

PROJECT PROPOSAL – N. ANDREW WALSH

Germany – Music, Composition

Project Outline

The goal of my project is to conduct research in intonation and acoustics, and to produce a reference work for composers and musicians that addresses the specific intonation of different instruments. I shall focus on the intonation of harmonics, as their tuning is of particular concern to musicians focused on precise intonation. Harmonics - a technique by which the musician physically isolates the higher pitches of an instrument's sound - are expected to sound in exact mathematical ratios relative to the fundamental pitch being played. However, differences in an instrument's physical characteristics (particularly string thickness, instrument size, temperature, etc.) can cause harmonics to deviate in pitch substantially from their expected tuning. For composers and musicians, this can cause significant complications in tuning, resulting in unforeseen differences between the expected and actual pitch of particular notes. My project is to compile these differences into a single comprehensive reference work, which composers and musicians can use as a guide for both performance and new works.

In addition to harmonics, I intend to examine properties of all instruments available to the contemporary composer for which tuning and intonation play an important role, including other extended techniques. This includes a number of techniques - which are not common to the traditional practice of music performance, but which are used frequently in new music - which are not grouped according to pitch in the current literature. Nor do the majority of reference works address intonation with sufficient detail to provide the composer or musician with the means necessary for adequate control of the acoustic result. The organization and information provided by this research will give composers and musicians a great amount of detailed information on the acoustic properties of the instruments that are presently in use. This is a substantial undertaking: I intend to cover every relevant instrument available within the current new-music repertoire, and to cover each instrument as comprehensively as possible. While this necessarily excludes custom-built instruments, or those for which tuning plays only a negligible part (such as synthesizers, whose acoustic

properties are artificial), the amount of detail required for such a reference work requires that I cover each sound possible on each specific type of instrument individually; this means that every pitch on a scale for every different size of an instrument (for example) must be covered separately. My dissertation is a composition focused on the details of intonation, and this research is thus an essential part of its realization.

State of Current Research

There presently exist numerous reference works that address the specific capabilities of various instruments (such as Robert Dick's *The Other Flute*, and Phillip Rehfeldt's *New Directions for the Clarinet*; see references at end), and which are commonly used by both composers and musicians. However, these works do not presently address their subject in terms of – or with highly specific detail regarding – the intonation of their respective instruments. There has been enormous progress in the last couple decades in addressing extended instrumental techniques; much of this work has been done by American performers and composers. This work has greatly expanded the resources available for musicians and composers: classical instruments (such as violins, clarinets, saxophones, etc.) are now characterized by every sound they are capable of making, not only those that are typical to traditional performance. However, there presently exists only one canonical text for the study of intonation: Harry Partch's *Genesis of a Music*. This work covers intonational theory and history quite comprehensively, and is the starting point for any student interested in intonation. However, as Partch built his own instruments, he did not address the issue of intonation in standard western classical instruments, nor did he address the extended techniques of which they are capable. Thus, the current literature has either works referencing extended techniques, in which tuning and intonation are not covered; or the literature addresses intonation, but only for custom-built instruments. This project will address the specifics of intonation for music performed on current Western music: such instruments as one finds in any modern performing ensemble. Preparing a reference work of this nature requires close cooperation with musicians with a high degree of experience in playing music in special intonation, but also with a high sensitivity to details of tuning.

The research I will be conducting is in largely unexplored territory: the musicians I have already been

working with here in Germany report that none of the literature with which they are familiar addresses the tuning issues that they confront in playing new music, and that they learn about those issues largely through experience. This research will thus be a new and meaningful contribution to the body of reference works available. In addition to instrumental technique, I plan to include other similar aspects of intonation and acoustics, most notably the otoacoustic effects that Maryanne Amacher discovered (an effect in which loud high pitches cause the bones of the inner ear to vibrate at another, lower pitch). Like the intonation of harmonics or other extended techniques, there does not presently exist a comprehensive reference work to guide composers and musicians in realizing these effects.

Research Outline

I am presently undertaking the first year of work on this project, funded by a grant from the Fulbright Commission for Germany. I will be working closely with Caspar Johannes Walter, a professor at the Staatliche Hochschule für Musik und Darstellende Kunst (State University of Music and Performing Arts) in Stuttgart, Germany. Professor Walter is an expert in tuning and intonation, and is uniquely qualified to supervise my research project: he has conducted workshops in several institutions in Germany and across Europe, and has worked with world-class ensembles to realize works using alternate systems of intonation. With his assistance, I will be contacting individual musicians, who are experts in the performance of music in special intonation, or in techniques for which intonation plays a significant role. I will record these musicians playing each specific technique, and later analyzing them digitally to provide as detailed a picture as possible of the exact acoustic properties of their sound. Professor Walter will be assisting me in contacting the individual musicians necessary to record the audio samples, the analysis of the samples I record, and compiling the results. The results will be grouped according to the organization of a typical modern orchestra: Woodwinds, Brass, Strings, and Other Instruments. As the project will require the collection of a large amount of data, substantial and detailed analysis, and extensive writing, I expect this to be a multi-year project: the Fulbright Grant I am presently undertaking will cover the first quarter of the instruments I intend to analyze: along with the introduction, I expect to be finished with the Woodwinds portion of the work by the end of the current academic year. Based on an estimate of roughly 50-80 pages per specific instrument, I

anticipate a length of approximately 500-600 pages for the first volume. While this seems like an enormous amount of material, most of the space will be taken up by data tables and graphs, and only the introductory sections (accounting for about 60 pages) and conclusive or heuristic material (likely around 100 pages at the end of the last volume) should consist mostly of text.

This grant from the DAAD will further fund this project, allowing me to continue making the field recordings and analyses to complete the work. While I will have already made substantial progress on this project by the start of the DAAD grant, the 10-month term of my current Fulbright grant will not provide me with enough time to complete it. I suspect that one of the main reasons such a reference work as this does not exist is the amount of time required to compile the recordings and analyze them.

Resources in Host City

While I expect to travel substantially to meet musicians in their home cities, I will perform most of the analysis and writing in Stuttgart. The musical culture around Stuttgart has a rich tradition of avant-garde and modern music: several ensembles in the region (such as the Chamber Singers of Heidelberg) are especially experienced in performing music in special intonation. Likewise, there are numerous instrumental performers in the region who are known in the field of Just Intonation. By collaborating with these musicians, I am gaining the invaluable experience of working with experienced microtonal performers. The students in Prof. Walter's seminar will also be helping me, particularly in preparing a pedagogical work on a subject in which they will have experience. I plan to publish the results of my research through the German music publication industry, which offers more support for musical publication of this sort. Under Professor Walter's guidance, and through the interaction with his students and fellow musicians, I will be able to broaden my own understanding of microtonality, and grow substantially as a composer and scholar in my discipline.

While I have had experiences traveling to Europe, it has always been as a tourist; visiting Europe as a scholar, and immersing myself within the international new-music culture, will broaden my musical experience in a way that I have not previously enjoyed. I will be meeting and working with a large community of European musicians, and developing a working relationship with them over an extended

period. In addition to exposing me to the European new music culture, this experience will help me develop professionally as a composer, by learning to work better with musicians in realizing my compositions.

Personal and Professional Impact

This experience is essential to my dissertation: a composition written as a concluding movement to the work "Temple of the Leviathan," the first movement of which is included in my application. My dissertation is focused on subtle and gradual changes between different sonorities and instrumental techniques; this exploration depends on a precise and delicate control of pitch and intonation. One of the primary means I have used to achieve precise details is through the technique of harmonics: as harmonics are expected to sound in precise relationships to one another, employing them should result in reliable intonation. However, as specific instruments in reality deviate so substantially in the intonation of harmonics, the composition will sound very different from how I intend. By performing this research I will gain a more realistic picture of how each sonority in the piece will sound, and be able to achieve more precise intonation in my composition.

Publishing the results will greatly aid my professional development through the authorship of a major pedagogical work. Such a manual will give musicians and composers an accurate picture of exactly how different instrumental pitches sound in one complete reference work. Through my own experiences, I believe that it is essential to provide a comprehensive reference work geared specifically towards nonspecialists, to help other musicians and composers to explore the many resources of Just Intonation, while avoiding many of its pitfalls.

The research from this project will enable me to write better for specific musicians, by understanding the particularities of their instruments. In addition to aiding me in my compositions, this will help me develop a better working relationship with the musicians who play them. This will also help composers of avant-garde music in general to reconnect with musicians, by helping them write with greater sensitivity for their instrumentalists. Furthermore, this research will help musicians in avant-garde and traditional music by shedding light on some of the complexities of the intonation of harmonics: such a manual would enable musicians to use the appropriate harmonics to sound better in tune with other instruments, and also to exploit

a potential source of expressive detail. This will help preserve and foster the older traditions of intonation, in which details of pitch were an essential part of music's expressiveness: a tradition actively cultivated from ancient Greece all the way to the 1930s.

By the start of this grant period, I will have been working and living in Germany for over a year. I will have completed the Fulbright Program's language training courses, and will have spent the academic year taking German classes. I expect to be - while not quite fluent - very capable of conducting my work comfortably in German.

References

Dick, Robert. *The Other Flute: A Performance Manual of Contemporary Techniques*, London ; New York : Oxford University Press, 1975.

Partch, Harry. *Genesis of a Music: An account of a creative work, its roots and its fulfillments*. New York, Da Capo Press, 1974.

Rehfeldt, Phillip. *New Directions for Clarinet*, rev. ed. Berkeley: University of California Press, 1993.