to the played line.
2. The mind does not have the same wiring for vocal/lip melodic process that fingers of two obviously left and right brain links hands does.
3. There is no visual feedback in terms of see-able melody (however the researcher can now improvise as adeptly in the dark as with the light on at the piano, but the *learning* of it was probably more specifically visual than with sing/play)

The researcher finds it necessary to improvise slowly and with intervallic awareness in this Bachian way and try to incorporate the melodic language that is easily available at the keyboard onto brass. Sometimes the researcher has imagined the music being played simultaneously on several instruments

(not practically possible), for example piano, trombone and trumpet all at concert pitch. The researcher found this thinking was deep and required a slower tempo, and yet the links or ghost images of this thought/ear process seem to widen the “flow” on any one instrument after this. Gigs the researcher has had requiring doubling trumpet and keyboard have definitely been getting closer to a single melodic “flow” experience as a result of the practice of multi-instrument musical visualisation (that is, after such a performance, the researcher had a memory of certain musical events, and any definition of what instruments were played on seemed to merge into a whole sense of “the music”). The researcher wondered if his work on Multiphonics was contributing to this experience of music as **a central experience of being** regardless of the mechanics of producing the music. Group playing got to this “merge point” or “flow” when the researcher hears his notes played as indistinct from the other players sounds, emerging from a single source. This happens for the researcher sometimes with familiar musicians who can leave enough space and engage in simultaneous interaction, or “play empty” (where the researcher hears the notes as being neutral; stimulating no language or reactive thought content and the group presence is clearly felt as joining with the first person). Although this space is a state of mind (probably alpha/theta frequency) that the researcher can attain, the group’s and audience’s situation and their environmental attunement really are large factors.

EMPIRICAL CONCLUSION

Maximising playing and improvising in a mental ‘state of grace’ (alpha/theta brainwave pattern) with the Multiphonics would be ideal.

This may be easier with drones and didge type playing where the harmonic, melodic and/or mental technique “bag of tricks” is limited or coming from the subconscious. In such a state, relaxed open awareness is possible and the mind is not distracted into specific problem solving that could affect the overall musical flow.

12/1/09

- **Throat singing and the vibrato in combination with Multiphonics**

OBSERVATION

The researcher noticed by experimenting with overtone 'throat' singing such as is used by Mongolian, Tuvan, Tibetan traditions that it is possible in a limited way to utilize this while playing brass instruments.

DISCUSSION

Overtone singing combined with played tones can also be heard used by some didgeridoo practitioners in emulation of animal and dreamtime noises. However few of the didgeridoo players use much functional melodic or harmonic structure or movement, and tend to use it texturally as a decorative fabric of the ground drone. Technically, the basic parameters used for overtone singing to produce a whistle type harmonic along with the sung fundamental are 1) throat setting, 2) tongue form and position (rather exact for the formants being reinforced, and 3) lips. These first two are possible, although the tongue cannot touch the roof of the mouth while playing as the tone disappears, while the third; changing an open lip shape is nigh impossible. However, the lip position does make a large difference in terms of setting the embouchure either forward (puckered out) or more inward. With the lips forward, the sound becomes more raucous and blends into a more blended slightly distorted type sound.

Mangelsdorff can be heard using vibrato quite often, which give a similar slight effect to a fast electronic phaser when used with Multiphonics, in that the tongue and embouchure are modulating the harmonic overtone combinations, as well as the fundamental to some extent.

It seems to be no accident that he used vibrato, many varied note envelopes (often staccato notes interspersed within legato passages), and had a full 'relaxed' tonal sound of his open trombone. These are logical

results (almost necessities) of the practice of extended solo multiphonic playing. *I.E. in terms of breathing, embouchure formation and embouchure stability, it is very likely these elements of his style are the direct result of following the nature of multiphonic solo performance.*

The variety of tone employed with Multiphonics can vary quite substantially from player to player. For example: Joe Fiedler tends to use a bright nasal eee vocal sound and sweet trombone tone, whereas Mangelsdorff's is warm, blended and clear. Matt Schulman on trp gets a strong forceful sound with apparent depth (undertone quality), and Howard Johnson is joyous and raucous in his baritone voice register, Baadsvik on tuba states a preference for perfect intervals to avoid low undertones, and sings very in tune with a tongue vowel sweep 'aei yaei yaei'. Ray Anderson actually can sing clear Multiphonics very well just with throat singing⁶⁶.

Later in his career Mangelsdorff seems to exaggerate the variety of tone with his tongue and throat to affect the overtones from the sung/played tones, as did Sam Nanton, Ed Neumeister⁶⁷ The plunger and tongue and appropriate volume, with embouchure set forward or back will make this

⁶⁶ witness Anderson's 'I'm Just A Lucky So and So' from Every One of Us CD, which sounds somewhat in fifths. Eg 0:50"-0:60"

<http://new.music.yahoo.com/videos/RayAnderson/I'm-Just-A-Lucky-So-And-So---2138874>

⁶⁷ Neumeister demonstrates improvisation with a pixie mute and plunger using a "yaei yaei" dipthong syllable (a la 'Tricky' Sam Nanton, the Ellington feature soloist from the 30's-40s) but **also** incorporating multiphonics on the video clip:

<http://www.youtube.com/watch?v=R4no-AP9A5Y>

optimum. *As Mangelsdorff practiced on mouthpiece alone, the development of intonation and vocal tone quality and projection specifically **through the mouthpiece** are likely to be of prime importance for effective performance in a club or concert.*

The aperture width is clearly a part of the tonal combinations, and it seems that the wider the vibrating 'line' of the lip the bigger the harmonic overtone* blend. –As opposed to pitched at the centre with either side inside the mouthpiece more still– that gives more clear and separated linear parts. Needless to say, posture seems best at optimum relaxed height with spine in balance over the centre of the feet.

As previously mentioned, when speaking of resultant tones, there is also the undertone found by subtracting the lower freq from the higher, however, personally the researcher finds this hard to hear in comparison to the additive overtone in most playing situations. It seems to appear as more a subconscious part of the **feeling** of the sound and is often obscured by the sounds of other instruments. This undertone is most clear for the researcher when the horn is angled up and a somewhat forward pucker is assumed.

The researcher experimented with a variety of signal effects processors, and found the overtone and harmonic spectrum to be affected in conjunction with physical methods.

EMPIRICAL CONCLUSION

Overtone singing combined with played notes is possible but somewhat limited by the set embouchure. It has not been practiced to its potential but there is a possibility to extend this combination of techniques further. It is easiest on drones, and its effect can be further influenced by mutes– particularly the plunger mute, or electronic effects such as the wa-wa pedal, aural exciter, phaser or notched EQ.

10/2/09

- **Difference in endurance: normal to multiphonic playing**

OBSERVATION

Multiphonics is more tiring than normal playing, and the higher the played tone, the more this difference is noticed. For example, playing a high tone and singing any tone at all is very difficult.

DISCUSSION

The fortitude of Mangelsdorff's 'chops' is remarkable and would have developed as a result of much of this multiphonic playing –it is very tiring at medium to high volumes. As much of the played range is below the sung tone and mid to low range, his forays into the upper reaches including lip trilling would balance the playing and guard against the loss of the high register. Although Mangelsdorff does not seem to manipulate the overtone formants much with his tongue earlier in his career, he can be heard doing this later, such as on *Purity* 1990, with some higher notes sounding remarkably like the spoken words '*Huey, Dewey, Louie*'. Generally a brass player moves the tongue position for register changes (usually unconsciously in practice) to support the formants of the frequency they are on. His higher tongue in the high register will help to support the pitch and be efficient in terms of conserving energy and strength.

The playing of Multiphonics creates extra turbulence for the lips to handle with the extra tonal resonances (sung tone/overtone/undertone), that is, it is relatively more demanding and tiring to play in any register, but the work is very keenly felt in the mid and high registers. The rate of tiring in these registers is somewhat similar to the free buzz versus playing on the mouthpiece. This brings endurance problems in these registers, and also by the ratio of clean playing to Multiphonics as shown by Cuong Vu, Matt Schulman, and Tomasz Stanko. This is more played phrases to multiphonic phrases than trombones and tubas (all trumpeters who necessarily have this situation due to the nature of their instrument's range). Playing of the high tones and high-speed flexibility tends to use non-aerobic 'fast-twitch'

muscles, while the low long tones the aerobic striated muscles. Both need to be nurtured for maximum musical expression. Mangelsdorff either intuitively or consciously understood this as evidenced by his practices of lip trills into the extreme register and excellent endurance necessary for solo performances.

EMPIRICAL CONCLUSION

All players (the trumpet, horn, trombone and tuba players) tend to play low and sing high, and the researcher think tiring is the main practical factor, along with the function of the sonorities themselves. It is probably best to build up the endurance and strength by a rotational program similar to what weight-builders routines. The non-multiphonic high register of the horn needs to be retained by practical use to balance the strong, low 'multiphonic chops' that develop.

○ 27/2/09 **Effect Of Articulation on Timbre**

OBSERVATION

Articulation appears to affect the stability of the tonal spectrum, both of played and sung tones (and therefore the resultants).

DISCUSSION

A long note of say 4 seconds duration has time both for the ear to consciously or subconsciously adjust the colouration and tonal quality of the sound, and for it to naturally settle on a resonance. Short notes seem to have a more out of tune or distorted, less settled, brighter and yet less rich sound. This could be considered the effect of explosion (or sudden exposure) of lips to the airstream.

EMPIRICAL CONCLUSION

A) To get results that are most in tune and easily controllable in terms of the resultant timbral quality, legato and slow passages are recommended.

B) To get more indeterminate pitched and bright sounds, short tones with

hard articulations are recommended. It is expected that aware practice with the latter will improve the former.

The combination of tonal control and short/loud notes is most difficult and would therefore require the consistent repetition of the sort of practice recommended in van Lier's⁶⁸ 10 long tone exercises, or Dr Tom Gibson's tonguing system⁶⁹ with short multiphonic chords. An example of a jazz application of this would be playing 4 staccato quarter notes per bar on the harmony of a song such as *all the things you are*⁷⁰

COMMENT

Different brass instruments bring different tonal effects with multiphonics. The Researcher has used it effectively on trumpet, flugelhorn, tenor horn, trombone, euphonium bass trombone, Eb and Bb Tuba and sousaphone. The conical instruments of the tuba family (flugelhorn tenor horn, euphonium, tuba and sousaphone) have the advantage of mellowness so the balance is good between voice and played instrument, and there are more harmonic possibilities with a comfortable singing register above the low instruments, which also have a less intense, more relaxed lip compression.

The researcher is not particularly drawn to playing Multiphonics on the trumpet, as the vocal range above the played note (and therefore the available harmonic content) is more limited, and yet trumpet multiphonics and growls has its own special charm in the hands of Matt Schulman, Bill Dixon, Tomasz Stanko, Cootie Williams and others...

3/3/09

- **Microphone Sound reinforcement for Multiphonics**

⁶⁸ From the Book *Coordination Training Programme for Trombone* van Lier, Bart Advance Music

⁶⁹ As on his podcast at <http://tbonegib.podbean.com/>

COMMENT

Mangelsdorff has a clear tonal spectrum with voice prominent in recordings and live concerts

DISCUSSION

It has been observed that Mangelsdorff made use of two microphones, one placed in front of the bell, **and one placed close, pointing directly at the throat.**⁷¹ The researcher experimented with various placements of two microphones going through a PA system with equalisation control.

EMPIRICAL CONCLUSION

Optimum placement and balance can be achieved by a mix of approximately 25% bell microphone to 75% throat microphone, with the lower frequencies rolled off somewhat on the throat microphone. Also for convenience, the throat microphone is best as a good quality clip-on gooseneck microphone almost touching the adams apple.

FINDINGS

➤ Findings on Mangelsdorff's technique development:

1. Mangelsdorff went through three different musical periods with the middle period 1968–78 being a rapid expansion of his musical tools and devices, experimentation and innovation, grafting other's tricks and methods onto his own developing musical persona, even borrowing inspiration across instrumental and stylistic borders.
2. The techniques can be categorized in the likely order of acquisition according to his recorded output:
 - Traditional clean commercial/jazz technique
 - Short (cellular) motif repetition and development
 - Against the grain playing⁷²

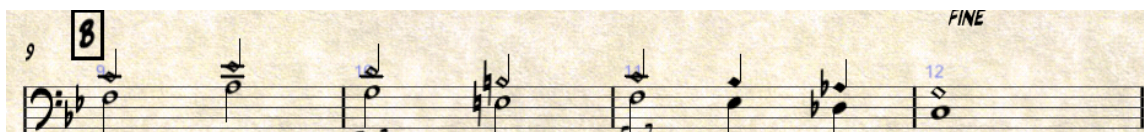
⁷¹ Observed by Dr Rodger Fox in 1976, and conveyed to the researcher in a lesson.

⁷² This is a technique where the slide moves in the opposite direction (outward for ascending lines, inward for descending) to the usual pitch direction so as to use the 'natural slur' harmonic breaks, giving a rapid semi-articulated movement through a scalar range.

- Swoops hollers and glissandi “gutbucket style”
- Pedal tones
- Extremes of range and dynamic
- Rapid multiple tonguing
- Ascending lip trills, sometime combined with vocalisation
- Multiphonics, both open and with plunger
- Rapid phrasal alternation of any of the above with conventional playing

3. According to the transcriptions, Mangelsdorff generally used (in descending order of occurrence) 6ths, and 5ths⁷³, 10ths, 11ths, 12ths, 13ths, 14ths, 4ths, 7ths, occasionally octaves, close or very wide intervals. This showed a preference for the most clear resonant intervallic choices
4. Particularly in his early usage, Mangelsdorff played Multiphonics almost exclusively in parallel harmony, using the same interval in sequence to fit the harmony (a notable exception is 'Mood Azure' from 1980's *Albert in Montreux*; a revisitation of his *Mood Indigo* styled ballad arrangement, but taking the next step into counterpoint and original harmony). This parallel practice is in agreement with the triadic and quartal-based harmonic situations of his repertoire.

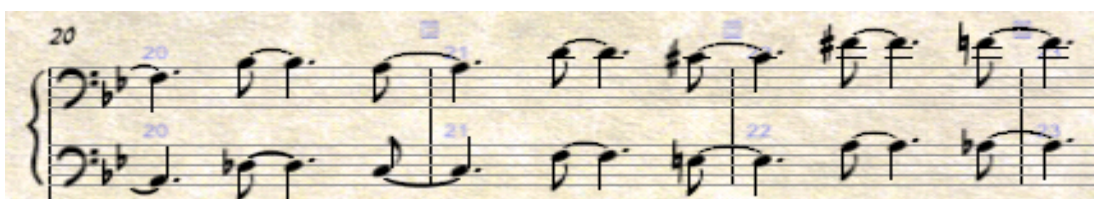
Bars 9-11 *Street of Loneliness* 1976 by Albert Mangelsdorff⁷⁴ shows parallel 5ths



Bars 20-23 *A Jazz Tune I Hope* 1976 by Mangelsdorff shows parallel 6ths

⁷³ These intervals, combined with their summed (overtone) and difference (undertone) notes, generate clear triadic sounds that Mangelsdorff and subsequent brass players used to enhance the functional harmony of their music.

⁷⁴ From *Hamburger Idyll* with sidemen Eddie Gomez, Elvin Jones and Wolfgang Dauner



5. For Mangelsdorff, the most effective harmonic range was the male falsetto voice, which normally does not have a particularly rich timbre. He did sometimes mix this with his normal tenor register Multiphonics for the gruffer sounds, and appears to have had no problem mixing the vocal registers (head and chest voice).

Mangelsdorff's multiphonic range found in this study:

6. Mangelsdorff used plunger occasionally at first and more so after 1970. But almost always varied it with passages of open playing during any one song, either with Multiphonics or just single line playing. Mangelsdorff's plunger work, like his overall technique, was extremely finely tuned, with hardly any gratuitous 'waa' sweeps through the harmonics. It seems as he was working for the specific resultant pitches in a functional way, and he was extremely adept at maximising the whole harmonic result.⁷⁵ Mangelsdorff clearly listened for the subtle sounds and was aided in this by usually being amplified.
7. Mangelsdorff was reported to have practiced the vocal multiphonics technique on the mouthpiece alone. Although it is at first rather difficult, this practice brings quick progress when brought back to the instrument after a period of practice. This has implications for the teaching and learning of the technique.
8. Mangelsdorff's trilling and extreme lip flexibility was almost without precedent on the jazz trombone, although Frank Rosolino and Bill Watrous were tremendous in the mainstream style, as are trumpeters Freddie Hubbard and Allen Vizzutti. Musicians such as Chicago

⁷⁵ For example, in the plunger work for *A Jazz Tune I Hope*: Appendix i

trombonists Ray Anderson and George Lewis soon followed Mangelsdorff's lead.

9. A large range of his contemporary musicians, both European and American, influenced Mangelsdorff, particularly those who developed a singular sound. He was an eclectic stylist and worked across musical boundaries, cross-pollinating what he found to suit his direction.

10. By any standard, Mangelsdorff was superb technician on the trombone, as revealed by his recorded legacy, demonstrating a high level of performance skill at each stage of development, and a forward musical thinker who forged one of the most distinctive idiomatic musical voices of any instrument.

11. The style of his vehicles was well suited to his technique and vice versa (pedal vamps, open structures, bass/drum trios, funk/free/jazz crossover).

12. It was also said he had an ornithologists curiosity⁷⁶, collecting and copying bird and nature sounds. The researcher assumes that his Multiphonics usage reflects this, and shows a parallel with certain classical avant-garde such as Messian⁷⁷, and more widely conjectures whether Mangelsdorff may have investigated the Aboriginal Australian techniques of Didgeridoo playing also?

➤ **Findings on the pedagogical applications of Multiphonics based on Albert Mangelsdorff's technique from the researchers' experiments:**

13. Lip trilling relies heavily on the movement of the tongue in order to modulate the air stream pressure (rapid repetition of the

⁷⁶ Zwerin 2005

⁷⁷ Oliver Messian produced numerous works inspired by and imitating bird sounds

syllables Aayeeaayeeaa). It can be developed with the exercises in books such as Colin's Advanced Lip Flexibilities, Irons, or Greg Waites. It could be said that trilling is to the trombonist as skipping is to the development of an athlete.

14. In applying multiphonic techniques, it appears posture; air volume, vocal tone, horn pivot, and aperture are the main factors in balancing the played/sung notes.
15. Intonation, tonal quality of voice and played note, in combination with the plunger mute are the main factors in the strength and quality of the resultant overtones.
16. It is relatively difficult to control the pitch of successive intervals that are different, dissonant sounds or sounds that place the embouchure or voice in an extreme range.
17. Recently musicians have incorporated Multiphonics with beat boxing⁷⁸, wider stylistic repertoire, speaking through the trombone whilst playing⁷⁹, and adapted the techniques to tuba and trumpet. New York trombonist Joe Fiedler has recorded a representative stylistically accurate tribute album⁸⁰ of Mangelsdorff compositions, as proof the language has become accessible to players and the mainstream public. These developments are a natural extension, as Mangelsdorff himself said, *"I think there is much development still to be done with the Multiphonics"*⁸¹.

⁷⁸ see YouTube http://www.youtube.com/watch?v=YIzO30_7tFU

⁷⁹ Modernists currently innovating in this way include: **Stuart Dempster, Nils Wogram and George Lewis.**

⁸⁰ : *Joe Fiedler Trio Plays the music of Albert Mangelsdorff* <http://www.cleanfeed-records.com/disco.asp?intID=174>

⁸¹ Henkin, Andrey. 'Albert Mangelsdorff; A Legend at 75' This research work is intended to help the development Mangelsdorff refers to.

18. The researcher believes Mangelsdorff's techniques are teachable and codifiable, with further work recommended on a methodical approach to teaching Multiphonics. His recordings point toward two paths of further research:

A) Multiphonics used in harmonically functional applications

B) Multiphonics technique extended to incorporate the use of contrary motion and much more varied intervallic harmony (see findings 19 – 22)

➤ **Findings on the extension possibilities of multiphonics based on Albert Mangelsdorff's technique demonstrated in the researchers' and other's compositions:**

19. **The Plunger and Electronic effects can be used in new ways** such as in the researchers arrangement of Thelonious Monk's *Misterioso*, where the plunger is moved on the off-beats, while the played phrase falls on downbeats, causing a harmonic overlap with the sustained tones:

20. **It is possible and practicable with concerted practice to play independent lines both in direction and rhythm.** This could be in the form of Counterpoint with one part more active, as in Aaron Stewart's *Dance of the Bears (excerpt)*

an ostinato such as in *Employment Tingo Tango*:

mirror counterpoint as in *Smeagol's Mirror*⁸²:

⁸² See appendix i

a displaced motif found in *Monkey Bars*:

or a contrapuntal duet transcription such as *Bach's Inventions*...

21. Syllabic pronunciation can be extended to include speech-like singing through the instrument while playing harmonies as in *Smeagol's Mirror*⁸³:

22. While limited due to the embouchure formation, the voice can also approach a throat singing effect while playing another harmony. This is asked for in Joe Fiedler's instructions for *Pyramid Lake*:

⁸³ In the song, it is necessary to over-accentuate all diction and also roll the rrrs to project audible words over the played tones. Tuba seems best for making word clarity

CONCLUSION

Brass multiphonics has a long tradition originating from the folk music of the Australian Aboriginals, and probably early African, Asian and European use of animal horns. The technique was adapted into western classical music in the 19th century, and has been acquired by jazz artists from vaudeville on in imitation of vocalisations. In the 1960s several jazz brass musicians brought the multiphonic technique into their armoury as part of the timbral and stylistic expansion that occurred with the avant-garde free music catalysed by accompanying societal changes. These societal changes included war protest and the hippie movement, disillusionment and militancy against racism, and the sexual revolution due to widespread contraception, rock and roll and drug culture. Heralding the musical changes were Roswell Rudd, Paul Rutherford and Albert Mangelsdorff. Their innovations were subsequently followed by other brass players, from the 1970's on. The most adept at employing multiphonics into both the mainstream harmonic structures and various instrumental groupings including solo, was Mangelsdorff.

Mangelsdorff developed the technique initially from imitating birdcalls, and subsequently gained tonal control of the intervals and resultant tones in order to play in functional harmonic jazz settings. He wrote a great many individualistic compositions incorporating various aspects of multiphonics, including: parallel intervals, wide intervals with falsetto, cadences. He later developed a degree of control over both contrary motion lines and held notes below (and very occasionally above) a moving line.

From Mangelsdorff, the researcher has taken and extended this counterpoint technique and applied it to Bach's 2-part music and various original music settings and arrangements in performance. The researcher has also explored possibilities inherent in speech/word vocalisation through the horn while playing, and the application of throat singing technique and signal processing to bring out/filter the tonal spectrum.

The process of developing multiphonic technique has been documented from the researcher's own practice, with aspects of the arising problems and concepts discussed and conclusions drawn from the findings.

This research is important because it is in an area that has had little previously written about it in research terms, particularly in the jazz field. This work appears to be among the first academic papers covering brass multiphonics and the work of Albert Mangelsdorff from an historical and analytical standpoint. It increases the field of knowledge for specific practical applications by brass and jazz musicians. Also, the researcher has presented new compositions to extend his ability in multiphonics towards, and in some elements, beyond what has been accomplished previously with regard to counterpoint and linear independence.

It is hoped that further research will be undertaken exploring this subject, with still more fruitful possibilities in the areas of timbrel combinations and counterpoint, and compositions drawn from Mangelsdorff's direction. It is the opinion of the researcher that multiphonics technique and facility, sound and intonation have yet to be optimised in the sphere of jazz. The various uses of electronic signal processing combined with multiphonics is one avenue to be expanded on, both by jazz players and researchers, and it is hoped that this will become evident in the future. The possible achievement of improvising 'freely' while satisfying harmonic principles with 2 (...and counting the ghostly resultants, *maybe 4....?!)* simultaneous melodies is a difficult and yet surmountable challenge. It is this journey that is pointed to, and can be extrapolated directly from Mangelsdorff's work and this research.

Nick van Dijk

10 JUNE 2009

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APPENDIX I

ANNOTATIONS AND MUSIC PLAYED IN RECITAL

There follows the programme notes and brief descriptive analysis for the researcher's recitals for Masters in performance, and specific analysis referring to the transcribed music is in italics. After the title there is the level of the multiphonic difficulty as categorised in appendix ii Composers Guide.

PROGRAMME NOTES FOR RECITAL 26th MARCH 2009

A Jazz Tune I Hope (intermediate)

By Albert Mangelsdorff from *Hamburger Idylle* 1978. This song features parallel 6th intervals in Multiphonics. the lower tone played while the upper tone is sung simultaneously. Mangelsdorff chose to filter and blend the sound on this piece further with the use of the rubber plunger mute. The original version features Elvin Jones on drums, Eddie Gomez on bass, and Wolfgang Dauner on piano. The evocation for me is that of a turkey strutting (Mangelsdorff was a keen ornithologist). Mangelsdorff points to this song as being a turning point in his multiphonic technique, which he had been developing at least since a solo performance at the 1972 Munich Olympic games. In 1978 I was 10, intrigued by scuba diving and the Star Wars phenomenon and that year began playing the euphonium. Mangelsdorff's solo style incorporates quartal lines and extended trombonistic techniques with the motivic melodic development style derived from saxophonist Lee Konitz.

The sixths and 5th intervals are consonant and create triadic effects with the summation and difference tones that enrich the trio harmony. It is parallel playing and covers the middle and high vocal register.

Street of Loneliness (Basic)

By Albert Mangelsdorff from *Hamburger Idylle* 1978. An open and almost bleak composition uses parallel 5ths and mallets on the drums to draw the listener in to a European night scene. The 5ths reinforce the harmony as the resultant overtones include a strong tenth or third, creating a ghostly triadic blend of trombone timbre. We play it with a slight hip-hop attitude, interpreting the original derivation of alone as 'all one'. The bass line (now doubled in the piano's left hand) is as played by Eddie Gomez and we incorporate a metric modulation 3:2, the same ratio as the frequencies of the interval of a fifth.

Split Tone (intermediate)

By Joe Fiedler from *The Crab*, 2008. Joe Fiedler is a New York based trombone player who has followed and extended Albert Mangelsdorff's style. This piece features complex intervallic single lines interspersed with long, almost static multiphonic chords. For me it brings to mind a sound picture of the movement and mood of crabs amongst the rocks. Fiedler has a rather

raucous and raspy tonal approach to the multiphonic sound which brings out the higher overtone partials of the chords. This contrasts aptly with his smooth lyrical single line playing.

This technically demanding piece demonstrates call/response between the fast single note lines and slow multiphonic chords. It also features fretted playing (where the slide moves in as the notes ascend, so as to bring out the fastest lines), wide intervals, and odd tuplets such as the quintuplet in the last 4 bars.

Dance of the Bears (advanced)

By Aaron Stewart, 2008. I had the pleasure of teaching Aaron for composition in 2007 and 2008, and this loping dance was played at his BMUS Honours composition recital. I have adapted it from a clean trombone trio arrangement to incorporate and showcase the various usages of Multiphonics. This includes one section where the sung tone is below the played, a rare occurrence in recorded jazz (Tomasz Stanko does use this technique on trumpet), and a mixture of contrary and parallel part movement that occur in mainly wide intervals. I believe Aaron has captured the nuance of bears dancing in the wild, and we will do our best to portray this rarely witnessed and fanciful social behaviour.

This extended composition has several sections that all employ slightly different Multiphonic intervals. The part movement is mainly consonant, but uses contrary motion, generally with the same rhythm for the upper and lower sung/played lines.

Earl Grey (intermediate)

By Nick van Dijk 1991. Originally recorded for a RNZ programme, this composition was also played for our wedding, and is in the style of a tea dance, I imagine one where Thelonious Monk may have been employed as sideman. It again uses the stable and rich interval of 6ths, with some moving played-notes under held sung tones.

Like Mangelsdorff's compositions A Jazz Tune I Hope, and his arrangement of Mood Indigo, this piece uses the 6th intervals for harmonic richness in a functional way. The B and C section have some different rhythms and oblique linear direction between the sung and played parts.

Lowburn (advanced)

By Nick van Dijk 2009. This song reflects a wonderful time at the Queenstown Jazz festival, and a subsequent gig for the Cromwell Rotary Club at a picturesque lifestyle farm overlooking Lowburn heights near the lake. There was sweet music, good wine and warm people. The composition uses a variety of intervals and some contrary moving rhythms and lines, which is a direction that has yet to be fully explored in brass multiphonic performance.

The style is similar to the jazz band ROOT 70, with counterpoint in both rhythm and line between the sung and played parts. It has an odd tuplet cross-rhythm going into the B section, and follows a harmonic scheme of mainly major chords with some surprise tonal keys. In its mood, it is also

similar to Curtis Fuller's composition Lido Road from the 1959 recording 'Imagination'

Monkey Bars (advanced)

By Nick van Dijk 2008. A quirky piece meant to reflect the fun of my youth as an intermediate school student swinging on the jungle gym. It also examines the typical behaviour of monkeys and chimps as observed from recent gigs at and visits to the zoo. It introduces variously some free playing, wider and more dissonant intervals, a delayed motif between played and sung notes, and a unison trombone and bass ostinato. A figure from Ride of the Valkyries may be heard sneaking into the bass part.

Displacement of phrases between sung and played lines occurs as the basis for composition. The odd time section for the solos gives a disjunct feel.

For Albert (Intermediate)

By Joe Fiedler, from ...Plays the Music of Albert Mangelsdorff, 2004. This poignant ballad is a tribute that shows a soft side to the multiphonic technique, accompanied here by brushes and gentle piano, it seems to also have some influence from Duke Ellington, and demonstrates a full harmony by drawing by Multiphonics chords that are additional colorations to the root tones played by the bass. Fiedler suggests this is a difference between his compositions and those of Mangelsdorff.⁸⁴

⁸⁴ From correspondence between the Author and Joe Fiedler, November 2008

PROGRAMME NOTES FOR RECITAL

26th MARCH 2009

MULTIPHONIC JOY (basic)

By Nick van Dijk 2003–9

This composition features the ambient sounds of ethnic instruments including the didgeridu, kalimba, conch shell, the rain stick, and taonga puoro to create a sense of the deep history of the multiphonic traditions. It mixes digital effects and arrives at a composition called Joy, played with flugelhorn and tenor saxophone which can be heard on Rata Records 'Oceans Like This'

The constant circular breathed drone from the Didgeridu is then played under the sung flugelhorn rubato melody, and finally the played tones follow a moving harmonic scheme. In this piece, the sung part is necessarily high falsetto register, and the drone low (low Bb)

ALBERT MANGELSDORFF COMPOSITIONS

SOLO TRANSCRIPTIONS FROM PURITY 1990:

These pieces are all from the same recording late in Mangelsdorff's career, and share unified motifs and compositional craft that makes the recording a satisfying whole.

FUR PETER (intermediate)

This demonstrates very wide and dissonant intervals and is dedicated to his previous bass player Peter Trunk.

Indeed the whole piece has a heart rending quality because of Mangelsdorff's choice of rich dissonant intervals that create complex summation and difference tones, finally released at the last chord (a 10th). The second repeat has added between the phrases, some improvised single note lines in a prayer like cantation.

MORBIDIA (advanced)

Contrary and oblique moving intervals alternating with single line improvisation makes this solo piece develop through 8 minutes of solo playing

PANTALONI (advanced)

Translation "Pants"

There is the main motif of the initial three contrary stepwise notes, that demonstrates Mangelsdorff developing some functional counterpoint with similar rhythms in 1990

HORN IS A LADY (intermediate)

Sweet and short statement of the nature of an instrument

This composition is related by motivic material⁸⁵ to these other pieces on Purity Fur Peter, Morbidia, and Brief Impressions of Brighton, showing Mangelsdorff was conceptualising a CD that has compositional integrity and economy.

BRIEF IMPRESSIONS OF BRIGHTON (intermediate)

A Trio piece which is impressionistic of the seaside tourist town with its carousels and sand. Appropriate to the recent impressionist exhibition at Te Papa that includes many paintings by Monet.

This composition has a rubato feel, and was recorded in both solo format, and trio. The open and more consonant intervals give a pleasant and dance-like quality even as the tempo moves.

PYRAMID LAKE (advanced)

by Joe Fiedler 2008

Features consonant intervals in contrary motion, with a section of circular breathing and 'Tibetany' overtone sing/chant

The overtone singing while performing a sustained perfect 5th is produced in the manner of Tuvan throat singers, that is; the performer accentuates the upper summation harmonic tone, and uses modulation of the throat, embouchure and tongue to phase through partials 5 (the '3rd + 2octaves') to about 9 (the 2nd + 3octaves). The consonant contrary intervals of the theme in bar 2 and 3 demonstrate the 'funneling effect' towards the stable consonant intervals described by Baadsvik.⁸⁶

INVENTIO 9 (advanced)

Although an open-minded musician, one can be quite sure that JS Bach had no intention of having his clavier piece played like this! Originally written as a didactic work for his son to learn the fine points of counterpoint at the keyboard, these inventions have become a staple for classical pianists and do wonders for clarity of mind, with their logic and cohesion. I love Glenn Gould's interpretations, which appear to follow on from his Goldberg Variations recordings in the concept of an insomniac awake/drifting off. I can also envision Bach playing the top line on viola while his young son Frederick plays the lower part. To my knowledge, this level of multiphonic counterpoint has not been achieved before.

This, and the other Bach piece required the most preparation, as it has complex counterpoint throughout with generally contrary motion and different interweaving rhythmic subdivisions of 16th and 8th notes. It is transposed down a fifth to accommodate the author's vocal range. Certain of the phrase pitches are displaced by an octave for ease of performance. Breaths are essentially stolen, as it is a typical ever-spinning Baroque linear dance throughout. Articulation is legato.

⁸⁵ For example, notice the motif of bar 1 Horn is a Lady = b15 of Pantaloni = b3-4 of Morbidia = b 5 and main motif throughout of Fur Peter.

⁸⁶ from correspondence between the author and Baadsvik. October, 2008

INVENTIO 11 (advanced)

A more paced study in counterpoint

Upper sung part is articulated with 'Dah' throughout. Bars 4 and 11–16 are particularly problematic in terms of range and intervallic clarity, and require repeated isolated slow study.

SMEAGOL'S MIRROR (advanced)

An attempt to sing actual words through the Tuba as the mirror reflection is played in notes in the opposite direction. It pictures Gollum from Lord of The Rings at a river where he is fishing, seeing his twisted hobbit features and through paranoia seeing his schizoid tendencies and his initial sweet hobbit nature reflected.

This spoken/sung word technique is used by Stuart Dempster, Steve Mead, and several of the free players such as George Lewis, Conrad Bauer, Paul Rutherford. It is difficult to make clear, and requires an exaggerated diction, particularly on the consonants that require lip movement (these can be 'faked' to some degree, maybe outside the mouthpiece on a n initial or final consonant sound). The contrary melodic reflection is an acquired skill that needs some practice. It can be heard in much of Cecil Taylor's playing (the piano has symmetry left and right from the mirror-point tones D and Ab)

ANT STEPPED ON AN ELEPHANT'S TOE (basic)

This was arguably Albert Mangelsdorff's most successful and popular composition. It was played at the Berlin Jazz Days Festival in 1976 with Jaco Pastorius and Alphonze Mouzon and released in the live recording Trilogue, and the subsequently recorded CD Solo Now. It merges Jazz-rock fusion with a funky telling of the nursery rhyme-like story poem in music:

"Way down south where bananas grow,
An ant he stepped on an elephant's toe.
The elephant cried with tears in his eyes,
Why don't you pick on a guy your own size?"

This piece is an example of the Jazz-rock application of Multiphonics. It uses variation of the tri-tone interval D & Ab as a Multiphonic chord (perhaps denoting the elephant's shock or pain), and the pedal Bb which gives a sense of weight (and stomp...).

EMPLOYMENT TINGO TANGO (advanced)

By Nick van Dijk 2008

Tingo is an Eater Island word that is defined as the dubious practice of a person stealing things he or she desires from the house of a friend without them realising. This piece features a Habanera ostinato bass-line and an insistent melody, at times sounding serenity, at others, fury.

The played part is essentially an arpeggiated bass-line covering the root, 5th and 10th of each chord, while the sung melody is mainly stepwise. In its multiphonics, this piece requires the most lip flexibility while maintaining a smooth sung part, (perhaps something akin to patting the head while rubbing the stomach). The improvised section begins like this, which is somewhat challenging, and then becomes freer, based on stylistically familiar tango sounds in A minor and Bb minor.

APPENDIX ii

WORKSHOP AND CONVERSATIONS REGARDING MULTIPHONICS

Tomasz Stanko Clinic Illot Concert Chamber, Wellington, March 7th

When asked about his beautiful tone replied "... I play multiphonics to develop the sound" [demonstrates on one played note, while singing a fifth lower, and gradually down the scale to the octave. Also demonstrates briefly singing above the played note].

In Stanko's concert that night, he was heard to play in the middle and lower registers while singing consonant perfect intervals below with his natural (non-falsetto) baritone voice producing a growl type of effect. The usage seems to be both for timbral expression and harmonic effect. Another way the singing was used was in the high register, as played notes were fingered fast above a constant sung pitch (probably falsetto?). Both these techniques can be heard in his recent ECM recordings such as *Suspended Night*⁸⁷ and *Lontano*⁸⁸.

Stanko seems to have great control over this, but uses it sparingly, and not apparently in contrary motion.

Matt Schulman, in contrast to Stanko plays lower and sings higher tones in falsetto, creating a different sound and having more standard jazz harmonic function.

Quotes from a meeting and discussion with Bass Trombone and Tubist Earl MacKintyre, Wellington, March 7th 2009

- "The singing should come from the back of the throat" [demonstrates oo and uuu]
- "Play and sing in tune to develop the third note clearly" (i.e. the upper resultant/ overtone)
- "Experimenting with alternate fingerings or slide positions will help find how to bring out the third tone strongest"
- "Work on the difficult music in short sections, such as 4 bars"

⁸⁷ *Suspended Night*. CD, Tomasz Stanko Quartet. 2004 ECM records,

ASIN: B0000V765G

⁸⁸ *Lontano*. Tomasz Stanko Quartet. 2006 ECM records. **ASIN:** B000GKH246

EXCERPTS FROM EMAIL CORRESPONDENCE WITH THE RESEARCHER

From: Joe Fiedler

Joe Fiedler

Hi Nick,

Good to hear from you. Its nice to hear that someone else is interested in the music of Albert. Since you are already into the multiphonic technique and have already transcribed some of Albert's solo music, there is probably not too much that I can add. However I have attached some tunes of mine to help you see where I am headed with my approach. As I have studied and transcribed a lot of Albert's music myself, the one thing that I'm moving away from is the idea that the "played note" (as opposed to the "sung note") is the root of the chord. Albert tends to have the root movement of his tunes follow the played note whereas in my music I am assigning the root to the bass and am using the Multiphonics for color notes. (See "For Albert" and "Split Tone" both tunes are on my most recent trio CD, "The Crab" also on Clean Feed records. You can hear "For Albert" at [www.myspacemusic/ joefiedlermusic](http://www.myspacemusic.com/joefiedlermusic)) As for solo playing, I have attached a simple tune of mine "Pryamid Lake" which is a good example of the use of contrary motion using particularly resonant intervals.

Best,

Joe

PS There is a great quartet version of Horn is a Lady on a John Lindberg CD called Dodging Bullets with Albert. (check it out here: <http://www.emusic.com/album/John-Lindberg-Dodging-Bullets-MP3-Download/11331872.html>)

And also one of Alberts last recordings, "Concert for Jazz Orchestra" uses it as well. It is part of the Second Movement.

Email From: Joe Fiedler

Hi Nick,

I do practice with a plunger sometimes. I really enjoy that sound/texture, but I'm trying to go with the open horn sound for the Multiphonics. Perhaps I associate the plunger/Multiphonics sound so closely with Albert? I use the plunger more in the vein of Ray Anderson. As for the singing. I do practice singing, just with my voice—sometimes at the piano. Also, I practice a lot on the horn, but not with just the mouthpiece. I have heard that Albert did that as well.

Thanks for the transcriptions. I actually have transcribed them myself many years ago. Its so great to see someone else digging that CD.

Best,
Joe

Email From: John Kenny

Dear Nick,

Nice to hear from you. Well, Multiphonics have been around for a very long time – indeed, for as long as human beings have been playing wind instruments, since both the use of the voice with lip or reed vibrations, and various forms of venting, cross fingering, or "lip Multiphonics" have formed part of the basic sound world of these instruments in every culture that have developed them.

In spite of this, Western "art music" ironed such imperfections out by the end of the medieval period, and it is only in the 20th century that they these impure sounds have become accepted again. This has been a *recrochement* from all sides: in jazz, improvisers naturally experiment with sound as an extension of emotion, and things that happened "by accident" are taken on board and replicated as established stylistic devices. Post war experimentalism looked for any possible extensions of the timbral palette of all instruments, and from the late '70's the so called "world music" movement delved into other cultures for inspiration.

In the case of the trombone, there is a huge amount of compositional use of Multiphonics. Look at: Alsina, Berio, Xenakis, George Nicholson, James Fulkerson, Helmut Lachenmann, and if you are so moved, my own music in print and on CD.

In jazz, Albert M was a master of the same generation as "straight" pioneers Globokar Europe and Dempster in the USA. How about Stephan De Haan in Australia, and James Fulkerson USA/Holland. A great current jazz master is Nils Wogram in Europe, or Ray Anderson in the USA. Once again, you might also like to listen to some of my own stuff, since I bridge the straight/jazz divide – and as such, I'm a "child of my times", like many friends and colleagues.

Multiphonics just means "more than one note at the same time" – there are two great classes: vocal & lip. To produce the former, sung notes are produced along with lip vibration, and either pure chords or complex rolling sounds can be produced. In the latter, a complex combination of tones is produced with the lips alone, by aiming "between" two adjacent harmonics. They are extremely effective, but far harder to produce and control than the vocal variety.

I hope that answers some of your questions!

All the best,
John

Email From: Wes Funderberg

Nick!

What's up?...I'm glad you like the podcasts. They are a lot of fun to do and Dr. Tom's podcasts are just wonderful.

Multiphonics...There are so many great players to check out. Of course, Mangelsdorff. But then there's Ray Anderson, James Morrison, Bill Watrous, Joe Fiedler, Paul Rutherford, Dick Griffin (<http://www.trombone.org/articles/library/viewarticles.asp?ArtID=85>) ...I'm sure there are tons of guys that I can't think of immediately.

It sounds like you're on the right track as far as practicing. Easy duet books like Rubank are good for pitch and general maintenance. You don't need to play anything too difficult right away (Bach Inventions seem pretty extreme but if you can do it, great!). I recommend picking up Mangelsdorff's album "Trombonliness". It's all solo trombone but his melodies are just beautiful and so well-structured. The tune I transcribed was "Do Your Own Thing" (the one on YouTube). I've been listening to "Trombonliness" since I was 14 (I'm 34 now) so I know that album like the back of my hand...therefore it was relatively easy to transcribe (by ear). I figured out the form of the tune first, then learned the played notes and then the sung notes. It helped that a lot of it was open fifths...

Also check out Joe Fiedler's album "A Tribute to Albert Mangelsdorff" available on iTunes. He transcribed 9 tunes and re-recorded them. It's quite impressive.

Wes.

Email From: Howard Johnson

Hello, Nick

Your e-mail came at a very intense time. That's the reason (but not an excuse) for the late response. The other thing is that it will take some time to put into words, that which is best either demonstrated or simply attempted and experimented with.

Tuba Multiphonics tend to be more sympathetic than the trombone version, but the sonic rules are the same. Some trombone and some tuba players use their falsetto voice and I don't have one, so I'm not sure how that changes the rules. But, using full voice, it basically goes like this:

- 1) Voice a fifth higher than the note played makes a tenth.
- 2) Voice a sixth higher makes a half step higher than the tenth.

2 to 1 makes a nice Christian a-men

After that (which you probably already know), just experiment. Find your own ways.

While I am glad that you wrote to me, I'm not a Multiphonics expert, so I hope that this basic info is useful. If you have the CD "GRAVITY!!!", in that long cadenza at the end of "Kelly Blue", I incorporate some simple Multiphonics that just happen to express the blues. Try that. Also, see if that eerie sound you get from voicing unisons is of any use to you. Your voice pitch and the tuba pitch are never quite the same. I like that sound. Have fun!

later, Howard Johnson

Email From: Øystein Baadsvik

Dear Nick,

Here are some lines that I just wrote to a composer on Multiphonics:

All intervals work in Multiphonics but it is very important to understand that it is NOT the same as playing intervals on a cello or piano. All intervals in Multiphonics will add a THIRD note to the harmony. Namely the difference in hertz between the lowest and the highest note. Ex if you play 230 Hz and sing 245 Hz you will also add a third note with 15 Hz ($245 - 230 = 15$). This means that it makes absolutely no sense to write a two note harmonic passage without taking in account the third note. Which is very hard to predict.

The presence of this third note varies with the vowel used when singing. In other words, the result is VERY unpredictable.

If done perfectly in tune this creates completely new sounds and harmonics that can captivate the audience.

If done poorly and out of tune this can really make the audience not come back after the intermission.

I find that most brass players do not understand how much work needs to be put into mastering this.

Compare it to double stops on the violin. All string players know and accept that it takes years and years to master this. Most brass players do this occasionally and spend far too little time on it.

However, if you write plain octaves and fifths it is much more easy for two reasons: 1. Both notes affect each others to help it in tune. It works almost like a funnel. 2. For most players hearing that an octave is in tune is easier than tuning in a diminished ninth.

I have yet to see a method that addresses this challenge methodically.

All the best,
Øystein Baadsvik

APPENDIX iii

COMPOSERS GUIDE FOR WRITING MULTIPHONICS

What are guidelines for writing Multiphonics from a brass instrument?

- 1 Follow the following global principles
- 2 Avoid what is generally ineffective
- 3 Write for the level of the player as categorized below
(Basic, Intermediate, or Advanced)
- 4 Consult the player to determine the possible range and idiosyncrasies in

GLOBAL PRINCIPLES

- Voice mostly or always above the played tones
- Keep within the ranges of voice and instrument
- The lines and sounds must be thoroughly internalised, imaged and produced at the same time, so simple is good
- The voice part should be able to find the start tone of each phrase, either from reference to the last sung or played note, or some other clear pitch reference
- The louder, closer/more dissonant the intervals, the stronger the overtone distortion, but generally keep to mid dynamics $mp < mf < f$
 $> mf > mp$
- Voice is generally softer than played sounds
- Consonant and wide (compound intervals) are the most stable, self-reinforcing intervallic structures where the parts are individually clearest

- Normal and head voice have different strengths, weights, tonal spectrums
- Sung part generally never on its own without played tones, unless the player is a trained singer (e.g. motorbike concerto)
- Generally suits legato and slow for pitching and formation of over/undertone chords
- Make both parts singable, generally with the same activity or the voice slightly more active
- account for breathing space and some rest between long phrases, as Multiphonics requires **more** air and endurance

GENERALLY IN-EFFECTIVE

- Large interval jumps
- Humming/singing through the nose
- Harmonic Intervals of semitones and tones
- Extreme soft
- Voice below played tones for a sustained time
- Un-amplified brass Multiphonics in combination with an ensemble who are playing at medium to loud dynamics in the same frequency ranges

GUIDELINES FOR General Multiphonic Technique

○ **E.G. James Morrison, Baadsvik's Fnugg, Howard Johnson, Bill Watrous**

- Consonant intervals octaves, 5ths, 6ths, 10ths
- Drones or Parallelism
- Played drone with sung glissando
- Same rhythms
- Mostly slow, long notes
- Non pitched cries a la didgeridoo
- Single harmonies or cadences in isolation
- Being able to easily hear both tones (particularly the sung) so a set up of that note before in a single line phrase is a good idea
- No crossing of parts, voice on top
- Low range brass, mid range voice
- Generally the played tone is root of harmony
- Stepwise and easy melodic parts

GUIDELINES FOR Extended Technique Multiphonics

○ **E.G. Mangelsdorff, Nils Wogram, Matt Schulman, Ray Anderson, Ed Neumiester and Christian Muthspiel**

- Precision intonation and tone
- Low range brass mid and high (head) range voice
- Parallelism mixed with slight oblique and contrary movement
- Good melodic voice leading, steps within parts
- Extended lines of same or very similar rhythm
- Any intervals from a fourth to a 16
- No crossing of parts, voice on top
- Both lines easily heard
- Combine and blend Multiphonics with Plunger mute or other mute
- Vowel changes with Multiphonics (E.G. Fnugg by Baadsvik)

GUIDELINES FOR Advanced Extended Technique Multiphonics

- **E.G. late Mangelsdorff, Joe Fiedler, Conrad Bauer, Wolter Weirbos**
- Any interval within the whole range of voice and instrument (not the extreme high or low major 3rd of instrument however)
- Crossing parts ~ still keep the majority in the voice below played part
- Played tone often not the root
- Contrary pitches and/or rhythms
- Medium tempo to Fast passages
- Extended dissonant interval phrases

EFFECTS THAT CAN BE COMBINED WITH MULTIPHONICS

- ‘guitar’ effects processing added from a microphone signal [any level]
(Robin Eubanks)
- flutter and/or multiple tonguing [any level] (Conrad Bauer, Stuart Dempster)
- Scream [any level] (Wolter Weirbos)
- Lip buzz/sung and mouthpiece/sung with played
[intermediate/advanced level] (Stuart Dempster, Nils Landgren)
- Circular Breathing [intermediate/advanced level] (Didgeridoo, various)
- Singing words while playing a tone or line ~ probably of the same
rhythm [intermediate/advanced level] (Mead)
- Combined with lip trills/extreme lip flexibility/ [advanced level]
(Mangelsdorff)
- ‘Throat’ singing harmonics with tongue position [advanced level]
(Fiedler, Wogram)
- Combination with beat-boxing and/or turntable mimicry [advanced
level] (Nat MacKintosh)

APPENDIX iv

MULTIPHONIC PRACTICE ROUTINE

DEVELOPING A MULTIPHONIC PRACTICE ROUTINE

A through G of the above exercise, or similar, could be employed daily as part of a standard warm up for an intermediate to experienced player, as it quickly brings the player an even and open tone with good air flow.

Experimenting, curiosity and fun free improvised play are important for a jazz player interested in expanding their technique.

Multiphonic concepts; developing from easy to more difficult:-

- long tones unison, consonant interval, dissonant
- basic cadences, step sung to consonant interval on held buzz drone
- chord sequences in 2 part parallel and/or contrary
- pedal tone buzz – voice scales, a set melody or free
- pedal tone sung buzz free
- parallel scales constant consonant interval or dissonant
- Mangelsdorff & other melodies
- contrary scales
- simple duet with one part slow or swapping activity
- equal activity duet (from duet books, composed, or improvised)

For all exercises while attaining the technique:

Transpose the music to suit your range(s)...

Sing strongly, listening for pitch and upper resultants...

Slow and sure...

Project...

Play with good air and posture...

Minutely adjust tongue position, embouchure, lip pucker and horn angle to achieve the desired balance and tone....

When proficiency becomes secure, the player may wish to:

vary: scale type and tonality, dynamics, range, rhythm, feel, tempo...

Make up and write their own exercises...

ADVANCED MULTIPHONIC PRACTICE IDEAS

- Practice additional fun free improvisation with Multiphonics
- Include walking bass-line and solo (like blues or a tune)
- Employ a constant ostinato (E.G 'the employment tango')
- Improvise contrary patterns as from the Bach style, as well as full scales in mirror (intervallic reflected) and diatonic mirror.
- Utilise a Play-along (E.G Jamey Aebersold) for interacting while playing a more parallel style harmony
- Use non similar rhythms or different rhythm groups or divisions
- Imagine in the 'minds ear' the perfect playing of Multiphonics for a few of minutes each day before practice
- Beat-Box, alternating with funky riffs