An Implementation of

GOOGLE GLASS

in the Context of *Gazebo Dances* by John Corigliano

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Contents

About This Project

There are no set standards for undergraduate honors projects throughout Cornell University. Variance exists both at the college and department level, making each project very individual in nature. As such, this paper is neither an exhaustive score study on *Gazebo Dances* nor a complete guide to programming Google Glass. Instead it is quite reflective, and discusses research implications in using Glass[1] through the lens of *Gazebo Dances* and other works for wind ensemble. Other useful references are included for those interested in learning more about *Gazebo Dances* and Glass.

[1] Google Glass and Glass will be used synonymously throughout this document.

Chapter 1

"Gazebo Dances for Band" by John Corigliano

1.1 Why *Gazebo Dances*?

When Dr. Turner and I met to discuss my project at the end of last school year, we knew that her new pair of Google Glass would likely arrive over the summer. After a brainstorming session, we came up with several uses for Glass in performance. One of these ideas was to conduct a work from the device, abandoning a paper score. Knowing that screen size was going to be an issue, I reviewed works for wind band that are transcribed from instrumental solos and chamber groups to larger ensembles. Since my first encounters with John Corligliano's *Circus Maximus* and *Concerto for Clarinet and Orchestra*, I have been greatly interested in his compositions. I knew that *Gazebo Dances* was originally written for four hands piano and later transcribed for wind band. After studying the piano edition (as the instrumental score is available on rental only), I proposed the project idea to Dr. Turner: combine Glass with *Gazebo Dances*, a work for wind ensemble that could be easily condensed into its original form.

1.2 About

Gazebo Dances was originally composed in 1972 for piano four hands by John Corigliano [1]. The work was not commissioned; each movement was written for a different person in Corigliano's life. The first movement is dedicated to his mother and her best friend. The second is dedicated to John Ardoin, a music critic.[1] The third movement is dedicated to Heida Hermanns, who was Corigliano's father's accompanist.[2] The fourth

[1]The ties between Ardoin and Corigliano are unclear. It's likely they were friends; Ardoin died in 2001.

[2]Movement four was later arranged for piano solo. This version of the "Adagio" is dedicated to his late friend Sheldon Shkolnik, who died of AIDS. Corigliano and Shkolnik gave the premiere performance of the original version.

and final movement is dedicated to Corigliano's close friends Jack Romann and Christian Steiner.[3]

The exact date that *Gazebo Dances*[4] was arranged for wind band[5] and orchestra is slightly ambiguous. The work was first performed on June 5, 1973 by the University of Evansville Wind Ensemble, but the official date of composition is 1974.[6] Therefore, Corigliano wrote the composition before or during 1973, but did not finalize it for publication until later. Warren Olfert states that the transcription of *Gazebo Dances* for orchestra took place during 1974 [4]. It is interesting to note that the orchestral version was not performed until February 20, 1981, seven years after Corigliano completed the transcription.

Another point of ambiguity is the official title. The score and publication lists it as *Gazebo Dances for Band* [1][4]. G. Schirmer lists the title as *Gazebo Dances (for band*), with "for band" serving as a subtitle[7]. Recordings also similarly inconsistent. The recording by the North Texas Wind Symphony refers to the work as *Gazebo Dances (arr. for band). Gazebo Dances (version for wind ensemble)* is used by the University of Texas Wind Ensemble. Corigliano's own website refers to the title as *Gazebo Dances,* in contrast to the title in the score.

The score of *Gazebo Dances for Band* is handwritten, but not difficult to read. There are many inconsistent markings throughout all four movements. For example, in the opening of the piece, the snare drum, although rhythmically in unison with the rest of the ensemble, contains no articulations. Crescendos do not begin in the same places in the measure on unison lines. Measure numbers are marked every ten measures, versus where musical "events" occur. This requires more careful counting and preparation when telling the ensemble where to begin. There are many note errors and rhythmic inconsistencies between the score and the parts.[8] The score and parts are available for rental only through G. Schirmer. There are also two versions of the score, both with the correction date of February 1980 and the copyright date 1978. Besides the location of this date (top right on one and bottom left on the other), the scores are identical and contain the same errors.

Gazebo Dances is, on average, 14 minutes in length.[9] The first movement is ~4:45, the second movement is ~2:45, and the fourth movement is around ~2:30. The third movement is ~4:45, with the exception of

[3]Jack Romann previously served as director of the concert and artist department of the Baldwin Piano Company [5]. Christian Steiner is one of the world's foremost photographers of classical performing artists.

[4]Unless the piano or orchestral versions are mentioned specifically from this point forward, it is implied that the wind ensemble version is being discussed.

[5]The terms wind band, band, and wind ensemble will be used synonymously throughout this document.

[6]Verified from John Corigliano's website: http://www.johncorigliano.com/index.php?p=item2&item=115. Accessed on December 2, 2013.

[7]http://www.musicsalesclassical.com/composer/work/26984. Accessed on December 2, 2013.

[8]These are noted in the Errata section of this chapter.

[9]These lengths are averaged from several recordings: The University of Texas Wind Ensemble, National Youth Wind Ensemble of Great Britain, North Texas Wind Symphony, and the Illinois Wind Symphony.

the University of Texas Wind Ensemble, which is 6:37. This disparity is caused by a tempo discrepancy beginning at m. 13. All other recordings increase the tempo here; this increases the intensity and prevents the movement from becoming stagnant. The indication *Un poco piú mosso* exists only in the orchestral edition; neither the piano nor band editions contain it. Considering this edition is the most recent, it is possible that Corigliano heard it performed with the increase in tempo and decided to add it.

The instrumentation for the work is quite standard. Nine percussionists are required, although the ninth is only required for mm. 175-177 in movement one. There are many times that fewer than eight are required; for example, the third movement requires only three percussionists and only for three measures. The alto clarinet is featured in a section soli in the second movement, but the part is cued in first alto saxophone. The Eb clarinet also has a solo[10] that is not cued in another part. Other prominent Eb clarinet parts are cued in the piccolo.[11]

Gazebo Dances is a challenging work, and is only accessible to skilled ensembles. Corigliano employs both full ensemble unisons and exposed writing, so musicians must constantly evaluate their role in the overall ensemble sound. Several passages are written in unison in high tessituras; for example, movement one mm. 168-169 features piccolo, oboes, Eb clarinet, first Bb clarinet, and first trumpet, all in unison on a concert G5. Sections like these require rebalancing to avoid stridency. The main theme in movement two is frequently displaced by one beat, requiring a strong sense of internal pulse. Another example of the piece's difficulty is in the third movement; it contains two extended oboe solos, requiring a very skilled musician. The final movement is the most accessible, but still contains difficult passages for the low reeds and low brass.

Warren Olfert summarizes the work well in the conclusion of his analysis [4]: "The nature of the work is well-suited for winds and the resultant writing allows the wind ensemble to best display its assets. In particular, the solo and small ensemble writing offers challenges for each individual player that are highly expressive and characteristic of each instrument." *Gazebo Dances* is a delightful composition, and it deserves a larger role in the wind ensemble repertoire.

1.3 Publications

There are several recommended texts that discuss *Gazebo Dances*, both the original piano four hands edition and the version for wind band.

[10] movement two, mm. 17-20
[11] For example, the clarinet soli in movement two, mm. 90-93.

Olfert, Warren D. "An Analysis of John Corigliano's 'Gazebo Dances' for Band." Journal of Band Research, 29:1 (1993: Fall) p. 25-42.

Olfert's article is the definitive essay on *Gazebo Dances for Band*. Olfert briefly provides background on the work, then a thorough harmonic analysis of each movement independently. Although he discusses main themes and ideas, he does not provide a list of errata or more interpretative performance considerations (for example: balance, blend, and tempo.) His analysis is a wonderful reference for score study.

Hinton, Eric L. "Conducting the Wind Orchestra: Meaning, Gesture, and Expressive Potential." Amherst, N.Y: Cambria Press, 2008.

Hinton's book discusses conducting considerations for the first movement of *Gazebo Dances*, *Music for Prague 1968* by Karel Husa, *Celebration* by Edward Gregson, and *Morning Music* by Richard Rodney Bennett. In the chapter on *Gazebo Dances*, Hinton discusses main themes and relates them to other works by composers such as Stravinsky, Sousa, and Fillmore. These relationships provide interesting performance decisions, but it is still important for conductors to consider these relationships under their own advisement. They are well thought out and justified, but since they are not from Corigliano's pen, they are still only one conductor's interpretation.

In another section, Hinton discusses conducting decisions. The first topic relates to the opening measure. He writes, "Since the ensemble enters after an eighth rest, the conductor can provide two silent beats, one silent beat, or simply a strong downbeat." He immediately discards the last of these, stating, "It does not provide the player with enough information with regard to tempo, nor does it allow the player an opportunity to take an ample breath. This approach forces the ensemble to guess the length of the first note and therefore fails on the grounds that it lacks clarity."

Although Hinton's views are respectable, there are several fallacies in his reasoning. Assuming the conductor uses a consistent tempo throughout the rehearsal period, confirms the ensemble is ready before starting the piece, and clearly discusses the style of the opening of movement, a strong gesture of syncopation emphasizes the explosive nature that the opening of the work calls for.

Aside from this, Hinton's parallels to other composers and his other conducting advice is helpful. His book is also recommended reading for conductors looking to program *Gazebo Dances*.

Kim, Do Young. "A Structural Analysis and Selected Aspects of Performance of Gazebo Dances for Piano Four Hands by John Corigliano." Doctor of Musical Arts (Performance), August 2008, 59 pp., 1 diagram, 6 tables, 33 musical examples, bibliography, 45 titles.

This dissertation focuses on the original piano four hands edition of *Gazebo Dances*. Although the harmonic analysis is similar to the Olfert article, Kim provides a thorough background on John Corigliano and performance considerations, which Olfert does not provide. Some of these are relevant to the wind transcription; for example, he address the proper way to play a tied note into a capped accent.[12] Other less relevant discussion topics include pedaling and avoiding collisions between the *primo* and *secondo* players. The dissertation is still useful, but the Hinton and Olfert texts are considerably more helpful when studying the band score.

1.4 Errata

These errors were identified during CU Winds's rehearsal process (detailed in the next section.) The score's last correction date is 1980.

Part or Score	Movement and Measure	Correction
Score and Percussion	I, II, III, and IV	The score never indicates cymbal choices. Although it is generally obvious, the first movement is considerably crisper in sound when a stick is used with a suspended cymbal versus traditional crash cymbals.
Score	I, m.24	Flute 2 is missing a tie between beats 2 and 3.
Score	I, m.74	Ambiguous marking; the solo is in clarinet 2.
Score and Trumpet 2	I, m.139	*Not entirely errata, but an observation:* Trumpet 1 and 3 are *senza sord.*, but trumpet 2 is muted. The score reminds trumpet 2 at m.135 to be muted, but it seems odd that two thirds of the trumpets would be open on a unison line.[13]
Score and Percussion	I, m.139	*Not entirely errata, but an observation:* There is no crash cymbal hit on beat 1, but the orchestral version and the recording by the North Texas Wind Symphony includes it.
Score	I, m.172	The bells rhythm is difficult to read. It should be an eighth rest, two sixteenth notes on G, and an eighth note G on beat 2.
Score and Bassoon	II, m.40	Missing crescendo that exists in both the baritone and bass parts.

[12] In the band version, movement one m. 7-8. In the piano version, movement one m. 8-9.

[13] When I conducted the work, I had trumpet 2 play *senza sord.* The blend and intonation was considerably better with the consistent, unmuted sound, and it gives the passage the desired sense of climax in the slower portion of the first movement.

Alto Sax 1	II, m.83	In the alto clarinet cue, the last eighth note should be an E and not a C#.
Percussion	II, m.85	Instrument is ambiguous; it should be triangle, not snare drum.
Flute 1	II, m.107	Key change is missing to E major.
Score and Bassoon	II, m.100	Missing articulation on beat 1 — should be staccato and accented.
Clarinet 2	III, m.4	Clarinet 2 has an incorrect tie. Both halves of the measures should have phrase marks, but not ties.
Score	III, m.24	Trombone 1 & 2 are missing a slur from the "e" of beat 4 to beat 5. The part is correct.
Tuba	III, m.24	The tuba part has an extra eighth note; the score is correct.
Tuba	III, m.25	Missing time change to 4/4.
Percussion	IV, m.175	Measure marking 175 is in the incorrect location.
Score and Percussion	IV, mm.175-176	*Not entirely errata, but an observation:* A soft stick roll to a hard stick attack is extremely difficult, if not impossible. Two players are required, or it might be easier to simply have the roll be with sticks as well.[14]

1.5 Rehearsal Schedule and Report

I had the opportunity to rehearse and perform *Gazebo Dances for Band* with the Cornell University Winds this semester. Below is my rehearsal schedule and a reflection after each rehearsal. Generally speaking, *Gazebo Dances* was allotted 45 minutes of rehearsal time in the beginning of the semester, and 30 minutes closer to the concert (due to the addition of another work on the program).

The rehearsal scope is my own addition, and is rated on the following scale:

Very Macro — Broad strokes on the entire piece, or several movements.

Macro — A single movement through its main themes and form.

[14] When I conducted the work, I had the preceding roll be with hard sticks.

Micro — A focus on individual motives, balance, blend, shaping, etc.

Very Micro — Very specific matters, e.g., note length/attacks/releases, articulation, etc.

These reflections are more informal, due to the personal nature of journal entries.

Rehearsal 1 – 10/1/2013 – Very Macro

Plan: Sight reading, with as few stops as possible. Provide brief background to the work, its origins as a piano solo, and then play it!

Reflection: Good sight reading! Not too much to report here. We have a lot of work to do, but we mostly made it through the initial run.

Rehearsal 2 – 10/3/2013 – Macro

Plan: Read through movements one and three. Discuss their overall moods and figure out what feelings are evoked. "What do we need musically to make these feelings happen for the audience?"

Reflection: In 40 minutes, we successfully ran through and discussed main ideas behind the work. Descriptors for movement one included joyous, upbeat, and political (?). Movement three was well summarized by one student as "bittersweet." There were many blank stares from the ensemble when I asked for their input. Calling on students was necessary, but it got everyone more engaged. It is hard to tell how many of them enjoy actively learning about the work, versus just the "fix-it" mentality so frequently used in rehearsals. I believe it will help to grow their overall musicianship.

Rehearsal 3 – 10/8/2013 – Macro (some Micro)

Plan: Read through movement two, focusing on the same initial matters (moods, feelings) as for movements one and three in the first rehearsal. Start rehearsing movement one, pointing out the main themes and how they should be approached musically. If time remains, read through movement four, and explain that due to its straightforward nature, it will be rehearsed considerably less than the other three.

Reflection: Movement two went quite well. We took it initially under tempo (~132 bpm) to ensure playability, but quickly increased it to closer to performance tempo. Descriptors included "creepy circus" and "lopsided". We briefly discussed what characteristics give it this feel (frequent harmonic shifts and asymmetrical meter). In movement one, we focused on main motives and the best way to approach them musically. We also started speaking about style. The read-through of movement four was surprisingly poor. Issues were mainly caused by a lack of counting and confidence in playing the more exposed sections. This will be rehearsed on Thursday. Notes from Robert Issacs, “Continue ‘crowd sourcing’ your rehearsals; it makes everyone quite engaged. Your Socratic rehearsal technique is effective. Consider mirroring less (although it’s

helpful in these beginning rehearsals) and being more conscientious about the perceived dynamic size from your pattern. Take a slower tempo on trickier spots, if you believe it will assist in note accuracy."

Rehearsal 4 – 10/10/2013 – Micro

Plan: Start rehearsing movements three, four, and one, pointing out technically challenging spots that ensemble members will need to focus on individually.

Reflection: Now that we were a week into the piece, I wanted to draw folks' attention to problematic spots. This would give them a chance to get the correct notes under their fingers before we continued the rehearsal process. In the beginning of the third movement, I gave Nick (oboe soloist) some ideas about shaping his solo, and his use of vibrato. Due to the transparency of the ensemble during his solo, I recommended that he allow his tone to start straight, and then have the vibrato blossom. I believe this imagery worked well, and his sound greatly improved in the third movement overall. I also showed the clarinets the extremely high (and difficult to tune) soloistic writing in the third movement. In the fourth movement, I pointed out solos in the trumpet, clarinet, and oboe. We also worked on section balance during the frequent solos in the movement. Unfortunately, I ran out of time to continue to movement one. Although I did not stay particularly loyal to only pointing out spots that require individual attention, I believe the ensemble became more familiar with *Gazebo Dances* overall.

Rehearsal 5 – 10/17/2013 – Macro, some Micro

Plan: Start with movement two at full tempo, but still beat the 3/4 measures in three and the 5/4 measures in five. Work on evoking the different moods of the movement, and draw attention to spots that still need personal practice. Fix all incorrect notes and missed entrances. Rehearse movement four slowly, section by section, under tempo. Demonstrate the significant dynamic contrast and the importance of listening across the ensemble for a consistent pulse. If time remains, run the movement at the end.

Reflection: This rehearsal was extremely successful. Movement two is falling well under the fingers, except for several technically difficult passages (for example, flute/piccolo/xylophone mm. 46-50). Cindi suggested that I rehearse movement 4 from end to beginning, which worked well. We ran the movement at the end of rehearsal to put all of our work into context.

Rehearsal 6 – 10/22/2013 – Very Macro, then Micro

Plan: Since we are now a third of the way through the rehearsal process, run the entire work, having students note sections that need attention. Write them down, and tackle the larger ones today, and others on Thursday.

Reflection: Running the piece exposed a lot errors, ranging from incorrect notes and entrances to very poor

ensemble balance and blend. Overall, it was truly difficult for me not to stop and to allow errors to go by quickly. After running the piece, I asked everyone what they thought. "Which movements went well? Which need the most work?" They were actively listening and critiquing the ensemble, which was great. After that, I polled the ensemble to know which movement they thought was the worst. The consensus was movement three; I agreed. We started at the beginning of the third movement, and fixed many incorrect entrances. Just before ending, I told the ensemble that I would send out the recording shortly so that everyone could listen to the full ensemble sound.

Rehearsal 7 – 10/24/2013 – Micro

Plan: Start fixing errors found in the run through in rehearsal six. Tackle the most problematic movements first: begin with the second half of movement three, then jump to the beginning of movement one for style.
Reflection: It was great to be back in charge, so to speak. Giving up control to the students' ears is very difficult. James Spinazzola and I spoke frequently last semester about the "fix-it" mentality that rehearsal technicians have: spot an error, and fix it. This makes rehearsals usually successful (keeping in mind that retention is a problem), but they are usually bland and unenjoyable for the ensemble. We began with the third movement. I asked the clarinetists why m. 42 was a problem; they told me they did not understand how the fermatas were being conducted. After clarifying this, we ran this section successfully. I could tell the other members of the ensemble were starting to fall asleep, especially the percussion (which is minimal in this movement.) I jumped to the first movement to get more students involved. We retuned the opening 9th interval, and worked on unifying the style and balance of the opening sonority. We also reviewed the necessary dynamic shifts needed, especially in sections like mm. 8-14, where the works goes from *ff* to *mf*, *mp*, *f*, *p*, and finally back to *f*.

Rehearsal 8 – 10/31/2013 – Macro and Micro

Plan: Today's goal is to finish providing feedback on the movements we worked on in rehearsal 7: the second halves of movements one and three.

Reflection: I began in the middle of the first movement. I frequently do not do this, since I believe that providing context is essential. However, since I wanted to focus on the second half, I began at m. 108. The first goal was to unify the tempo shift beginning at m. 124. Although we discussed this rallentando before, it was clear that ensemble members were not expecting it. I asked them to both circle it and check in with me to find our new tempo. We also worked on more important lines in this section: muted trombones at mm. 127-128 and all of the section solis throughout. Since I was short on time, I jumped to movement three afterward. We began at m. 10, worked on balance in the solo clarinets, unity in brass beginning in m. 13, and intonation in the woodwinds beginning in m. 15. I asked the flutes and piccolo to play *senza* vibrato in

order to better blend with the clarinets. Just before ending the rehearsal, I began to address the brass style (first marked and separated, and then warm and lush) in m. 30 and onward.

Rehearsal 9 – 11/1/2013 – Macro, Micro, and Very Micro

Plan: Start by running movement four, focusing on overall balance and blend. Afterwards, start back from the beginning and fix these issues. Stop when necessary to fix these problems and other style concerns.

Reflection: After running the work, I solicited feedback from the ensemble. Students agreed that they were very much into their own parts, and did not focus well on others. Beginning in m. 152, the brass began to rush considerably. This was noticed by many of the woodwinds. I also addressed the quick mute change necessary in the trumpets at m. 145; it was missed each time that we ran this movement. After pointing out these mistakes, we began back at the beginning. I let the ensemble play for few dozen bars to hear how significant the ensemble sound changes when folks are actively listening. After that, we began to work on micro details, especially unifying style.

Reflection 10 – 11/5/2013 – Very Micro

Plan: Polish movement one.

Reflection: Before I began, I warned the ensemble that I would stop frequently, and that our goal was to polish the first movement. I also told them that although I usually enjoy facilitating rehearsals with a lot of ensemble interaction, we did not have a lot of time to spend doing this for the rest of the rehearsal process. (That being said, they were very understanding. Some of the students that do not like giving feedback were happy to hear this!) I stopped to unify several entrances, and we spent a considerable portion on the "slightly slower" section of the movement, mm. 124-147. As I only had a few minutes left after fixing balance in this section, we played to the end of the movement and stopped.

Reflection 11 – 11/7/2013 – Micro

Plan: Work on improving the style of the second movement. Currently it is quite heavy, as opposed to a light waltz.

Reflection: After I gave this opening idea, I started to conduct the work in a faster three. I thought about conducting this movement in one, but I knew that it would be considerably more difficult for the ensemble and for myself. Just as I was thinking this, Cindi said, "Why don't you conduct it in one?" "Oh no!" I thought to myself. I knew I was going to have serious problems with this. Even so, I gave it a try. I was quite uncomfortable. I was focusing on my conducting and not on the ensemble. This made it quite difficult to rehearse as well. The style was slightly improved, but overall, it was not worth the problems it was causing. I decided to work on my conducting before the next rehearsal, and jump to movement four to fix a few

problematic areas there. During my final 10 minutes, I isolated the melody in the basses (mm. 110-114), the unison woodwind and muted trumpet soli (mm. 119-123) and the trombone glisses (mm. 132-133).

Reflection 12 – 11/12/2013 – Macro, Micro

Plan: After spending a few days working on my one pattern (for movement two), I want to put in context. Work the movement back to front since the ending is the most shaky.

Reflection: Conducting this movement in one was adequate, but not ideal. Each time there was an entrance issue, I was unsure if it was my error or the players'. This is not a good spot for a conductor to be in; I do not want to tell people they are making mistakes if it is my fault. I have decided from this point onward to conduct the work in three for the sake of clarity. I believe that at this point, accurate entrances take precedence over style. Conducting the movement in three also ensures that I have complete confidence when rehearsing the ensemble. This is essential from this point forward, as we are working to finesse details. Working the movement back to front was a good idea. By the end of the rehearsal, the ending was sounding considerably more confident.

Reflection 13 – 11/14/2013 – Micro, Micro

Plan: Run movement three, and then return to fix errors.

Reflection: It was difficult to run this movement without stops, but I wanted to be sure that everyone were playing right from the start. This is the most thinly scored movement, and I have noticed before how quickly the ensemble zones out when rehearsing it slowly. After we stopped, we returned to the opening of the movement. I complimented Nick on his solo; the vibrato was quite well done. I asked him for a greater sense of shaping, especially with the marked hairpins in m. 7. We previously added hairpins to the ostinato in the opening clarinets. I reminded everyone about those, and the role of the constant eighths (to keep the tempo consistent). In the next section, we worked on the balance between the first and second clarinets in mm. 10-12 and the *piú mosso* section at m. 12. At the next rehearsal, I want to continue with the third movement and work on the overall quality of the ensemble sound in the climax of this movement.

Reflection 14 – 11/19/2013 – Very Micro

Plan: Since this is our second to last rehearsal, and the final rehearsal before we are in the concert hall, focus on the spots that need the most attention in movements two, three, and four.

Reflection: I started with the end of movement two, working back to front (quickly!) We realigned a few entrances that were problematic. These were fixed previously, but were not retained. After that, I resumed where I had left off in movement two from the last rehearsal: m. 17. The brass was not playing with their best tone, so I asked them to think of a personal memory that would reflect a warm chorale. My example

was a large church choir. I reminded them that connections between music and life are essential; this is why we make music! I also drew their attention to the almost sorrowful nature of the accented notes in m. 20 and the need to exaggerate length and tone quality. We also worked on the overarching crescendo into the climax at m. 30. After briefly refining the conclusion of the movement, I worked back to front on movement four, ensuring that all of the various section solis were strong and accurate.

Reflection 15 – 11/21/2013 – Very Macro

Plan: As this is the final rehearsal, I want to run the work and address balance and blend in Bailey Hall, where it will be performed.

Reflection: Although I wanted to stop and address quite a few passages, I knew that I had only a brief amount of time. As such, I only made essential comments. I reminded everyone that crispness was quite important; the sound in Bailey is considerably more live and resonant than in our rehearsal room (Lincoln B20). In the second movement, section solis were too quiet. I had everyone play more soloistically when they had the melody. In the final movement, everyone still wanted to rush the end considerably. I asked them to write "don't rush" at the final statement of the melody (m. 152). After this, I thanked everyone for a wonderful rehearsal process and told them how much I look forward to the concert.

1.6 Student Feedback

After the concert, I passed out an anonymous survey to have the ensemble members evaluate my progress. Twenty-two responses were received. Students were asked to write about several topics listed below. I have included several demonstrative positive and negative comments for each topic[15], and my own response below them.

Baton Technique: Pattern was clear, cues were helpful, the style was accurately displayed, etc.

> "Yes! It's obvious that the piece was chosen to challenge Tyler, but he handled the challenge well."
>
> "Very good. Conducting in 1 seemed challenging at first but improved."
>
> "For the most part, the pattern was clear...at times the style was lost a bit in the mechanical difficulty of conducting."
>
> "Yes, and thank you for paying attention to the far away percussion section!"

[15]The feedback written has been abbreviated when ellipses are present, but no other changes were made (grammar and style remain intact).

"Very clear, but visibly uncomfortable when asked to change technique in any way."

Most responses were favorable. Many musicians mentioned the difficulties in conducting in one in the second movement. If I had prepared and practiced this over several weeks, I think I could have done it successfully. Unfortunately, I did not obtain a sufficient mastery of it in only a few days to be able to do it in the concert. I know that conducting in one is a weakness, however, and I will address it in my personal practice time from now on.

Score Preparation: A clear aural vision was effectively communicated to the ensemble.

"Tyler definitely knew the score flawlessly."

"He knew what he wanted. Percussion would try different techniques to emulate the sound desired."

"Very well aware of the score (even though it's full of errors.)"

"Discussion of the mood of each movement helped with understanding style. An emphasis was placed on getting the right sound for the movement and the entire piece."

"Definitely. Communicated what the sound should be to the ensemble."

Responses here were the most favorable out of any category. There was not one negative comment.

Rehearsal Technique: Rehearsals were well-planned, talking was well-balanced with playing, ensemble involvement in rehearsal was appropriate, etc.

"Some things were redundant. For example, 'give me a word that describes this piece.' 'If I asked [a different section] where the accents are, could they tell?' Just say, 'bring out the accents.' We got it!"

"Time was tight but Tyler was able to get a large number of points across at each rehearsal."

"Probably talked too much when stopped. Some sections didn't play for quite a while (20 minutes) at times."

"...At times it got boring to sit around, but not bad."

"I thought rehearsal time was well utilized for the most part, and I liked that you sometimes solicited player feedback."

"We rehearsed in good mixes of large chunks and small chunks which was nice. Offered quick, constructive feedback to playing."

"For the first few rehearsals, talk/play balance swung back and forth, but this improved over time."

"At times, I wished that we would rehearse what you commented on, right after you commented on them, so that we could hear the improvement right away."

"Rehearsals very well thought out, knew exactly what was going to be covered beforehand and could prepare. Sometimes talking was a bit excessive, but thoughtful and thought-provoking. Asked ensemble for feedback effectively."

Feedback in this category was the most divided. Students were divided on the importance of the discussion of moods in the beginning of the semester. I know that we spent time discussing them, but I think it is essential to informed playing. The "fix-it" rehearsal technique[16] is something I avoided until the end of the semester. Students do not critically think unless they are asked what they would change or fix if they were the conductor. It is interesting that most students prefer this idea of the conductor giving direct orders to the ensemble. In my next rehearsal process, I think I will try and combine the "fix-it" technique with soliciting ensemble feedback in the same rehearsals. Generally speaking, rehearsals for *Gazebo Dances* utilized either one technique or the other.

Interpersonal Skills: The tone of rehearsals was appropriate, humor was well balanced with seriousness, etc.

"You're a friendly guy, Tyler."

"A few rehearsals had a tired atmosphere and everyone was struggling, but they were handled well and you were often able to lighten the mood."

"Tyler was always amusing and helpful. He was serious when needed but there were no events in which I was off put by this."

"Very comfortable in front of the ensemble."

"You often talk too fast."

"The tone was mostly good. Sometimes humor went on longer than it should have when seriousness was needed."

"I really enjoyed the tone of rehearsal. It was usually pretty light and I felt like I could relax but we never got carried away and always were serious about the music."

[16]The ensemble plays a section. The conductor stops, says the issue, fixes it, and the ensemble resumes playing.

Ensemble members seemed to enjoy the various rehearsal moods. I do talk too fast, although this was only mentioned on one survey. This is an issue when I am nervous and in front of many people. It stems from the fact that I do not have enough rehearsal time as I would like, and I believe that if I talk faster, the ensemble will remain engaged. The opposite of this is true. If I speak more slowly and make eye contact, that will ensure more active listening from the ensemble members. I hope to improve this in the future as well.

Other Thoughts?

"Tyler is the best and will be an amazing conductor in any context. Great job!"

"Very fun working and learning with Tyler as a conductor for an ensemble."

"I thought the performance of *Gazebo Dances* was very good!"

"The overview of the history of the piece and going over the feel to each movement was very helpful."

"Tyler did a great job with conducting and I feel like I learned a lot from his comments."

"Conducting the waltz in 3 versus 1 was 'eh'. I'm glad you chose 3 so we stayed together, but I can't say I preferred it."

If I program *Gazebo Dances* again, I will conduct movement two in one to emphasize the waltz style.

Overall, feedback from the ensemble members was extremely positive. In the future, I plan to use these comments to further refine my rehearsal technique.

1.7 Conclusion

Studying *Gazebo Dances* and working with the Cornell University Winds has been a great pleasure. The work deserves more recognition in the wind ensemble repertoire. The vast majority of feedback seemed positive both about the work itself and about our rehearsal process. I hope to program *Gazebo Dances* again soon, and to use what I have learned to make my next performance of it even better.

Chapter 2

Google Glass

2.1 Introduction

In late February 2013, Google began accepting applications to the "Glass Explorer" program [3]. During a meeting with Dr. Turner, I showed her the website and the video posted by Google about what Glass can do.[1] When she asked if I was applying, I responded, "$1,500 is too expensive for me." Although I did not know it at the time, she applied for the program right after I left the room. After submitting two tweets, she received a direct message via Twitter from Google saying she was selected as a Glass Explorer. We anxiously waited several months, and that summer, she picked up her pair of cotton colored Glass.

A few weeks ago, all of the Explorers were contacted to provide three names of people that should have the opportunity to purchase Glass. We purchased a second pair through our grant, and now have both a charcoal and cotton colored Glass to use for our research.

2.2 Introduction to Glassware Development

During the release of Glass, Google heavily emphasized the Mirror API[2] as the only way to program for the device. From the developer pages[3], Google writes, "The Google Mirror API allows you to build web-based services, called Glassware, that interact with Google Glass. It provides this functionality over a cloud-based API and does not require running code on Glass." After Glass was released to the first round of Explorers, various articles began circulating around the internet explaining how to run native Android applications on

[1] http://www.youtube.com/watch?v=F_DsUl_vqvo. Accessed on December 4, 2013.
[2] Application Programming Interface
[3] https://developers.google.com/glass/develop/mirror/index. Accessed on December 4, 2013.

Glass.[4] Once the device has "debug mode" enabled, developers can access Glass through ADB[5], just like a standard Android phone or tablet. This allows for sideloading[6] applications, and developers can use IDEs[7] to directly test and deploy native Android code on Glass.

On November 19, 2013, Google released a "sneak peak" of the Glass Development Kit (or GDK).[8] The GDK is essentially an add-on to the Android SDK that lets developers build Glassware that runs directly on the device. Unlike the Mirror API, which requires an external server to run, Glassware built using the GDK allows access to low-level hardware features, for example, the camera, voice input, locations and sensors, and touch gestures.

Since the official GDK was not released until several days before our concert, our native applications do not rely on the GDK to run. Instead, they are installed using the IDE Eclipse and can be initialized via Launchy[9], a supplementary application launcher designed specifically for Glass.

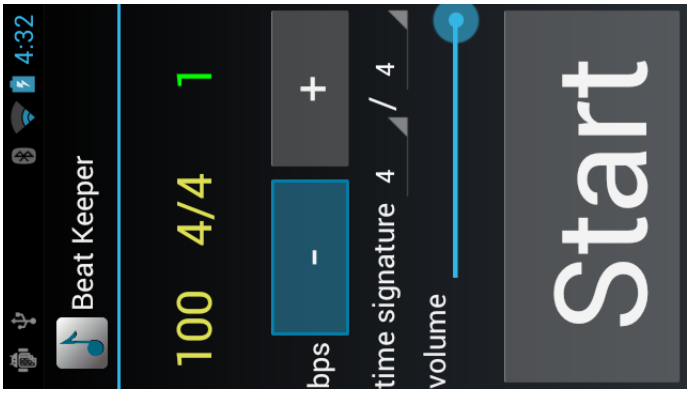
2.3 Applications

Although the title of this project only lists *Gazebo Dances,* it would require little effort to retool these applications for any piece, in either rehearsal or performance contexts.

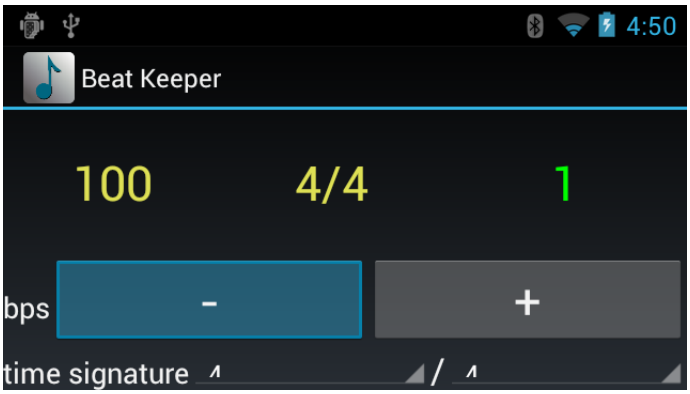
2.3.1 Metronome

The most straightforward application idea was to embed a metronome in Glass. The starting point for this Glass application is an open-source[10] metronome designed for Android called "BeatKeeper".[11] After cloning the source code from GitHub, it was simple to import it into Eclipse and sideload the application on Glass. With no modifications, the device rendered the metronome in landscape:

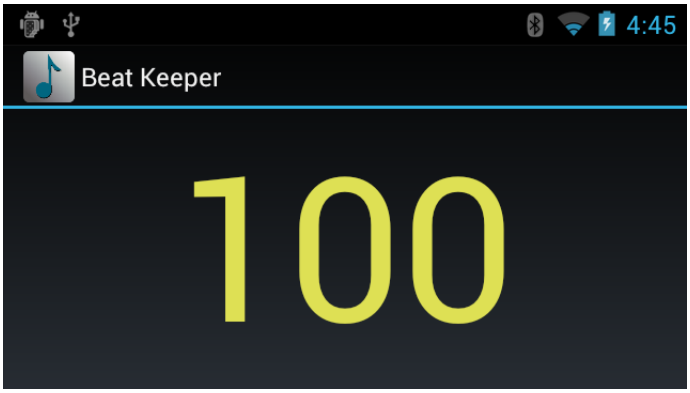
[4]For example, http://songz.quora.com/How-to-run-Android-Apps-on-Google-Glass. Accessed on December 5, 2013.
[5]Android Debug Bridge
[6]Sideloading is the process of installing an application by any means other than the Google Play store.
[7]Integrated Development Environment
[8]http://www.theverge.com/2013/11/19/5122878/google-releases-sneak-peek-of-long-awaited-glass-development-kit. Accessed on December 5, 2013.
[9]https://github.com/kaze0/launchy. Accessed on December 5, 2013.
[10]Open-source software is computer software with its source code made available and licensed with a license in which the copyright holder provides the rights to study, change and distribute the software to anyone and for any purpose.[2]
[11]Source is available here: https://github.com/MasterEx/BeatKeeper. Accessed on December 5, 2013.



By editing `android:screenOrientation="portrait"` to `android:screenOrientation="landscape"` in the `AndroidManifest.xml` file, the orientation automatically changes to landscape and the application is easier to read. The text, however, is still cut off the bottom of the window.



The next task was to make the application easy to navigate. By removing the buttons and sliders and adding a `GestureDetector`, a user can simply slide his or her finger along the side of Glass to set the tempo. The metronome can be started and stopped by a single tap. The final interface is sleek and simple.



This interface utilizes a `GestureDetector` to calculate the direction of the scrolling:

```
1  public boolean onScroll(MotionEvent e1, MotionEvent e2, float distanceX,
2                                                  float distanceY) {
3      Log.d("Gesture␣Example", "onScroll:␣distanceX:" + distanceX +
4      "␣distanceY:" + distanceY);
5      if (distanceX < -1) { //determine scrolling direction
6          bpm++;
7          TextView bpmText = (TextView) findViewById(R.id.bps);
8          bpmText.setText(""+bpm);
9          metroTask.setBpm(bpm);
10     } else if (distanceX > 1) {
11         bpm--;
12         TextView bpmText = (TextView) findViewById(R.id.bps);
13         bpmText.setText(""+bpm);
14         metroTask.setBpm(bpm);
15     } return true;
16 }
```

The source code for this project can be found online at https://github.com/tehrlich/BeatKeeper.

2.3.2 Score Viewer

After spending weeks looking into Android PDF libraries, the Mirror API seemed like a much more logical choice to use to deploy a musical score. Google supports several programming languages to use with the API: Go, Java, .NET, PHP, Python, and Ruby. Due to curiosity and a fondness for the language, I decided to use Python.

After downloading the quick start project, I created an application on Google App Engine. Since this application was designed to contain *Armenian Dances* by Aram Khachaturian, the application was titled "CUWindsKach" and is accessible at: http://cuwindskach.appspot.com. After editing `client_secrets.json`, generating a `session.secret` file to store session cookies, and editing `app.yaml` to include the name of the application, the Python application was ready to deploy.

Once it was launched, the next step was including the scores. After scanning in the condensed score, I

divided it up into 640x360 images, the size of Glass's display, using Photoshop. A simple form hooked into the Python application to send the image.

Here is the form that serves the image to the backend:

```
<form action="/" method="post">
  <input type="hidden" name="operation" value="insertItem">
  <input type="hidden" name="message" value="">
  <input type="hidden" name="imageUrl" value="/static/images/1.jpg">
  <input type="hidden" name="contentType" value="image/jpeg">

  <button class="btn btn-block" type="submit">
    Insert page 1
    <img class="button-icon" src="/static/images/1.jpg">
  </button>
</form>
```

Here is the backend Python code that processes the HTML form.

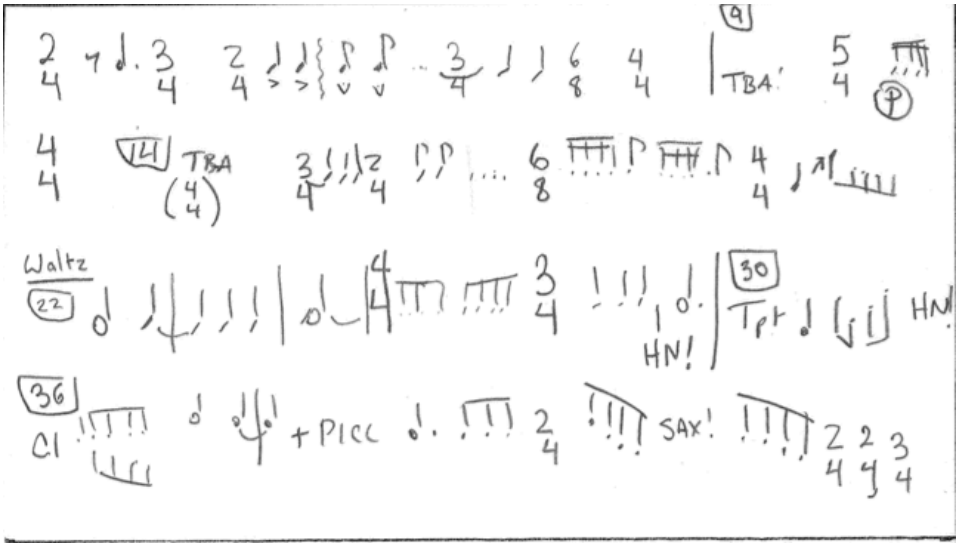
```
def _insert_item(self):
"""Insert a timeline item."""
logging.info('Inserting timeline item')
body = {
    # this is slightly unnecessary, as the two levels are null and default
    'notification': {'level': 'DEFAULT'}
}
# check if it's just text or if there markup
if self.request.get('html') == 'on':
  body['html'] = [self.request.get('message')]
else:
  body['text'] = self.request.get('message')

media_link = self.request.get('imageUrl')
if media_link: # see if media is present
  if media_link.startswith('/'):
```

```
17        media_link = util.get_full_url(self, media_link)
18      resp = urlfetch.fetch(media_link, deadline=20)
19      media = MediaIoBaseUpload(
20          io.BytesIO(resp.content), mimetype='image/jpeg', resumable=True)
21    else:
22      media = None
23    # self.mirror_service is initialized in util.auth_required.
24    # insert into the timeline
25    self.mirror_service.timeline().insert(body=body, media_body=media).execute()
26    return  'A timeline item has been inserted.'
```

Any user with Glass can navigate to this page and install the score to *Armenian Dances* on his or her Glass. It is possible to change this, however, using the settings in Google App Engine. One possible improvement for this application would be to bundle the images together. This way, if the user received a notification while they were installing the score, it would not be placed in between the pages in the score. Also, a single send button would be helpful; currently the user needs to click for each page of the score.

One clear limitation of Glass is the screen size. To combat this, Dr. Turner and I discussed the idea of a salient score that contains only the information necessary to conduct a work. As each conductor's needs are different, each individual would likely need to create his or her own salient score. This would allow the scores to be as minimalistic as possible. Below is one possible salient score of the opening of *Gazebo Dances*.



This score only contains time changes and other landmarks that are necessary to conduct the work. If a salient score is used in rehearsal, a full score is necessary to have nearby for reference.

To control page turns, a Bluetooth controller is optional, but recommended. To set this up, the native Android `Settings.apk` file must be sideloaded on the device.[12] This application can then be started with the following command:

```
adb shell am start -n com.android.settings/com.android.settings.Settings
```

After the control panel displays, it is possible to pair a keyboard or other Bluetooth device. After the pairing process is complete, pages can be navigated with the left and right arrows on the keyboard.

The source code for this project can be found online at https://github.com/tehrlich/scoreviewer. The application is also in production and accessible at http://cuwindskach.appspot.com.[13]

2.3.3 Photo Streaming

One of the original ideas for Dr. Turner's research was to stream the conductor's perspective from Glass. Due to the limited power of the device, it is currently not possible to live stream without at least a half of a second of latency. To combat this problem, one idea was to take still images and show them to the audience.

There are two Android applications that are necessary to make this possible: "Tina Time-lapse" by Wessel Rossing and "FTPServer" by Andreas Liebig. Both of these must be sideloaded onto the device. After installing the applications onto a different rooted Android device, one must navigate to `/data/app/` to find the corresponding APK[14] files. Using ADB's `pull` function, they can be transferred to a computer before using ADB to install them on Glass.

"Tina Time-lapse" is an Android application that automatically takes pictures at a user-defined time interval. Other settings allow the user to set the image's resolution, quality, and location where the photo is saved. After installing the application using ADB, the image is initially distorted:

[12] This file is available here: https://googledrive.com/host/0B3CzS-bH2NyETHNQZC1TbWh4RTQ/Settings.apk. Dan McLaughlin's original instructions are posted on Google+: https://plus.google.com/+DanMcLaughlin/posts/X8GVGJvois7. Both of these links were accessed on December 5, 2013.

[13] Both of these links were accessed on December 5, 2013.

[14] Android application package file

This is a known error[15] with the release of EX10.[16] After importing the source code into Eclipse, the addition of one line of Java fixes this problem:

```
parameters.setPreviewFpsRange(30000, 30000);
```

This is added after the `Camera` is initialized, in the `Recorder` class in the package `nl.nanatech.b.tinatimelapse.` To begin taking photos, one simply selects the second icon: the camera.

Glass will automatically sleep after several seconds of inactivity. This can be changed by manually installing the `Settings.apk` file (discussed above), starting the application using ADB, and changing the preference under the Display menu.

Photos can be accessed from a different computer after an FTP Server is configured on Glass. Although there are several applications available to accomplish this task, Andreas Liebig's "FTPServer" has a setting that is required for the device to be network accessible. There are several network interfaces available through Glass:[17]

lo	UP	127.0.0.1/8	0x00000049	00:00:00:00:00:00
ifb0	UP	192.168.167.239/0	0x000000c3	86:67:db:e8:XX:XX
ifb1	DOWN	0.0.0.0/0	0x00000082	3a:a5:94:8c:XX:XX
sit0	DOWN	0.0.0.0/0	0x00000080	00:00:00:00:00:00
ip6tnl0	DOWN	0.0.0.0/0	0x00000080	00:00:00:00:00:00
wlan0	UP	192.168.1.113/24	0x00001043	f8:8f:ca:24:XX:XX

[15] http://stackoverflow.com/questions/19235477/google-glass-preview-image-scrambled-with-new-xe10-release. Accessed on December 5, 2013.

[16] This is the current version of the Glass interface. EX stands for "Explorer Edition."

[17] MAC addresses in the table are obfuscated for security.

Only the last interface, `wlan0`, corresponds to the physical MAC address of the device. Due to an issue with the Glass interface, all FTP servers default to use the `ifb0` interface. This prevents other clients from finding Glass on the local area network. The application "FTPServer" allows the interface to be manually set, sidestepping this bug.[18]

Wessel Rossing provided me the source code for our research with Glass, but as it is not open source, it will not be posted it on Github. The source for "FTPServer" is also not available online, but no modification to the raw source code is necessary for it to work on Glass.

2.4 Applications in Context: November 22nd Concert

On November 22, 2013, CU Winds performed "A Concert Through Glass" which featured our Glassware through each individual piece (with the exception of a premiere, *Me Disagrees.)*

Pineapple Poll: For the opening work, Dr. Turner recorded the work while she was conducting using Glass; the video will be uploaded soon to YouTube. This is similar to the recording of her perspective of the Syracuse Society for New Music[19] and my recording from *Sweeney Todd*[20]. This task only utilized Glass's native software.

Gazebo Dances: Before conducting the work in concert, I discussed the basics of how the score viewer application works and the idea behind the salient score. The salient score was projected above the audience, although due to limited time to test the application while conducting, I was afraid I would be more involved with Glass than with making music. I hope to slowly get used to conducting from Glass, but it is not as easy as simply putting on the device and having a worry-free experience.

Lost Vegas: Originally, our plan was for Dr. Turner to wear Glass while conducting this work and have the photos projected above the ensemble. However, I found another bug in Glass's software that prevented this from being successful. "Head Wake Up" is a feature that allows the user to turn on the display by tilting his or her head up instead of tapping the touchpad. This is convenient for hands-free operation, but when conducting, head movement is quite typical. Even though this option is disabled, the device will still be turned off if the user looks up.[21] To experience the photo-taking application, I wore Glass while playing

[18] This error has not yet been reported to the Glass developers. I plan on submitting a bug report after I complete more testing in the coming weeks.

[19] http://www.youtube.com/watch?v=smon-nW7p9k. Accessed on December 5, 2013.

[20] http://www.youtube.com/watch?v=teuHR0x3btY. Accessed on December 5, 2013.

[21] I had a short email exchange with the folks at Google regarding this error, who told me that this is "intended behavior" and not a bug.

Lost Vegas. This provided the audience with the experience of being in the ensemble, versus the conductor's experience.

Armenian Dances: Dr. Turner conducted *Armenian Dances* while viewing the condensed score peripherally from Glass. The score was also shown to the audience via projection.

2.5 Our Research in the Press

Dr. Turner and I were very fortunate to have our research discussed in the news recently. Here is a sampling:[22]

http://performancetoday.publicradio.org/display/web/2013/10/22/music-through-google-glass

http://events.cornell.edu/event/janets_jaunt_go_go_gadget_google_glass_with_cynthia_johnston_turner

http://www.wqxr.org/story/conductor-horn-player-modernize-orchestra-google-glass/

http://edcetera.rafter.com/how-google-glass-can-help-students-make-better-music/

http://cornellsun.com/blog/2013/10/24/from-greenstar-to-lincoln-hall-cornell-professor-beta-tests-google-glass/

http://www.theverge.com/2013/10/27/5034818/cornell-professor-cynthia-turner-mixes-google-glass-and-classical-music

http://facultyrow.com/profiles/blogs/cornell-prof-wears-google-glass

http://chronicle.com/blogs/wiredcampus/professors-envision-using-google-glass-in-the-classroom/44401

http://www.classicalite.com/articles/3742/20131112/through-the-looking-glass-conductor-cynthia-turner-eyes-google-for-new-music.htm

http://www.dailydot.com/technology/orchestra-music-google-glass/

http://www.kwikboost.com/google-glass-in-the-classroom/

http://lentreprise.lexpress.fr/equipement-informatique/les-google-glass-place-a-la-musique-classique_43954.html

http://cornellalumnimagazine.com/index.php?option=com_content&task=view&id=1750&Itemid=1&ed=38

http://windbandtoday.com/2013/06/25/wind-conductor-tapped-to-work-on-google-glasses/

http://www.broadwayworld.com/bwwclassical/article/Cornell-Conductor-Uses-Google-Glass-Technology-to-Modernize-Orchestra-20131028

[22]These links were accessed on December 5, 2013.

2.6 Conclusion

Will Google Glass change music performance? Quite possibly, yes. If ensemble members were used to wearing Glass, they would view the score peripherally and the conductor directly. The device could provide an easily accessible metronome and tuner to aid in individual practicing. Perhaps in future versions, the device will have a powerful enough microphone to pick out individual players in an ensemble and assist in improving intonation. The conductor might be able to make notes directly on the musicians' music (although the physical act of making indications does help internalize the change.) It is difficult to say how far away we are from this world. Once Glass becomes available to the public and is less expensive, perhaps ensembles will be based around the device. I look forward to an exciting future of wearable technology and music, and to seeing the amazing advancements at the intersection of these two fields.

Bibliography

[1] Do Young Kim. *A Structural Analysis and Selected Aspects of Performance of Gazebo Dances for Piano Four Hands by John Corigliano*. PhD thesis, University of North Texas, Month 2008.

[2] Andrew M. St. Laurent. *Understanding Open Source and Free Software Licensing*. O'Reilly Media, 2008.

[3] Claire Cain Miller. Google Searches for Style. *The New York Times*, February 2013.

[4] Warren D. Olfert. An Analysis of John Corigliano's "Gazebo Dances For Band". *Journal of Band Research*, 29(1):25–42, Fall 1993.

[5] Harold C. Schonberg. Jack Romann, Aided Pianists As Representative Of Baldwin. *The New York Times*, May 1987.