

The Music of Mechanical Instruments

Dr Helmut Kowar offers some remarks on the research project of the Phonogrammarchiv of the Austrian Academy of Sciences in Vienna. This is an edited version of his address to the Musical Box Society International in Chicago on August 30th, 1996, and specially illustrated for The Music Box with pictures from Dr Kowar's archives.

It is interesting to reflect upon the extent to which mechanical instruments have been ignored by musicological research even though quite a number of facts concerning music history, performance practice, organology, repertoire, and even ethnomusicology can be discovered through with them. This information would add considerably to the knowledge of music.

This almost complete absence of scholarly interest in mechanical instruments as a historical source is partly explained by their eventual degeneration into the category of mere playthings which would never be considered suitable for serious scientific examination. Another reason is that these mechanical instruments are rare objects, often hidden in museums and private collections and therefore are not easily accessible to any but the most serious investigators. Many instruments are also in need of restoration and their poor condition renders any musical performance rather unpleasant to listen to.

All of the above facts help to explain the lamentable lack of attention which these instruments have received. It is, however, necessary to point out that mechanical instruments represent the only historical source for learning something about past musical repertoire as it was played privately in the home. No publisher's catalogue and no reports about the pieces played in public concerts can really tell us which music was popular and when. Only the barrels of the musical boxes or mechanical organs, the rolls and discs collected by their owners can tell us which music people liked to hear.

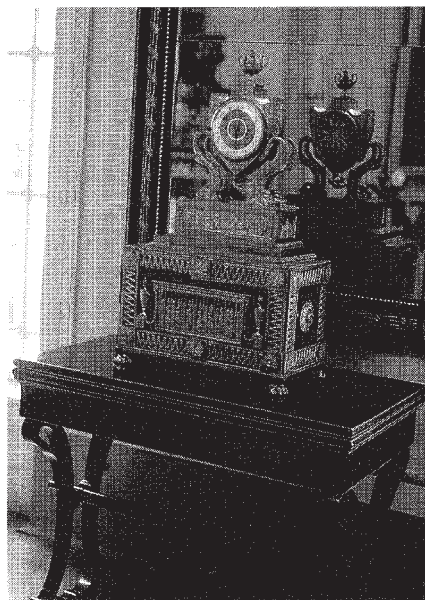
One special interest of the research project of the Phonogrammarchiv of the Austrian Academy of Sciences has been in repertoire and particularly in the discovering of mechanical instruments which play ethnomusicological material.

It has emerged from contemporary literature and from the tune lists of various manufacturers that there existed quite a number of tunes from various exotic traditions, Arabian, Indian, Chinese etc. on musical boxes, barrel organs or orchestrions.

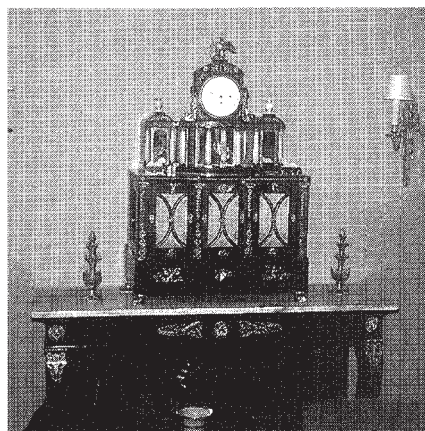
Also various folk music traditions can be found recorded for playback on mechanical instruments. Collecting this kind of music is intended to provide valuable material for the future of ethnomusicological research, as in most cases this is the only source of musical sound proceeding the invention of the Edison phonograph and the fieldwork and recording of music for.

Another important fact is that mechanical instruments keep on their barrels, discs and so forth important

information about how music was played, its articulation, how and where, for example, to execute grace notes and other forms of ornamentation. This information in this form has been fixed permanently to the time of its original performance and has remained un-



Flute-clock, probably made by Peter Rau, Vienna ca 1800, playing original music by J. Haydn (Geymüller Schlößl, Museum for Applied Arts, Vienna), photo by the author.



Flute-clock by Ludwig Boltzmann, Vienna ca 1820 or earlier with two barrels each playing 8 tunes (private collection, Vienna), photo by the author.

altered by fluctuations in taste.

For the research project, this indicates not only the importance of obtaining transcriptions of the music on the barrels and its identification (which are sufficient to answer questions about

repertoire) but also we need the actual performance. The sound itself must be preserved and documented as a unique dimension of mechanical instruments. Additionally, these recordings provide an interest for investigations in sound characteristics through the spectral analysis of these instruments (a kind of research which is quite common with regular, hand-played instruments). In spite of the fact that written music cannot give us that kind of information, mechanical instruments are often regarded as of marginal importance and a systematic approach to the field of mechanical music has yet to be developed.

It was with this situation in mind that the Phonogrammarchiv of the Austrian Academy of Sciences started in 1980 a research project documenting and recording mechanical instruments.¹ To begin with, the main idea was to make sound recordings of mechanical instruments in order to preserve and collect this unknown musical repertoire and in doing so make possible further musicological investigations.

In the first years of the project, its main task was to find and develop an adequate method of recording mechanical instruments. This aspect alone could be a subject for a separate paper.

The project began with the documentation of mechanical instruments in public collections in Vienna. These activities were then extended through visits to public and private collections in Switzerland, France, Slovakia and Hungary. With increasing experience and knowledge, the project became more than just collecting mechanical music. Quite a number of different and specific interests and favourable consequences turned up, some of which represent aspects which have already influenced the course of the project.

The documentation of the instruments recorded represents quantity of data concerning the history of the instruments and their manufacturers. Serial numbers, production numbers, scale numbers, inscriptions, signatures - all were essential for identification and dating of the instruments and for clarifying the development of different types of instruments. It was necessary in many cases to dismantle the instruments to obtain these data. Also photographs were taken of the instruments and references of published documentation recorded.

Thus far the work done has been accepted as useful by collectors and researchers. In the course of the project more and more people became acquainted with its purpose and provided additional information, through which it has been possible to find unknown

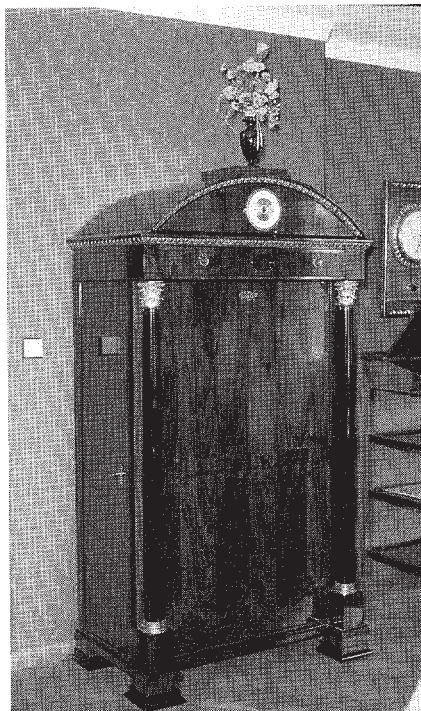
instruments and collections or other researchers who are specialists in the field of automata.

Museums, custodians and collectors who come into contact with this research project learn about the importance of the pieces they keep. As a result they often feel encouraged to start restoration or repair of their instruments, or to emphasise the description and cataloguing of their musical holdings. For example when dealing with musical clocks, I noticed that owners of mechanical instruments became more interested in the history of the instruments or in the music, and even became active collecting further objects. This project helps to create a consciousness of the value of mechanical instruments as a part of wider cultural heritage.

With the help of the sound recording, the music of the instruments is preserved and available on demand. It is no longer necessary to use the instrument itself for further investigation of the music or for demonstration. Recording music has therefore become a means of caring for and preserving the instruments. This is important, especially for public collections which are not usually specialised in the field of mechanical music and where a well trained staff skilled in the maintenance of the instruments is not available. A sound recording also makes it possible for visitors to hear the music played on these instruments without the risk of incurring expensive and possible irreparable damage to them.

The project brought to light the fact that, in the 19th century, Vienna and Prague were important centres of manufacturing mechanical instruments. We discovered the following different kinds of mechanical instruments which were made in Vienna:

1. The barrel organs which were used by the organ grinders, a tradition which started after the end of the Seven Years' War in 1763 when Empress Maria Theresia gave licenses to the disabled veterans in order to help them to earn money.

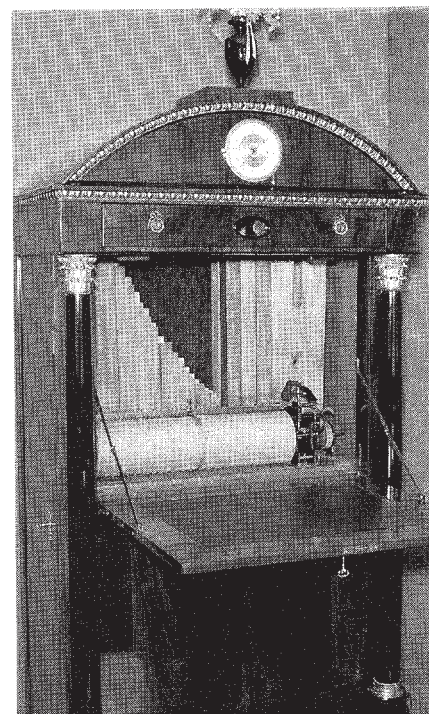


Flute-clock, probably by Johann Adam Hoyer, Vienna ca 1820 (private collection, Vienna), photo by the owner.

2. The manufacturing of flute playing clocks
3. The making of musical boxes
4. The making of orchestrions at the end of 19th century by Hofmann & Czerny and several other smaller firms.

As an example of the work so far carried out I would like to draw attention to the history of flute playing clocks in Vienna, one of the subjects of the research project.

In the upper classes of Viennese society, mechanical music began to play an important part at the end of 18th century. Reports about the first Viennese clocks with small pipe organs (flute clocks) are linked to the composers Joseph Haydn and Wolfgang A. Mozart. This makes it clear that the manufacture of the first flute clocks made in Vienna



dates from around 1790.

Haydn's compositions for clocks with flute organs (the earliest of these clock-organs is dated 1789) were written for the clocks of one of his students, the librarian at the court of Count Esterházy and gamba player Pater Primitivus Niemecz. Niemecz's mechanical clocks are documented for the years 1792-1793, although he may have constructed another one as early as 1789.

Earlier it was believed that the first known Niemecz/Haydn clock was made in 1772, but that has now been discounted. Niemecz is said also to have made other mechanical instruments such as a chair which played a tune when a person sat down on it, and a musical spinning wheel. Descriptions from 1784 and 1786 state that both of these objects were in the Palace of Esterháza (today Fertod in Hungary)². Haydn also wrote and arranged works for other musical clocks.

Apparently Niemecz's clocks acquired quite a good reputation, since one that he constructed with the help of the Viennese instrument maker Walter was sold to England.³

In the period from December 1790 until May 1791, Mozart composed five pieces for a mechanical flute organ. Two of the pieces were no more than fragments or sketches of a few bars. These compositions were most probably destined for the so-called 'Müllersches Kunstkabinett', a kind of wax museum founded by Duke Josef Deym von Stritz (under the pseudonym Müller) which was expanded after 1780.

Mozart's music was supposed to be the acoustic expression of a scene called 'Laudon's Grave' and of another one called 'The Bedroom of the Three Graces'. These scenes represented the nucleus of Müller's collection and consisted of life-sized wax figures as well as a rich variety of furnishings. The trained wax sculp-



Sofa with automatic organ (flute-clock) by Johann Christian Heinrich, Vienna after 1817 (Geymüller Schlöbl, Museum for Applied Arts, Vienna), photo by the author.

tor's collection was an odd assortment of wax figures representing famous contemporaries, original statues and plaster copies of classical works, paintings, drawings, arts and crafts, mechanical robots, musical clocks and other 'curiosities'. It was one of the major attractions of its day in Vienna, and even Beethoven, who was a friend of the family and the music teacher of Duchess Deym, probably wrote three pieces for the collection's mechanical organ in 1799. Unfortunately no composition for mechanical organ by Mozart has been preserved on an original barrel.⁴

That composers such as Haydn, Mozart and Beethoven wrote works for mechanical organs proves that they were acquainted with the potential and characteristics of these instruments. They not only knew how to pin the broadly-set chords, ornamental trill combinations and polyphonic passages of these instruments to good advantage but also indicated how the pieces could be shortened or even lengthened so as to fit the cylinders of the mechanical clocks.

The rest of the repertoire consisted of arrangements of opera overtures and arias as well as dances. Haydn's symphonies and chamber music and Mozart's operas were popular sources of music for the cylinders of these mechanical works. Besides such established works there were also numerous tunes by other, lesser composers who are totally unknown today. Not unexpectedly, the ballroom was represented on the barrels as well. Polonaises, *Ländler*, Scottish dances and similar dances by various composers were included in the programme.

As an example of the programme commonly found, let us look at a flute clock by Ludwig Bolzmann (private collection, Vienna) probably made around 1820 or some years before. This has two barrels and plays sixteen tunes, eight tunes on each barrel. The programme sheds some light on the music which was popular in Vienna at that time:

Cylinder 1 plays:

Menuett from *Don Giovanni* (Mozart)
an Andante by Mozart

an Aria from his *Magic Flute*

the Polonaise from the opera *Die Schatzgräber* by Johann Schenk (1780)
a waltz

Alexander Quadrille and *Alexander March* (probably very popular compositions made in honour of the Emperor Alexander of Russia who attended the Viennese congress in 1815)
Scottish dances (*Eccosaises*)

Cylinder 2 plays:

Andante and Allegro from *Don Giovanni* (Mozart)

Polonaise from the opera *Sargino* by Paer (1803)

Ballet from *Zephir and Flora* by Wranitzky (1786)

March from *La Vestale* by Spontini (1807)

Duet from *Aline*, probably by Wenzel Müller



Laudon's grave in the "Müller'sches Kunstkabinett" in Vienna (O. E. Deutsch *Musikalische Kuckuckseier und andere Wiener Musikgeschichte*, Wien-München s.a. pl.8.)

a tune from the ballet *Nina*, composer not identified

Chorus from *Jean de Paris* by Boieldieu

An indication of the popularity of Boieldieu's little-known opera *Jean de Paris* can be seen from its inclusion in the repertoire of a number of the surviving mechanical flute-organs.⁵ This work was first performed in the *opéra comique* in Paris in 1812 and was presented in Vienna in the same year, with great success, but it has since been completely forgotten.

With another flute clock, I also found a barrel bearing a label inscribed *Overture to the Magic Flute*, but the music turned out not to be the well known music by Mozart. Most probably it is the overture to the 'travesty of the *Magic Flute*' composed by Wenzel Müller and performed 1818 at the Leopoldstädter Theater in Vienna. At that time it was a common practice in Vienna to write parodies of famous operas, full of jokes, changing the original story by placing it in Vienna and so forth. This was the case with the travesty of *The Magic Flute* by the theater-Kapellmeister Müller. The piece is reported to have been a great success and it played for several weeks. Then it disappeared.

The music of this opera parody was never printed - which was usual with

such compositions since the musicians played from hand written notes and this material is obviously lost. At that time, nobody thought of keeping the music of a short-lived success of one season, so I could not find it in the libraries and archives. But the overture was put on a barrel, which now represents the only source for this composition.⁶

Not only can we find the latest successful operas on the barrels, but the development of popular dance music is also well documented on the cylinders of the flute clocks. If we look at the barrels of different flute clocks we can see that the older dances were replaced in popularity by the quadrilles and waltzes of Lanner and Strauss. It was also common to unite the most popular tunes in a long medley.⁷

According to contemporary sources, mechanical organs and flute-clocks spread beyond the framework of private *divertissements* of the aristocracy and the wealthy bourgeoisie. In spite of the fact that the larger instruments with more tones [a broader scale] and registers (known as mutations) [stops] were extremely expensive, such mechanical organs served as public entertainment in Vienna's inns and pubs.

Beethoven was a customer in one restaurant next to the Josefstädter Theater, where the mechanical organ

played Cherubini's overture to *Medea*, Beethoven's Terzet from his opera *Fidelio*, the overture to *Fidelio* and a movement from his fourth symphony. It is recorded that Beethoven liked to listen to the music of this flute clock: his favourite work was the overture to *Medea* and he also enjoyed his *Fidelio* overture, because, as he said, the flute clock performed the overture more accurately and better than the orchestra in the opera house. In a different inn, Beethoven's overture to *Die Geschöpfe des Prometheus* was on the programme of the flute clock. A mechanical organ built into a desk, preserved in Vienna's Technical museum plays Beethoven's *Egmont* overture.

Franz Schubert's popularity was also demonstrated by the adaptation of his works for mechanical organs. An inn in the Himmelpfortgasse in the town centre is reported to have had an organ that played several of his compositions, and Ferdinand Schubert writes in a letter of 3 July 1824 that he heard a mechanical organ in the inn *Zur ungarischen Krone*, which played several of his brother's waltzes. It is also reported that a hairdresser in Prague had a flute clock in his shop in order to entertain his clients with melodies from well-known operas.⁸

The most comprehensive contemporary report on Viennese flute clocks is found in the *Darstellung des Fabriks- und Gewerbewesens im österreichischen Kaiserstaate* ('Description of the manufactures in the Imperial Austrian State') by Stephan Keess from 1823. Here we read that flute clocks had been in use in Vienna for 20 or 30 years. He records that the small instruments have at least 46 pipes (this is not quite true: I know several instruments which have fewer pipes), while large instruments have up to 140 pipes. Every instrument is equipped with six barrels normally, and the barrel makes up to seven revolutions, so a maximum playing time of five to eight minutes can be achieved.

The mechanical organ was built into almost every kind of furniture including writing desks, secretaires, wardrobes, and sofas. From this report we learn that as early as the 1820s not only were clocks equipped with flute organs, but that mechanical music had become a sophisticated entertainment in the homes of the wealthy. Imagine writing a letter at a secretaire which plays your favourite tunes, think of a lady doing her hair in front of a musical mirror, and what a surprise for visitors sitting down on a sofa which suddenly plays music!¹⁰

Keess says in his report, that in Vienna important improvements were made, especially in the construction of the pipes. These were square and wooden but later with a round cut-up for the mouth instead of the rectangular cut up, which was used earlier. Keess also states that Vienna was the only place in the Austrian state where flute clocks were made, and that many of these instruments were sold to the provinces of the Austrian empire. Numerous flute clocks were also sold to Constantinople and to other cities of the Turkish Empire, to Bucharest and Jassy (Romania).

Keess writes: 'Recently Hoss (a well known manufacturer) also sent instru-

ments to Paris, Naples, St. Petersburg, Dresden, Frankfurt and other places, which proves the perfection of his organ works'.¹¹

I would like to comment on this enthusiastic report of Keess. One has to admit that Vienna was indeed an outstanding centre for the manufacturing of flute clocks. For the period between 1803 and 1855 I found 49 makers of flute clocks in Vienna, not taking into account Niemez, who obviously did not make flute clocks on a commercial basis, nor Strasser in Baden near Vienna who went to the Russian Court in 1795. Also omitted are organ and pianoforte makers like Anton Walter or Johann Joseph Wiest who made mechanical organs as a side line of their business.

In the years before 1803 it is particularly difficult to identify makers of flute clocks because the manufacturers of organs or clocks had not yet specialised in making clocks with mechanical organs and no differentiation of the manufacturers is given in the registers at this time.¹² Before 1803 it is only possible to identify the makers by signed instruments, announcements and reports in newspapers, descriptions, letters and itineraries. Another difficulty is that most of the flute clocks were not signed by their makers. However, since the manufacturers obviously made series of similar flute clocks, with the help of one signed instrument at least an assumption about who the maker of an unsigned specimen might be becomes possible.

By the 1850s and 1860s, the manufacturing of mechanical organs of the Viennese flute clock type had begun to decline and seems to have come to an end in the 'seventies. It is noteworthy that up to the end of the manufacturing period no technological development occurred. The conception and the construction never changed, the manufacturers stuck to the principle of the pure flute-organ, and added no other instruments.¹³ In the course of the first half of 19th century the instruments became bigger and the clock itself was left aside. The famous waltzes of Strauss were pinned onto the barrels for this kind of instrument the same way as the pieces by Haydn decades earlier.

This is the present state of research. As there remain more sources and other records in the archives not yet systematically investigated I can give here only a provisional picture of the situation and the development of the flute-clock in Vienna.

FOOTNOTES

¹ Helmut Kowar: *Zur Aufnahme von Tondokumenten aus der Sammlung für mechanische Musikinstrumente des Technischen Museums für Industrie und Gewerbe in Wien. Studien zur Musikwissenschaft* 31, Tutzing 1980 p.195-210.

² *Beschreibung des Hochfürstlichen Schlosses Esterházy im Königreiche Ungern*, Pressburg 1784 p.17, 21; Johann Matthias Korabinsky, *Geographisch-historisches und Produkten-Lexikon von Ungarn*, Pressburg 1786, 'Esterhaza'.

³ See for example: Arthur W. J. G. Ord-Hume, *J. Haydn and the mechanical organ*, Cardiff 1982; E. F. Schmid, *J. Haydn und*

die Flötenuhr, Zeitschrift für Musikwissenschaft 14 (1931/32) p.193ff., Sonja Gerlach and Georg R. Hill, *Vorwort und Kritischer Bericht zu Joseph Haydn, Stücke für das Laufwerk (Flötenuhrstücke)* München 1984 (Joseph Haydn Werke, Volume 21); Ernst Simon, *Mechanische Musikinstrumente früherer Zeiten und ihre Musik*, Wiesbaden 1960.

⁴ For literature and detailed discussion see Helmut Kowar, *Mozart und die mechanische Musik*, in: 'Mozarts Klangwelt, Katalog zu Ausstellung', Kunsthistorisches Museum Vienna 1991, pp.122-131, English version: *Mozart and mechanical music*, in: 'Mechanical Music', Journal of the MBSI 1992 Vol. 38/1 p.26-30; Martin Haselböck, *Mozart und die Orgel*, in: 'Mozarts Kirchenmusik'. Tagungsberichte der katholischen Akademie der Erzdiözese Freiburg, edit. by Harald Schützeichel, Freiburg i.Br. 1992, pp. 37-51.

⁵ Flute-clock, Technical Museum Vienna, inv. no: 22597 with two barrels: overture and the aria 'Reise-Lust' from *Jean de Paris*; three flute-clocks in the Musikinstrumenten-Museum of the Karl-Marx-Universität Leipzig, each playing one or two pieces from *Jean de Paris* (see Simon *op.cit.* p.27ff).

⁶ Helmut Kowar: *Mechanische Musik des Wiener Biedermeier*. 'Tondokumente aus dem Phonogrammarchiv der Österreichischen Akademie der Wissenschaften' edit. by Dietrich Schüller, PHA LP1, Vienna, 1988.

⁷ Two flute-clocks in the Technical Museum Vienna play such potpourris: one barrel plays *Waltz-melodies by Strauss 1836*, the other barrel is labelled *New waltzes by Strauss and Lanner 1832*.

⁸ See Otto Erich Deutsch: *Schubert und Beethoven auf der Walze*, in: O. E. Deutsch, 'Musikalische Kuckuckseier und andere Wiener Musikgeschichten,' Vienna s.a. p. 77ff.

⁹ Stephan von Keess, *Darstellung des Fabriks- und Gewerbewesens im österreichischen Kaiserstaate*, Vienna 1823, vol. 2, p.175ff.

¹⁰ Secretaires with a clock in the upper part and a built-in organ were very common. A musical mirror is preserved in the collection of Musikautomatenmuseum Seewen, Schweizerisches Landesmuseum, a sofa with flute-clock by H. Chr. Heinrich is part of the collection in the Geymüller-Schlössl, Museum for Applied Arts, Vienna.

¹¹ Keess *op. cit.* p.179.

¹² See the relevant years of commercial schemata, address books &c of Vienna, published by A. Redl, A. Ziegler, F. B. Fray, F. Haller, E. Lehmann, V. F. Gottfried, E. Pernold, Gerold, J. B. Schilling or by some other official societies. Some indications are given by: Helmut Ottner, *Der Wiener Instrumentenbau 1815-1833*, Tutzing 1977; Helga Haupt, *Wiener Instrumentenbau um 1800*, Diss. Vienna 1953 (published also as: *Wiener Instrumentenbauer von 1791 bis 1815*, 'Studien zur Musikwissenschaft' 24, Graz 1960 p.120ff.

¹³ One exception we may find in one large automatic organ from Vienna (manufacturer unknown) which incorporates also one rank of side-blown flutes (made by Koch, Vienna) but still resembling the type of the flute-clock (Heinrich Weiss-Stauffacher, Rudolf Bruhin, *Mechanische Musikinstrumente und Musikautomaten*, Seewen-Basel 1973 p.141). ■