

Theses for DLA doctoral dissertation

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EAST-ASIAN DOUBLE-REED INSTRUMENTS AND
THE USE OF THE HICHIRIKI IN 20th CENTURY AND
CONTEMPORARY MUSIC

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Doctoral School No. 28
classification history of art and culture

Budapest

2011

Chapter I

Structure of the dissertation, main objectives and the antecedents of the research

The dissertation consists of two parts. The first part presents an overview, establishing the definition of double-reed instruments, their place in the different systems of instrument classification, with an overview of the two basic double-reed instrument types, the ones of conical and that of cylindrical bore. Following this the dissertation discusses in detail the double-reed instruments of the East-Asian region (China, Korea and Japan). In the case of China, great emphasis is given to the presentation of the basic types (*guǎnzi*, *suǒnà*). At the end of the first part the acoustic qualities of double-reed instruments are also discussed. The second part of the thesis focuses on the *hichiriki* (a Japanese double-reed instrument), first detailing its role in traditional Japanese music, then pointing out the new traits in instrumental play based on the analysis of selected pieces of music written from the 1970's up to this day. The dissertation also introduces pieces by Western composers and discusses the role of *hichiriki* in popular music.

The aim of writing the dissertation was twofold: firstly, to give a detailed, comprehensive work, since no such work exists in the body of literature accessible in European languages (the majority of the literature on the Far East is written in one of the East-Asian languages, and the rest only discusses instruments in a passing manner); secondly, to prove through the analysis of the role of the *hichiriki* in the 20th century and contemporary music that the existence of this hardly known instrument, that has previously been used exclusively in *gagaku* (traditional Japanese court and ritual music) is firmly justified, it has the potential to renew itself and has several possibilities for the future.

The research of East-Asian instruments is almost exclusively done by local scholars. The most important academic work on Chinese double-reed instruments is the *Zhonghua yueqi dadian* (*The Great Encyclopedia of Chinese Instruments*) by Sheng Yue, and on the instruments of Japan Kikuko Masumoto's researches on *gagaku* (which give a detailed discussion of the instruments and their use as well) served as a starting point (*Gagaku nyūmon* [*Introduction to Gagaku*], *Gagaku - Dentō ongaku he no atarashi apurōchi* [*Gagaku - New Approach to Traditional Music*]). The East-Asian instruments are also discussed in detail in Japanese-language encyclopedias of music (Kenji Hirano: *Nihon ongaku daijiten* [*The Great Encyclopedia of Japanese Music*], Shigeo Kishibe: *Ongaku daijiten* [*The Great Encyclopedia of Music*], Takatomo Kurosawa: *Zusetsu sekai gakki daijiten* [*Picture Encyclopedia of the Instruments of the World*]).

The Western literature primarily consists of works on Japan, the *hichiriki* first appears in the 1878 *La musique du Japon* by Alexandre Kraus Fils, and is later mentioned throughout the 20th century by several significant scholars of Asian music. The most important among these is *Japanese Music and Musical Instruments* by William

P. Malm, which, even though discussing the *hichiriki* to some extent, just as the encyclopedias accessible in European languages, only offer superficial presentation.

In the Hungarian literature János Kárpáti treats Asian music, but his research deal more with music theory than matters of organology, thus his research results could not be directly used in writing the dissertation.

For the chapter on acoustics I was greatly helped by Reis Flora's article, *The Acoustic Behavior of the P'iri and the Hichiriki*, which presented a spectrographic analysis of the acoustic properties of the two cylindrical bore double-reed instruments, and which is the only accessible treatise on East-Asian double-reed instrument acoustics. The basic knowledge of musical acoustics was gained from *The Fundamentals of Musical Acoustics* by Arthur Benade and several articles on wind instruments by Neville H. Fletcher.

As there have been no academic works discussing the use of the *hichiriki* in contemporary music, the dissertation can be considered a pioneering work in the field.

Chapter II

Methodology of the research

For the first part of the thesis I have collected the accessible body of literature and used it to summarize what is known about East-Asian double-reed instruments. Where the different sources show contrasting information, I present all the available data and after a careful examination of the question I also indicate my own views. For the part on acoustics I have also used the help of André Almeida, a researcher of double-reed instrument acoustics.

For the second part I have searched for and collected the scores and recordings of 20th century and contemporary pieces of music featuring the *hichiriki*, and exposed them to detailed analysis of the aspects of form, style and instrumental usage. I compare the usage in traditional and modern music, pointing out the new characteristics of the playing techniques and the unambiguous development of the possibilities of the instrument. I established contact with *hichiriki* player Hitomi Nakamura, and thanks to her insights I was able to gain otherwise virtually unattainable professional information on *hichiriki*-playing and also had the opportunity to try the possibilities of the instruments in person.

Chapter III

Results of the research

a) Organology

With the help of the data and information collected in the first part I attempted to draw up a comprehensive picture of double-reed instruments, acquainting the reader with the double-reed instruments of the East-Asian region with respect to general build, size, materials, tuning, timbre, cultural and historical background.

In the dissertation it is established that double-reed instruments can be divided into two basic categories based on the geometry of the internal bore: instruments with conical and cylindrical bore, which, in the Hornbostel-Sachs system of classification are placed under numbers 422.111 and 422.112. The two double-reed instrument types have different acoustic behavior; the ones of cylindrical bore overblow at the twelfth, while those of conical bore overblow the octave. The size of the body of the instrument is also related to the size of the double-reed, with the reed of the cylindrical bore instruments generally being large and thick, and the conical bore instruments being small and thin.

The ancestor of the cylindrical bore double-reed instruments is the *bili*, which through Chinese and Turkish transmission has spread all over Asia, on the Balkan Peninsula and Eastern Europe. Relatives of the *bili* include the Korean *piri* and the Japanese *hichiriki* as well. It originates in Western Asia, its contemporary Chinese form is called *guǎnzi*, and is primarily spread in the Northern part of China. Several versions of it can be found throughout China, where both the body and the reed are made in different sizes, from different materials. The cylindrical bore double-reed instruments also have a double type, where two instrument bodies are attached and are usually sounded by two double-reeds. There is a great emphasis on the development of instruments in China, thus most instruments also have a version with added keys, which usually has a bigger range, is suitable for chromatic playing and generally allows for a more virtuoso manner of play. The most significant developer of these instruments is Zhongfu Wu. Distinctive features of the *guǎnzi*-playing are for example *vibrato*, *portamento*, *tongue-tremolo* and dental sounds, however in folk variants several other techniques are observable.

The ancestor of conical bore instruments is the Persian *surmay*, which spread all over Asia, Northern Africa, Eastern Europe, the Balkans via Persian, Arabian and Turkish transmission, and, through Chinese immigrant workers, to Cuba as well. Indirectly all double-reed instruments with conical bore of the Euro-Asian cultures can be said to be related, including the oboe. Its Chinese version is called *suǒnà*, and is spread over the whole country, with several regional variations. The instrument consists of five parts: double-reed, lip support disc (also known as *pirouette*), staple, body, bell. The instrument is not chromatic, so differently tuned instruments are used for pieces in different keys. *Suǒnà* playing requires a lot of air, and circular breathing

is often used. Its main playing techniques are: *legato*, simple, double and triple *staccato*, *frullato*, *glissando*, *vibrato*, *bisbigliando*; it can also be used to imitate the sound of birds and insects. The *suǒnà* also has a double variety and a type with added keys. The most interesting type is the double version with two bodies of different length joined together, allowing for a wide range of intervals to be played.

In Korea, the representative of the cylindrical bore instruments is the *piri*, which is used in four distinct forms: *dangpiri*, *hyangpiri*, *sepiri* and *daepiri*. The instrument arrived at Korea with Chinese transmission, maybe as early as the 6th century, or by the end of the 10th century at latest. Its composition is similar to the *guǎnzi*. The *dangpiri*, the *hyangpiri* and the *sepiri* are made of bamboo, have a nasal, but flexible sound, with the characteristic technique of lip *vibrato*. The *dangpiri* is utilized in court music of Chinese origin, while the *hyangpiri* is used in Korean music, and the *sepiri* in vocal chamber music. The *daepiri* is the keys-added version of the *piri*, developed in the mid-20th century, and is made of hardwood. The conical bore instruments are represented by the *taepyeongso*, also known as the *hojok*, which probably arrived from China in the 7th century. Its build is similar to the *suǒnà*, the body of the instrument is made of wood, bamboo or metal, the bell, the staple and the lip support is made of copper. Due to its strong, bright sound it is often used in open air.

In Japan, the cylindrical bore double-reed instruments are represented by the *hichiriki*, which arrived from China in the beginning of the 7th century. Until the 10th century it existed in two variations, the small and large *hichiriki*, but the large *hichiriki* (*ōhichiriki*) was stopped to be used in the 10th century. The *ōhichiriki* was reconstructed based on the surviving records at the end of the 20th century, and is often used in *reigaku* (new pieces of music written for reconstructed ancient instruments). The *ōhichiriki*'s tuning is a perfect fourth deeper than the *hichiriki*'s. The body of the *hichiriki* is made of bamboo, it is wrapped around in birch bark, and is lacquered both inside and outside. The internal bore of the body is slightly narrowed towards the end. The bottom part of the large double-reed is inserted in the instrument wrapped in Japanese paper. The gap of the reed is controlled by a wattle clamp called *seme*. The ambitus of the instrument is only slightly more than one octave, its tone is characteristically shrill, penetrating. Its main playing techniques are *enbai*, or *meri-kari*, which is a sort of *glissando* produced by moving the reed inside the mouth; *tataku*, which is an effect produced by hitting the fingers on the sound-holes, and *osu*, which indicates accents without interrupting the sound.

Conical bore instruments in Japan were represented by the *charumera* up until a few decades ago, when it entirely stopped to be used. The name of the instrument is Portuguese in origin, but the instrument itself is a variant of the Chinese *suǒnà*, arriving in Japan at the end of the 16th century. It existed in versions with and without a bell, and was primarily the signaling instrument of street sweet-sellers and buckwheat noodle stalls.

b) Acoustics

In the chapter on the acoustics of double-reed instruments first the working of the double-reed is explained: the two cane lamellae rhythmically clap together and open up, which results in the vibration of the air column. In a part of the cycle, due to the Bernoulli effect the reed closes up completely. The ratio for this in the case of cylindrical bore instruments is half of the cycle, while in conical bore instruments it is significantly smaller. The size of the reed influences the difficulty of sounding the instrument, as larger reeds can be sounded more easily, while smaller reeds are more difficult to sound. The material used in the body of the instrument usually does not affect the timbre of the instrument, but in the case of bamboo, the material is weak and porous, thus for example the *hichiriki* needs to be lacquered from the inside to gain an even, smooth internal bore.

The 1974 article by Reis Flora poses intriguing questions, of which I attempted to answer a few. Flora analyzed the sound of the *piri* and the *hichiriki* by spectrographic analysis and arrived at the result that opposite to expectations, the sound of these cylindrical bore instruments does not lack even harmonics. During my consultations with instrumental acoustician André Almeida I have come to the result that this phenomenon is due to the fact that the bore in the *piri* and the *hichiriki* is not regularly cylindrical, thus the minima and maxima of the acoustic impedance curve are irregularly located. It may be another result of the irregularity of the bore that the *hichiriki* (together with the *piri*, according to the Grove encyclopedia) overblows at the eleventh.

Another point of interest in the sound of the *hichiriki* is the strong activity of partials in higher registers, which may be an explanation for the nasal timbre of the instrument. In the sound spectrum in the case of both instruments, practically irrespective of frequency a rise in the amplitude of overtones in the register around 2500-4000 Hz is observable. In the case of the *hichiriki* the high activity of partials around 3000 Hz is observable in a particularly consequent manner, however it is somewhat more sporadic in the case of the *piri*, where it manifests more around 3500-4000 Hz. Flora does not offer an explanation for this phenomenon, but based on my discussion with André Almeida I postulate that the natural frequency of the reed may fall within this register, and since both instruments are played with a rather loose embouchure, the damping may be insufficient, thus the natural frequency of the reed appears as a formant in this register. However, lacking the sufficient background in acoustic studies, I can only conclude that further research is needed in this area.

c) The *hichiriki* in 20th century and contemporary music

In the second half of the dissertation the role of the *hichiriki* in 20th century and contemporary music is examined. In order for the changes that had taken place to be unambiguously clear, I first begin by describing the traditional use of the instrument.

Up until the second half of the 20th century the *hichiriki* was exclusively used in *gagaku* (an umbrella term for ancient genres played on traditional instruments by rather large orchestras). *Gagaku* can be divided into three larger groups: music of foreign origin (*kangen* - instrumental orchestral pieces, *bugaku* - orchestral pieces accompanied by dance), Japanese vocal pieces written for instruments used in foreign music, generally composed in a later period (*gagaku utaimono*), and vocal and dance music that arrived in Japan before the 7th century or is of Japanese origin (*jōdai kabu*). I present the instruments and the orchestration of different genres of *gagaku* in a table, followed by a description of the traditional use of the *hichiriki*: it is always played together with some type of transverse flute, and together they always play the main melody, however it is usually not fully *unisono*. Traditional *hichiriki* play is usually characterized by *legato* playing, small ambitus and slow, solemn melodies.

I also take note that *kangen* and *bugaku* pieces are preceded by a sort of tuning, the *chōshi* sounded before *bugaku* is especially interesting, since its section introducing the *hichirikis* is an aleatoric canon, which motif appears in several 20th century pieces.

After describing traditional music I turn toward the introduction of Japanese music of the 20th century. I examine the pieces divided into groups of genre and instrumentation. It soon becomes obvious that the main use of the *hichiriki* remains to be the *gagaku*, thus firstly I examine pieces of new *gagaku* and the aforementioned *reigaku*.

The Japanese National Theater launched a program in 1970 to renew the existing *gagaku* repertoire and to animate interest towards *gagaku*. The theater commissioned a different composer every year to write a new piece of modern *gagaku*, also encouraging them to compose for reconstructed ancient instruments. It is apparent from the presented pieces that the composers were attempting to create a synthesis of traditional and modern music. The use of the *hichiriki* in early pieces can be considered fully traditional, however, later (especially starting from the 1990's) composers began to experiment, thus expanding the available ambitus (to *h''*), the dynamic spectrum and introducing new playing techniques (*frullato*, *glissando*, *tremolo*).

Another main area of use of the *hichiriki* is a group of solo pieces, which are the most suited to present the development of the instrument. A large part of the solo pieces were written for the order of *hichiriki* artist Hitomi Nakamura, who considers it her mission to popularize contemporary music written for the *hichiriki*. The modern pieces written for classical instruments demand instrumentalists who are well versed in Western score writing and are able to keep up with the challenges of contemporary music. Thus in the last decades a number of virtuoso artists of traditional instruments have appeared, who pose new challenges for composers again and again. The solo

pieces exploit every possibility of the *hichiriki*, we can find, among others, virtuoso passages, imitation of Scottish bagpipe, multiphonics, *bisbigliando*, virtuoso *staccato*-passages and lip *vibrato*.

Concertos are also written for the *hichiriki*, three pieces, to be exact, but in my opinion these cannot be considered successful, as they find it difficult to handle the fact that the *hichiriki* is unable to play over a full orchestra. They are, however, rather interesting moments in the literature of *hichiriki*.

In the group of chamber music for *hichiriki* we can find a number of pieces, and the most interesting among these are the ones where the *hichiriki* plays alongside Western instruments. In these pieces the *hichiriki* usually appears with a traditional manner of play, which stands in stark contrast with the effects of the Western instruments, but there are certain pieces, where new playing techniques appear, such as singing during play, 'key-noise' made by hitting down the fingers or overblown sounds, which allow for further expansion of the ambitus (*d'''*).

The section on Japanese music is followed by the description of Western pieces featuring the *hichiriki*, although the number of pieces is significantly smaller in this group. Interest towards Japanese music dates back to the Paris World Exposition in 1889, however only those composers paid more attention to the *hichiriki*, who had spent longer time in Japan. The *hichiriki* appears in pieces by Stockhausen, Cage, Hovhanness and Stähler. It can be stated in general that Western composers prefer the traditional manner of playing the *hichiriki*: while Japanese composers like to experiment with the possibilities of expanded playing techniques, in the case of Western composers the Japanese sound proves to be interesting.

Finally, the dissertation examines the role of *hichiriki* in popular music. I introduce *hichiriki* artist Hideki Tōgi, who, after leaving the *gagaku* orchestra of the Japanese imperial court, founded his own ensemble and started popularizing the *hichiriki* and *gagaku*. It is mainly due his efforts that every Japanese today knows what sort of instrument the *hichiriki* actually is. I collect a number of examples of the presence of *hichiriki* in popular music, film scores, and theater accompanying music.

Thus, in summary, in the second half of the dissertation, I demonstrate that the *hichiriki*, having had an unchanged tradition for more than a thousand years, where only a single manner of play and a single type of music existed, is very much alive and flourishes, has a new body of literature and its manner of play has been expanded by several new techniques. Composers and performers inspire each other, new pieces are written and new possibilities open up before the *hichiriki*. It is beyond doubt, that we were witnesses to a great rebirth at the turn of the 21st century, which process has still not ended by this day.